Environmental Statement

Land at Lower Berse Farm, Wrexham

On behalf of Redrow Homes Ltd

July 2024

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1 Introduction

1.1 Introduction

1.1.1 This document in an Environmental Statement (ES) prepared in support of a planning application for the residential-led development of a site at Lower Berse Farm in Wrexham, and seeks to evaluate the potentially significant environmental effects of the project and identify measures by which these could be avoided, reduced or offset. The planning application was submitted on behalf of Redrow Homes Ltd (hereafter referred to as 'the applicant'), a specialist housebuilder operating across the UK.

1.1.2 This production of this ES has been co-ordinated by Christopher Peacock of Pea Green Ltd. He holds a Masters Degree in Environmental Impact Assessment and Management, is a Chartered Environmentalist, a Full Member of the Institute for Environmental Management and Assessment (IEMA) and an IEMA Principal EIA Practitioner with 19 years of professional experience in the co-ordination of EIAs. The component technical chapters of this ES have been prepared by various specialist consultants, and statements of compentancy are provided in the introductions to each chapter.

1.2 Regulatory Context for the Submission of Further Information in Respect of the Environmental Statement

1.2.1 This ES wholly replaces the version originally submitted with the planning application in August 2023, and has been updated to take account of changes made to the proposed development in response to consultation with statutory consultees during the determination period and to reflect the updated planning policy context, given the adoption of Planning Policy Wales 12 and the Wrexham Local Development Plan.

1.2.2 This replacement ES is therefore submitted in accordance with the requirements of Section 24 of the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, which covers the submission of 'Further information and evidence in respect of environmental statements'.

1.2.3 We politely direct the Local Planning Authority to the publicity and consultation requirements set out Section 24, Parts 3, 4 and 5 of the EIA Regulations. These Parts place a stutory duty upon the recipient of the further to send copies of the ES to all parties consulted on the original application and to publish notices by local advertisement.

1.2.4 We also note the obligation set out in Part 7 of Section 24 of the EIA Regulations, which requires the recipient of further information to suspend determination of the planning application for 30 days from the date at which the further information is sent to all persons consulted on the original application and the date on which notices are

published. The applicant kindly requests that the mandatory actions are commenced at the ealiest convenience of the Local Planning Authority.

1.3 The Site

1.3.1 The site comprises 72.85ha of agricultural land at Lower Berse Farm on the western edge of Wrexham. The site is located to the south of Ruthin Road and the east of the A483. To the south, the site abuts Bersham Road and on its' eastern boundary the site abuts the existing development along Homestead Lane, which comprises playing fields, Ysgol Clywedog, and residential development.

1.3.2 The application boundary is shown in red on an aerial photograph of the site in Figure 1.1, below.



Figure 1.1: Aerial Photo of the Site

1.4 The Proposed Development

1.4.1 The proposals to which this ES relate are for up to 1,450 homes, a mixed-use local centre, a primary school, and associated infrastructure, access, open space and landscaping. The proposals have been developed in accordance with adopted planning policies for the site and have been informed by a wide range of survey and environmental assessment. The plans seek to meet identified local housing needs, whilst avoiding impacts on the environment wherever possible. Full details of the proposed development are presented in Chapter 4 of this ES.

1.5 Planning Context

1.5.1 The current adopted development plan is the Wrexham Local Development Plan (LDP), in which the site is identified as a site for a residential-led mixed-use scheme for at least 1,500 homes. The adopted LDP policy removed most of the site from Green Barrier and Special Landscape Area deisgnations and established the principle of development at the site. A section of the site, adjacent to the southern boundary, remains within the Green Wedge.

1.6 Structure of the Environmental Statement

1.6.1 This ES presents the findings of the Environmental Impact Assessment (EIA) carried out in respect of the proposed development for which planning permission is sought. The development is defined by the description of the development presented above and a series of plans and drawings that are reproduced in this ES. Further details on these assessment parameters and the approach taken to the EIA is presented in Chapter 2: Approach.

1.6.2 The Environmental Statement comprises the following component parts:

- **Environmental Statement** - This volume contains the main body of text of the ES, split into chapters and illustrated with a series of figures. Each chapter contains the following: an introduction, the approach to assessment, a description of the proposed development, a review of relevant planning policy, a technical assessment relating to a specific environmental topic, including cumulative and combined effects, and a summary of the residual effects taking into account any mitigation measures proposed.
- **Appendices** – This volume contains supporting information and a collection of technical reports upon which the conclusions of the ES are based.
- **Non-Technical Summary (NTS)** – A document providing a synopsis of the ES without using technical language or terminology. The summary includes a description of the development, a summary of the potential environmental effects of the development and an explanation of the measures proposed to mitigate these impacts.

1.6.3 The ES and all planning documents can be viewed at Wrexham CBC's planning access website. Paper copies can be obtained at cost price from Redrow Homes Ltd or Pea Green Ltd.

2 Approach

2.1 Introduction

2.1.1 This chapter describes the methodology used to undertake the EIA in accordance with the The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017[1] (The 'EIA Regulations) and best practice guidance.

2.1.2 The chapter begins with a description of the general approach to assessment and EIA regulatory compliance, including how the planning application and EIA are linked. EIA procedure and methodology is presented, then the stakeholder consultation process is explained, before the spatial and temporal scope of the assessment is discussed.

2.1.3 Following this, the criteria used for impact prediction, assessing significance and implementing and securing mitigation measures are explained, along with any limitations and assumptions. With regard to the methodologies and assumptions for the technical assessments, each chapter has its own specific assessment methodology and assumptions, which are explained within the relevant sections.

2.2 EIA Regulations and Guidance

2.2.1 The EIA Regulations were transposed into UK law from the EU's 2011 EIA Directive[2] and provide the regulatory framework for the completion of EIAs for development projects in Wales. The EIA Regulations are supplemented by guidance published by the Welsh Giovernment[3], which provides additional advice on the EIA process and the collation of Environmental Statements.

2.2.2 The UK is no longer a member of the European Union. EU legislation as it applied to the UK on 31 December 2020 is now a part of UK domestic legislation, under the control of the UK's Parliaments and Assemblies. The European Union (Withdrawal) Act 2018 introduced "retained EU law" which provides that EU-derived domestic legislation continues to have effect after Exit Day.

2.2.3 In addition to these statutory documents, the various component assessments of the EIA process are informed by a series of best practice and industry recognised guidance. The guidance followed is explained within each technical chapter of the ES and compliance with such guidance ensures that the EIA process is recognisable and robust.

[1] The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations, SI 2017 / 567 (W. 136)
[2] Environmental Impact Assessment (EIA) Directive (2011/92/EU as amended by 2014/52/EU)
[3] Environmental impact assessment: guidance | GOV.WALES

2.3 Establishing the Need and Scope for the EIA

Screening

2.3.1 Regulation 5 of the EIA Regulations makes provision for a developer to request a 'Screening Opinion' from the Local Planning Authority (LPA) to ascertain whether an EIA is required in circumstances where a development is classed as a Schedule 2 development. This decision is based on the likelihood of significant environmental effects arising in relation to the development proposals.

2.3.2 The applicant accepted that the development is of a size and scale such that there is the potential for significant environmental effects to arise, falling within category 10(b) of Schedule 2 of the EIA Regulations and exceeding 0.5 ha in area and more than 150 dwellings. Therefore, in order to provide a comprehensive analysis of the development proposals, the applicant decided to progress with an EIA voluntarily and a screening opinion was not sought. The EIA Regulations state that a planning application submitted with an ES (regardless of whether a screening opinion was issued by a local planning authority) is EIA development and must be treated as such during the determination of that planning application.

Scoping

2.3.3 Scoping is a process that, through research and consultation, identifies the environmental issues that require assessment as part of an EIA.

2.3.4 In accordance with Regulation 15 of the EIA Regulations, a formal request for a Scoping Opinion was made by The Planning Consultancy on 5th May 2021. An EIA Scoping Opinion was issued by Wrexham CBC on 19th July 2021, a copy of which is included in as Appendix 2.1. Based on the Scoping Opinion, the following technical assessments were 'scoped in' to the EIA:

- Archaeology and Heritage
- Ground Conditions (Comprising assessment of Soils and Minerals)
- Drainage

2.3.5 Further to this, the applicant voluntarily included the following additional assessments within the EIA based on the potential for significant effects identified through the survey and design process:

- Landscape and Visual
- Ecology

2.3.6 Although scoped out of the EIA on the basis that impacts were unlikey to be significant, reports have been prepared and submitted with the planning application outside of this ES in relation to the following:

- Flood Risk
- Transport
- Air Quality
- Noise
- Odour

2.3.7 These freestanding reports confirm that the potential impacts in these ares would not be significant and the decision to omit them from the EIA process was appropriate and reasonable.

2.3.8 A scoping review undertaken by Pea Green Ltd also concluded that the EIA did not need to include specific assessments in relation to population and human health, wind, daylight, sunlight and overshadowing, accidents and disasters, climate change (although this is factored into other assessments where relevant) and lighting because of the limited potential for environmental effects. The scoping process followed ensures compliance with the requirements of Schedule 4, Part 8 of the EIA Regulations.

2.4 Overarching EIA Methodology

Assessment Parameters and Detailed Plans

2.4.1 The planning application has been prepared and submitted in outline with all matters reserved for future determination except means of access.

2.4.2 For the detailed access arrangements, the assessment is based on the detailed plans and drawings that are submitted for approval.

2.4.3 For the outline elements of the application, the assessment is based upon a series of assumptions and design principles that have been encapsulated in a set of assessment parameters and summarised in Chapter 4: The Proposed Development.

2.4.4 As a result of a legal case associated with Rochdale Metropolitan Borough Council, the 'Rochdale Envelope Principle' is a well-established way of dealing with uncertainty in preparing and assessing development projects, proposed through outline applications where full details of the development project are not available. It seeks to ensure that a proposed scheme is reasonably representative of the eventual development and has sufficient detail to identify, predict and assess the significance of any potential environmental impacts.

2.4.5 This approach is based on a precautionary, realistic worst-case scenario(s) which then feeds through into any necessary mitigation measures identified. Guidance on the Rochdale Envelope for the EIA has been based on the Planning Inspectorate Advice Note Nine: Rochdale Envelope which sets out the approach, and case law which sets a precedent that

outline planning permission should be based on a realistic worst-case approach and that EIA should be consistent with the defined parameters in the application to ensure a robust assessment of the likely significant effects.

2.4.6 In order to meet these requirements, the applicant invites the Local Planning Authority to impose planning conditions aimed at securing consistency between the development parameters assessed as part of the EIA and any subsequent applications for the approval of reserved matters. This is to ensure that the detail of the proposed development is progressed in accordance with the development parameters established by the outline elements of the application and on which the EIA has been based.

Indicative Plans

2.4.7 The outline application is supported by plans and documents that are indicative in nature but with which broad compliance is expected to be a condition of any planning permission. These include the illustrative masterplan and the Design and Access Statement.

2.4.8 The illustrative information provides additional context to the development and has been acknowledged in undertaking the EIA, particularly where more detail is required to complete a meaningful assessment. However, the assessment of impacts for the outline element is based predominantly on the parameters defined in Chapter 4: The Proposed Development. This enables a permission to be granted based upon an assessment of a robust, worst-case scenario.

Spatial and Temporal Scope of Assessment

2.4.9 The spatial extent of the EIA is determined by the geographical area potentially affected by the proposed development. It takes into account the physical extent of the proposed development, defined by the limits of land to be used both during construction and operation (temporary and permanent); the position of sensitive receptors within or outside of the site boundary; and the nature of the baseline environment.

2.4.10 The effects for each of the environmental topics/disciplines are likely to extend to different spatial extents; for example, visual effects may extend to a much wider study area than the effects on trees or below ground archaeology. The spatial scope or study area for each environmental topic/discipline is described within each of the technical assessment chapters, as required.

2.4.11 The temporal extent of the EIA is defined by the duration of the construction period (approximately 15 years) and the duration of operational activities (around 100 years, essentially permanent).

2.4.12 The decommissioning of the site has not been accounted for in this EIA as it is the lifetime of the development is substantial (assumed to be around 100 years). Furthermore, the materials likely to be used during construction are commonplace and easily repurposed and recycled, meaning that a specific strategy for decommissioning would not be necessary to ensure their

productive reuse. It is also anticipated that the residential use of the site would continue beyond the lifetime of the buildings proposed. Therefore, a restoration plan to return the site to it's existing condition is not required. There are also no hazardous operations or processes involved in the proposed development that would necessitate a decommissioning strategy to safely dispose of any residues or wastes.

2.4.13 For some technical assessments, the periods assessed are reflective of industry standard approaches, such as considering visual effects after 15 years to allow for maturation of vegetation. Where other timescales are employed in the assessments, they are explained and justified within the Approach sections of the technical chapters.

Defining The Site of the Proposed Development.

2.4.14 Schedule 4, Part 1(a) of the EIA Regulations requires that an ES includes 'a description of the location of the development'. Accordingly, a description of the site and the prevailing environmental conditions is presented at Chapter 3.

Description of the Development

2.4.15 Schedule 4, Part 1 of the EIA Regulations outlines the information that should be provided within an ES. This includes in particular:

> *b) a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases*
>
> *c) a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used.*

2.4.16 Chapter 4 of this ES provides a detailed description of these aspects of the proposed development.

Assessment of Alternatives

2.4.17 The EIA Regulation state in Schedule 4, Part 2, that an ES should include:

> *A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*

2.4.18 Chapter 5 of this ES sets out the alternatives considered by the applicant in the development of the proposals for this site. This chapter includes analysis of the no development alternative, which represents the conditions anticipated to prevail in the absence of the proposed development. This analysis is based primarily on professional judgement of likely future conditions based upon knowledge of the existing site and the likely continuing uses in the absence of development.

Procedures upon Submission of an Environmental Statement

2.4.19 The procedures for publicising and consulting on an Environmental Statement submitted with a planning application are set out in Section 18 of the EIA Regulations. This requires the relevant planning authority to send copies to the Welsh Ministers, consultees and persons likely to be affected by, of have an interest in, the application.

Procedures upon Submission of Further Environmental Information

2.4.20 As stated in Chapter 1, this updated ES wholly replaces the ES submitted with the planning application in August 2023. In cases where additional or amended information is submitted in relation to an EIA Application, the requirements of Section 24 of the EIA Regulations apply. Section 24 states that copies of the further information must be sent to all persons consulted in accordance with Section 18, as summarised above, notices must be published by local advertisement, and the application must not be determined for a period of 30 days from the date that the notices are published and/or the further information is send to the consultees.

2.5 Approach to the Technical Assessments

2.5.1 Each technical assessment presented within this ES follows a consistent format wherever possible to ensure that they meet the requirements of the EIA Regulations. The stages of the assessments are set out under the subheadings below.

Identifying the Planning Policy Context

2.5.2 A review of the prevailing planning policy, legislation, strategies or guidance of relevance to the technical discipline.

Defining the Methodology

2.5.3 In accordance with the requirements of Schedule 4, Part 6 of the EIA Regulations, the technical chapters within this ES include:

> *A description of the forecasting methods or evidence, used to identify and assess the significant effects on the environment, including details of difficulties (for example*

technical deficiencies or lack of knowledge) encountered compiling the required information and the main uncertainties involved.

Establishing the Baseline

2.5.4 The EIA Regulations require, at Schedule 4, Part 3, that an ES must include:

A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.

Defining Embedded Mitigation Measures

2.5.5 Measures to mitigate any environmental effects of the proposed development that have been incorporated into the proposals throughout the design evolution are described as 'embedded mitigation'. These are typically enshrined in the proposals through the parameters plans, detailed plans or schedule of development, but may also be referred to where minimum legal standards of conduct or practice are required. These measures do not typically require conditions or planning obligations to secure them as they are already integral to the proposals or required by law and are assessed as if already present in the proposed development in the EIA.

Assessing the Potential Effects

2.5.6 The EIA Regulations state that an ES should include:

A description of the likely significant effects of the development on the environment resulting from, inter alia:

(a) the construction and existence of the development, including, where relevant, demolition works;

(b) the use of natural resources, in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;

(c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances, and the disposal and recovery of waste;

(d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);

(e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;

(f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;

(g) the technologies and the substances used.

The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development.

2.5.7 Accordingly, the EIA has focussed on these aspects where they are relevant to the proposed development within the technical chapters.

2.5.8 Further, Schedule 4, Part 1(d) of the EIA Regulations states that the ES should include:

an estimate, by type and quantity, of expected residues and emissions (such as water, air, soil and subsoil pollution, noise, vibration, light, heat, radiation and quantities and types of waste produced during the construction and operation phases.

2.5.9 Several of the topics listed have been scoped out of the ES but soils are discussed in the Chapter 10: Ground Conditions, Minerals and Soils.

Application of Significance Criteria

2.5.10 The significance of effects is assessed by looking at what the changes will be against the existing or predicted baseline as a result of both the construction and operation of the proposed development. It is a product of the sensitivity of the receptor, and the magnitude of the impact upon it. The specific criteria for each technical assessment are presented within each chapter.

2.5.11 Based on the sensitivity of the receptor and magnitude of the impact, specific significance criteria have been used in each technical assessment and these are explained in the methodology sections within each technical chapter. Typically, these are based on clearly defined criteria from published best practice guidance but where no such guidance exists, criteria have been developed based on consultant experience and applied using professional judgement. Tables 2.1 – 2.3 presents a series of illustrative examples of significance criteria that are applied throughout the ES.

Table 2.1: Illustrative Assessment Criteria for Receptor Value

Value	Description
High	• Feature possessing key characteristics which contribute significantly to the distinctiveness, rarity and character of the site. • Feature possessing very significant biodiversity, social/community value and/or economic value at the national level. • Feature is extremely rare.
Medium	• Feature possessing key characteristics which contribute significantly to the distinctiveness, and character of the site. • Feature possessing significant biodiversity, social/community value and / or economic value at the regional level. • Feature is uncommon.
Low	• Feature possessing characteristics that are locally significant. • Feature not designated or only designated at a regional / local level. • Feature possesses moderate biodiversity, social/community value and / or economic value at the local level. • Feature is relatively common.
Very Low	• Feature characteristics do not make a significant contribution to the character or distinctiveness locally. • Feature not designated. • Feature possesses low biodiversity, social/community value and / or economic value. • Feature is common.

Table 2.2: Illustrative Assessment Criteria for Impact Magnitude

Magnitude	General Impact
High	Significant, permanent loss / irreversible changes, to key characteristics, features or function of an environmental parameter. Impact may occur over a significant area (>50%). Significant Impact certain or likely to occur.
Medium	Damaging significant changes to key characteristics or features or function. over a moderate area (15%-50%). Likely to last for more than 2 years. Impact likely to occur.
Low	Noticeable but not significant changes (temporary / potentially reversible), over a partial area (<15%), to key characteristics or features of an environmental parameter. Impact will possibly occur.
Very Low	Noticeable temporary / reversible, changes for less than 6 months, or barely discernible changes for any length of time, over a small area, to key characteristics or features of an environmental parameter. Impact unlikely to occur.

Table 2.3: Illustrative Impact Significance Matrix

Magnitude	Value and sensitivity of Receptor			
	Very Low	**Low**	**Medium**	**High**
Very Low	Negligible	Negligible	Minor	Minor
Low	Negligible	Minor	Minor	Moderate
Medium	Minor	Minor	Moderate	Major
High	Minor	Moderate	Major	Major

Table 2.5: Illustrative Significance Descriptors

Significance	Generic Significance Ratings
Major	Very large or large change in environmental conditions. Effects, both adverse and beneficial, which are important considerations at a national to regional level because they contribute to achieving national / regional objectives, or, likely to result in exceedance of statutory objectives and/or breaches of legislation.
Moderate	Intermediate change in environmental conditions. Effects that are likely to be important considerations at a district to local level because they contribute to achieving local objectives or may result in exceedance of local statutory objectives and/or breaches of legislation.
Minor	Small change in environmental conditions. These effects may be raised as local issues but are unlikely to be of importance in the decision-making process.
Negligible	No discernible change in environmental conditions. An effect that is likely to have a negligible or neutral influence, irrespective of other effects.

2.5.12 Conclusions on the overall significance of impacts are made based upon the relevant technical guidance for each assessment. Typically, this includes moderate and major impacts (or their equivalent), as shown in grey in Table 2.3, but specific tests may be applied in individual assessments (such as ecology and heritage) to comply with industry standard guidance. Furthermore, professional judgement may be applied in some cases, notably in the assessment of landscape and visual effects, when a moderate or major effect may not be referred to as 'significant' due to other justifiable factors, such as the surrounding development context, planning status of the site or the presence of existing permissions that have already assessed the suitability of the site for development.

Defining Mitigation and Monitoring Requirements

2.5.13 In accordance with the requirements of Schedule 4, Part 7 of the EIA Regulations, the assessments include:

> *A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment and, where appropriate, of any proposed monitoring arrangements (for example the preparation of a post-project analysis). That description should explain the extent, to which*

significant adverse effects on the environment are avoided, prevented, reduced or offset, and should cover both the construction and operational phases.

2.5.14 Where environmental mitigation measures have not been embedded into the proposals through design, it is expected that all other requisite measures will be secured by appropriate planning conditions or obligations. Descriptions of these 'secondary' mitigation measures are included in the technical chapters and summarised in Chapter 13: Summary of Mitigation and Residual Effects.

Identification of the Residual Effects

2.5.15 Residual effects are those that remain once mitigation measures have been taken into account. This section of the chapters identifies these effects and allocates significance criteria to them. These residual effects are also summarised in Chapter 13: Summary of Mitigation and Residual Effects.

Referencing

2.5.16 In accordance with Schedule 4, Part 10 of the EIA Regulations, each technical chapter within the ES includes references detailing the sources used.

2.6 Cumulative Effects

2.6.1 Cumulative effects are assessed in Chapter 12 of this ES. The requirement for a cumulative effects assessment is set out in Schedule 4, Part 5 of the EIA Regulations, which states that an ES should include:

'A description of the likely significant effects of the development on the environment resulting from (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources'

2.6.2 Chapter 12 therefore provides an assessment of the potential cumulative effects of the proposed development in conjunction with effects arising from other developments in the surrounding area. It also provides an assessment of the potential combination of some or all of the effects identified in the EIA on a particular receptor.

2.6.3 The cumulative sites considered in Chapter 12 were identified through a planning history search and consultation with Planning Officers at Wrexham CBC to identify those schemes which are proposed in the local area that have the potential for environmental effects to interact. This process was carried out addition to agreement of the list of 'committed' development schemes as part of the scoping process for the Transport Assessment (which is

submitted as a freestanding report rather than as part of the ES). The schemes identified for inclusion in the cumulative effects assessment are presented in Table 12.1.

2.6.4 In addition to the consideration of effects in combination with other developments, Chapter 12 includes analysis of the possible interaction of effects upon particular sensitive receptors.

2.7 Assumptions and Limitations

2.7.1 The assumptions made in this ES are explained within each technical chapter where they relate to the various technical assessments.

2.7.2 In terms of overall assumptions, the EIA has been progressed on the basis that publicly available records and data accessed to inform the desktop research stages of the technical assessments are accurate and reliable.

3 Site Description

3.1 Introduction

3.1.1 Schedule 4, Part 1 of the EIA Regulations requires that an ES includes 'a description of the location of the development'. This section of the ES identifies the site's location and provides a description of its features and characteristics, particularly those relevant in an environmental context.

3.2 Site Location

3.2.1 The site comprises 72.85 hectares of agricultural land in Bersham, Wrexham. It is positioned to the western side of Wrexham. The national grid reference for the site centre point is SJ31314983, post code LL14 4HP.

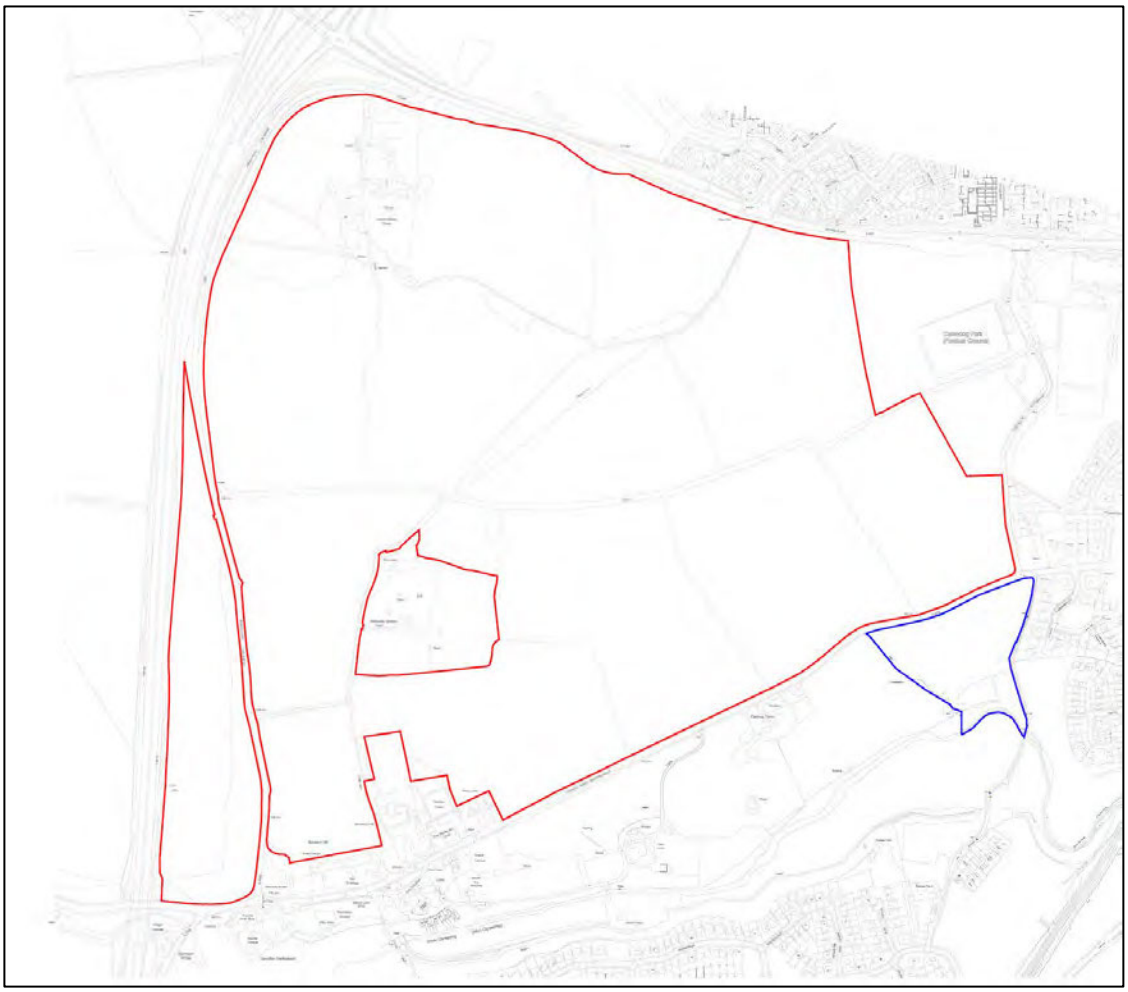


Figure 3.1: Site Location Plan

3.3 Site Description

3.3.1 The site is currently used as agricultural farmland, containing associated farmhouse and barn structures in the northwest and a telecoms mast with anchoring and power substation structures to the south. There is also a residential property north of the telecoms mast, accessed from Berse Lane. Pedestrian and vehicular access can be gained through the farmyard off Berse Road to the north of the site.

3.3.2 The site is bounded by existing road structure; B5098 Berse Lane runs adjacent to the west of the site, A525 Ruthin Road runs along the northern boundary, and B5099 Bersham Road to the south.

3.4 Site History

3.4.1 The site has been in agricultural use for most of its history. A review of Ordnance Survey mapping shows the site has been agricultural land from circa 1872 until today, with two farm buildings: Lower Berse Farm and Bryn-Moel.

3.4.2 Since 1872, there have only been minor changes to the site. A small pond was present in the southeast of the site from 1938. An algal pond has been recorded to the south of Lower Berse farm from 1964. A wireless electricity station was constructed next to Bryn-Moel in 1992.

3.5 Environmental Context

3.5.1 The followings sections detail the current environmental conditions of the site and surround area, identifying important receptors that could be affected by potential environmental effects.

Topography

3.5.2 The topography of the site is slightly variable, with the site at a higher elevation in the west, falling in an easterly direction. Generally, the land falls 20m from the west to the east. Topopgraphy is illustarted on Figure 3.2 below.

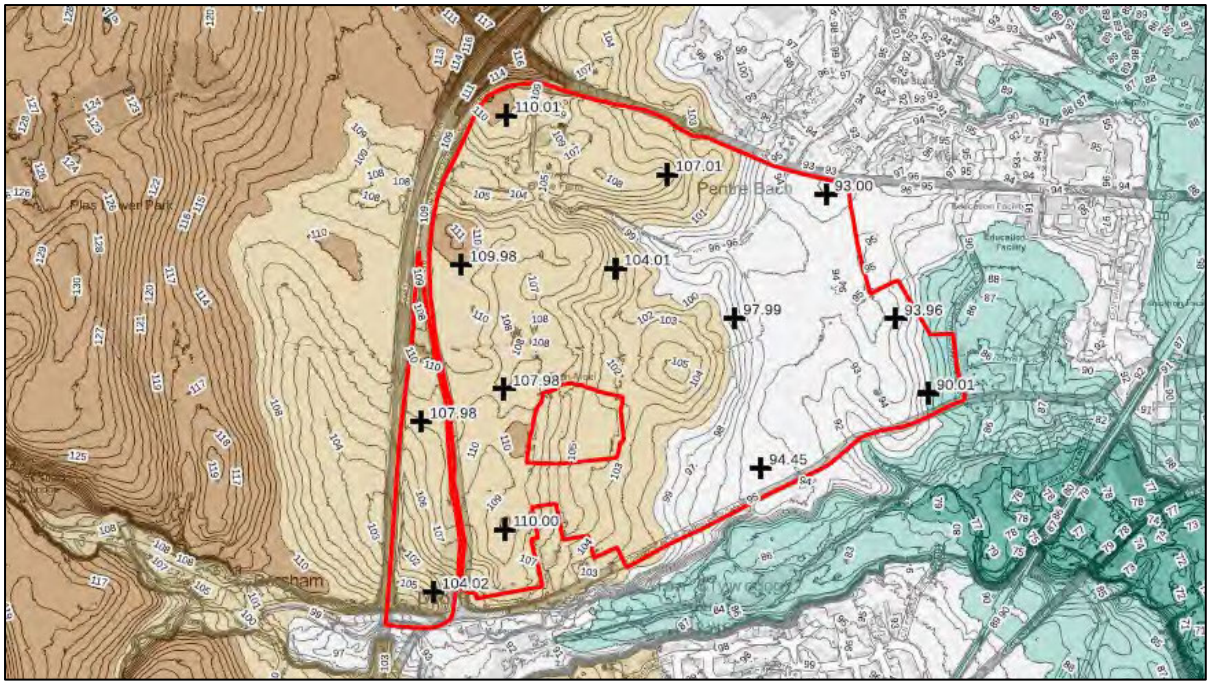


Figure 3.2: Topographical Survey Plan

Landscape

3.5.3 The site is not situated within any areas designated in recognition of their landscape quality or value at the statutory national level (e.g. National Landscapes or National Parks); however, the Clwydian Range and Dee Valley National Landscape lies approximately 3km to the west of the site at its nearest point.

3.5.4 Key landscape characteristics include a watercourse in the north-western part of the site, near to Lower Berse Farm, a wooded corridor with hedgerow and trees running from east to west through the centre of the site, and some evergreen spaces. The wooded corridor is a prominent feature as it sits on a slightly higher ground than the rest of the site. The remainder of the site is medium sized agricultural fields.

Public Rights of Way

3.5.5 There are several public footpath routes providing public access to the site on the existing PRoW network. PRoW Footpath BER/4 follows a diagonal alignment from Ruthin Road, joining PRoW Byway BER/4 near to a residential property at Bryn-moel. PRoW Footpath BER/5 runs northwards from Bersham Road and links with PRoW Byway BER/4. PRoW bridleway BER/3 runs west to east/northeast across the site, turning into PRoW footpath WER/21 for the last section where it joins Homestead Lane.

Ecology And Trees

3.5.6 The site does not contain any areas designated for their ecological value; however, there are four sites of special scientific interest (SSSIs) surrounding area, with the closest to the site being the Gatewen Marsh SSSI which lies 1.3km to the north. The Johnstown Newt Sites Special Area of Conservation (SACs) lies approximately 1.9km to the south of the site and the Lake Bala and River Dee SAC is located to the southeast, approximately 9km from the site at the point that the River Clywedog joins it.

3.5.7 The site includes a variety of habitats, including improved grassland, a network of hedgerows, and semi-natural broad-leaved woodland. There is a narrow belt of ancient woodland within the south-west corner of the site located within a field bounding the A483. Full details of the habitats on the site are presented in Chapter 8: Ecology.

Heritage Assets

3.5.8 There is one designated historic asset on site: Lower Berse Farmhouse, a Grade II* Listed building located in the north-western corner of the site. Details of this heritage asset and its curtilage structures are presented in Chapter 9: Archaeology and Heritage.

3.5.9 There are four non-designated heritage assets identified; the potential medieval moat at Lower Berse Farm, the post medieval farmstead at Lower Berse, the Pritchards Tennements and the former extent of the park and garden at Plas Power Park. Additionally, there is stonework in the watercourse, indicating a former crossing point.

3.5.10 The Bersham Conservation Area is located to the south-west of the site. There are several listed buildings within the Conservation Area and many more within Wrexham itself.

Ground Conditions

3.5.11 BGS mapping indicates the presence of glacial till (sand, silt, clay, and gravel) and alluvium across the majority of the site within the superficial drift deposits. The solid geology on site is recorded as Penning Lower and Middle Coal Measures (mudstone, siltstone, and sandstone). The bedrock formation of the site functions as a secondary A aquifer and the superficial deposits found at site as secondary undifferentiated.

Soils

3.5.12 Agricultural soils at the site are classified as shallow lime-rich soils over chalk or limestone according to maps viewed at magic.gov.uk. Soils are reasonably free draining, with some slower draining areas that may expereince periodical seasonal waterlogging.

3.5.13 The soils at the site have been assessed to determine their agricultural land classification status. This survey, as presented at Appendix 10.3, confirmed that around 80% of the site is classified as Best and Most Versatile (BMV) agricultural land, as illustrated in Figure 3.3, below.

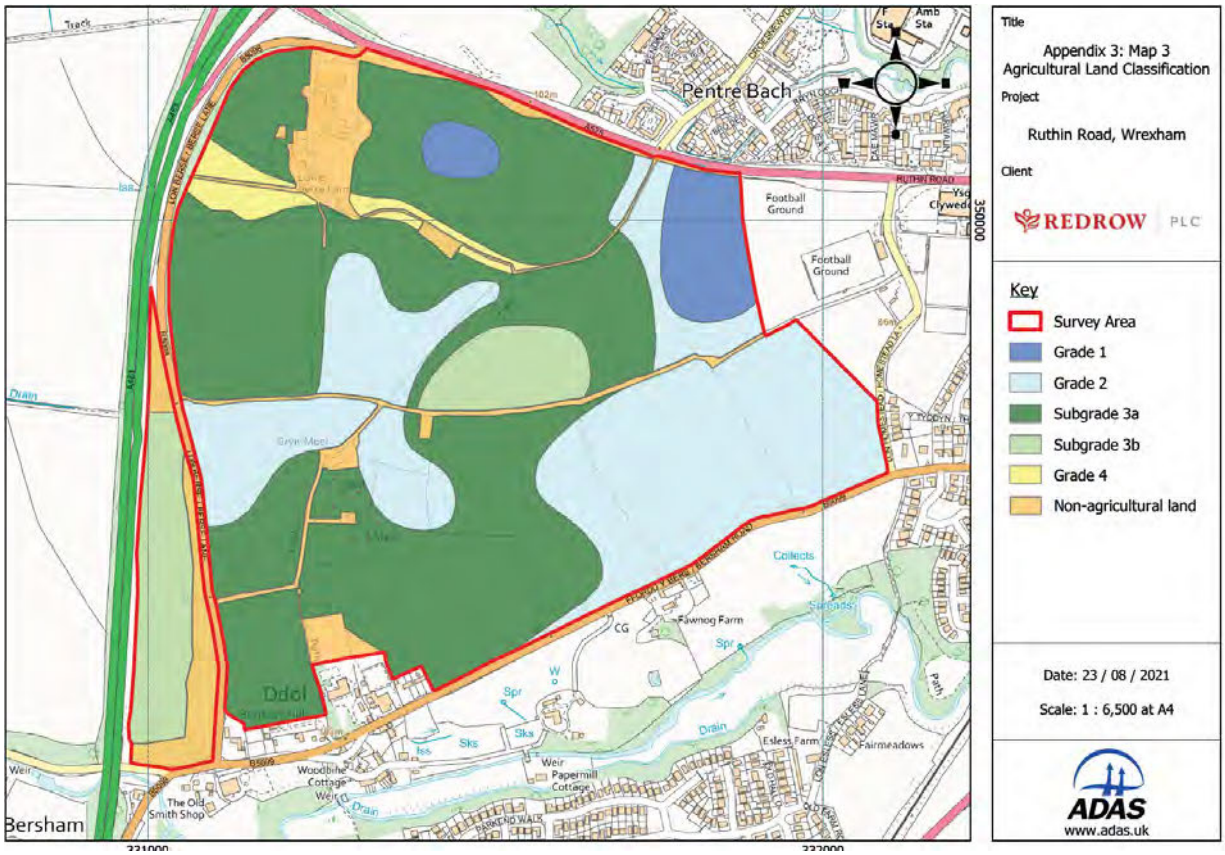


Figure 3.3: Agricultural Soils Plan

Mineral Reserves

3.5.14 Figures 3.4 and 3.5 show that part of the site is designated as Mineral Safeguarding Areas (MSAs), which are allocated to protect mineral reserves from sterilisation by non-mineral development. The proposed development is located within tertiary shallow coal, brick clay and other sandstone, and sand and gravel MSAs.

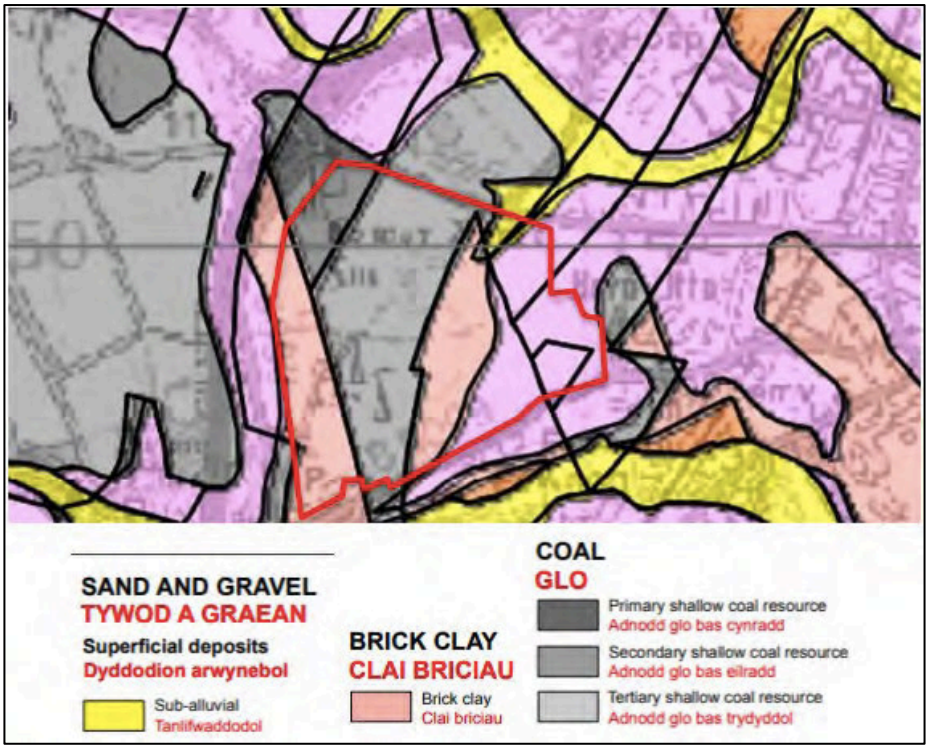


Figure 3.4: Mineral Safeguarding Zone – Tertiary shallow coal, brick clay and other sandstone (Source: BSG Mineral Resources Map - North East Wales)

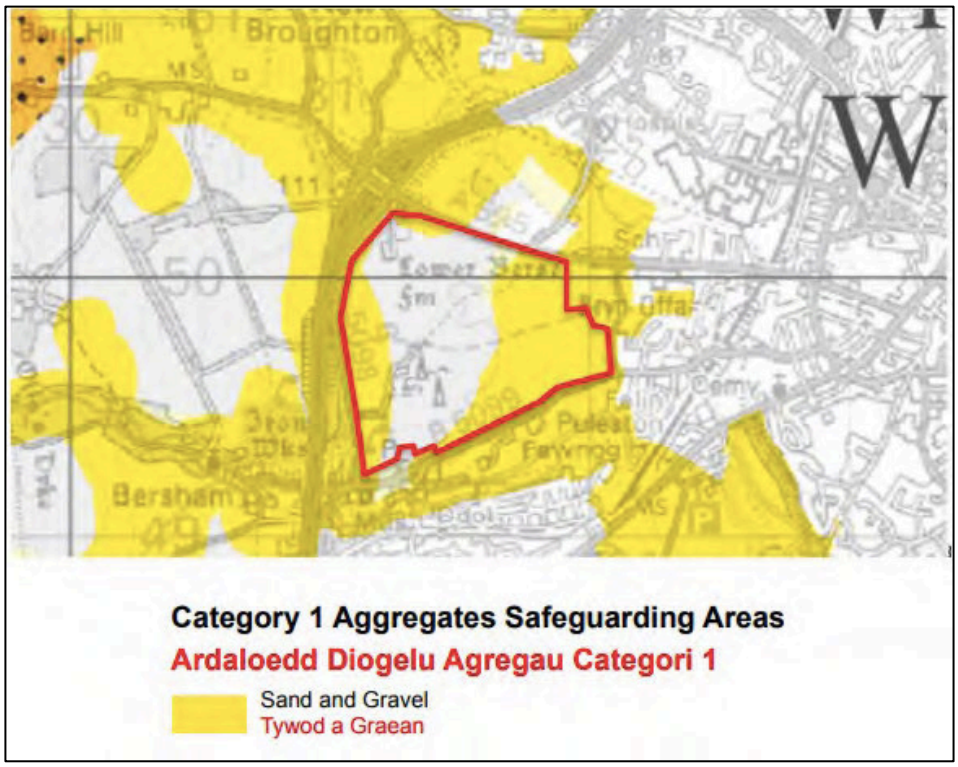


Figure 2.5: Mineral Safeguarding Zone - Sand and gravel (Source: BSG Aggregates Safeguarding Map of North East Wales)

Unexploded Ordnance

3.5.15 Online UXO maps (Zetica) indicate that the site is located in a 'low bomb risk' area. Therefore it is anticipated that no special UXO mitigation measures will be required for the investigation and redevelopment of the site.

Surface Water Drainage and Flood Risk

3.5.16 To the south of the site, running west to east, is the River Clywedog, which passes Wrexham on it's southern side before entering the River Dee. There are areas around the Clywedog that are at risk of flooding, but these do not affect the development site.

3.5.17 An unnamed watercourse flows east through the northern extent of the site, exiting on the northern boundary. The majority of the site is located within an area at little or no risk of flooding.

3.5.18 The Natural Resources Wales (NRW) flood map shows small areas of high flood risk from rivers at the north of the site and small areas of flood risk from surface waters scattered throughout the site. There is known flood risk in the area of the site adjacent and into Ruthin Road associated with a depression in the north of the site. The areas of flood risk are shown on Figure 3.6 below.

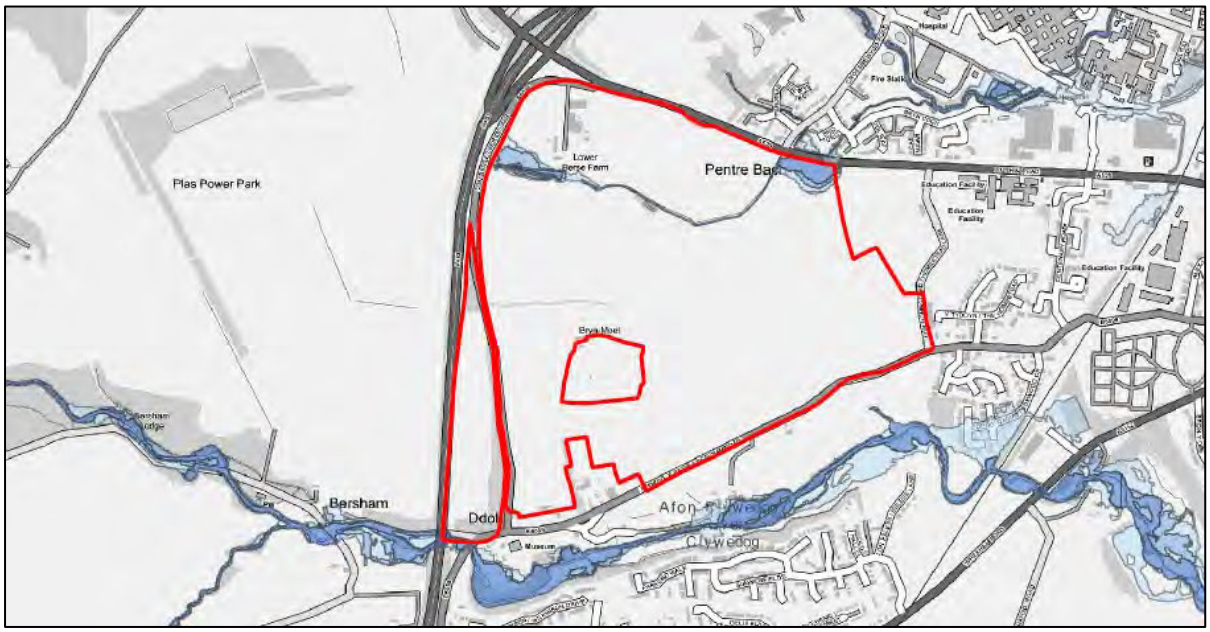


Figure 3.6: Flood Risk Map

Foul Drainage

3.5.19 Welsh Water sewer records show that there is a public combined sewer of varying diameter crossing the site in a broadly north-west to south-east direction. There are also public sewers serving adjacent urbanised areas. There are no records of sewer flooding at or near to the site. The site forms a relative high point within the local topography and there are no distinct flow routes in the area which would direct any potential sewer flooding towards the site.

3.5.20 The public sewers drain to the Five Fords Wastewater Treatment plant. This facility has a discharge permit, issued by NRW, which sets a phosphate limit. The Five Fords Wastewater Treatment plant has phosphate stripping technology to achieve the phosphate limit and Welsh Water has confirmed that it can accommodate foul flows from the proposed development whilst operating within their phosphate limits.

Transport and Access

3.5.21 The site is accessed off B5098 Berse Lane, which connects the A525 Ruthin Road leading east into Wrexham and west/northwest towards Coedpoeth. Berse Lane also junctions with B5099 Bersham Road, which leads east towards Wrexham and south to junction with the A483.

3.5.22 The existing PRoW footpaths surrounding the site provide both pedestrian and cycle access, linking the site to the existing residential areas.

3.5.23 There are bus stations located within 1 mile of the site, closer to the centre of Wrexham, situated on Mold Road. The site is situated close to Wrexham Central train station, located to the northeast of the site and accessed by Ruthin Road.

Future Highway Improvement Works

3.5.24 Figure 3.7 below presents a plan of the Welsh Government's proposals for Junction 4 of the A483. As shown, it include a new roundabout junction on the A483 that enters the application site from the west and connects to the A525 Ruthin Road via two sections of link road connected via a roundabout junction that provides access to the residential developmet site.

3.5.25 The timing of the delivery of this project is currently unclear, but the details include a requirement to safeguard the route from development. The safeguarded route is referred to as TR111, and must be observed in any future planning applications/decisions for development of the Lower Berse Farm site. There is no further design detail, traffic modelling or environmental information available for this potential project.

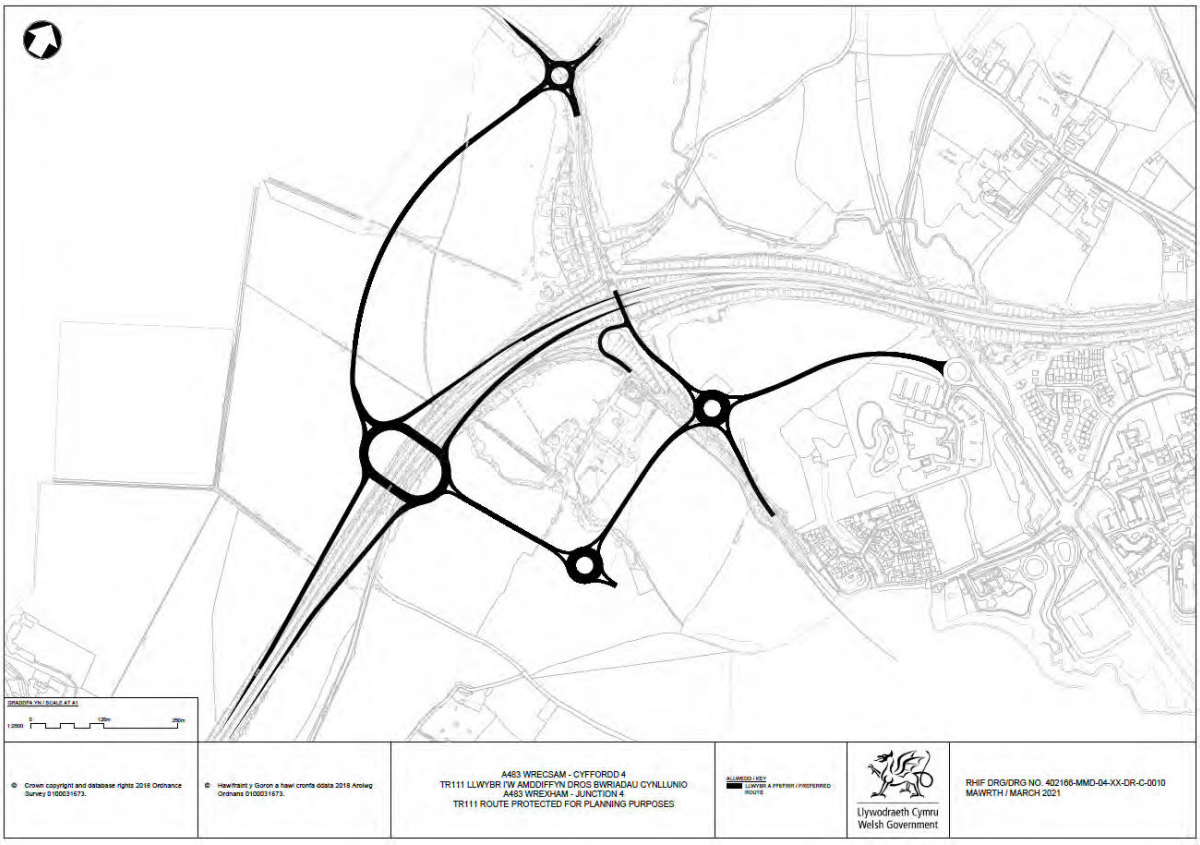


Figure 3.7: A483 Wrexham – Junction 4 Proposals

Air Quality

3.5.26 Air quality monitoring from IQAir.com list Wrexham as “good quality”. There are no Air Quality Management Areas within the local authority area or indeed, in North Wales, according to the 2020 Air Quality Progress Report for North Wales.

Noise

3.5.27 Traffic noise from the A483, A525 Ruthin Road, B5098 Berse Lane, and B5099 Bersham road is the dominant noise source at the site. There is potential for noise from the surrounding residential areas to the east of the site, including the playing fields and school.

3.5.28 The residential properties to the east and south of the site represent the nearest noise sensitive receptors.

3.6 Summary

3.6.1 This chapter has identified the main environmental characteristics of the site and a combined constraints plan illustarting these is presented at Figure 3.8.

3.6.2 The site is located to the western edge of Wrexham and accessed by B5098 Berse Lane and existing pedestrian access.

3.6.3 Receptors sensitive to potential effects of development are relatively limited. Residential properties to the east and south of the site could be affected by the construction and operational activities associated with the development.

3.6.4 There is an area of ancient woodland within the site as well as a wooded corridor with hedgerow and trees running through the centre of the site. The site itself is not located within any designated landscapes but the Clwydian Range and Dee Valley National Landscape lies approximately 3km to the west of the site.

3.6.5 There are localised areas of flood risk from rivers in the north of the site and scattered areas of flood risk from surface waters. A public sewer runs throught the site from north-west to south-east.

3.6.6 The agricultural land on site is of BMV quality and there are mineral safeguarding designations across the site relating to tertiary shallow coal, brick clay and sandstone, sand and gravel.

3.6.7 The above factors area considered throughout the ES when evaluating the potential environmental effects of proposed development.

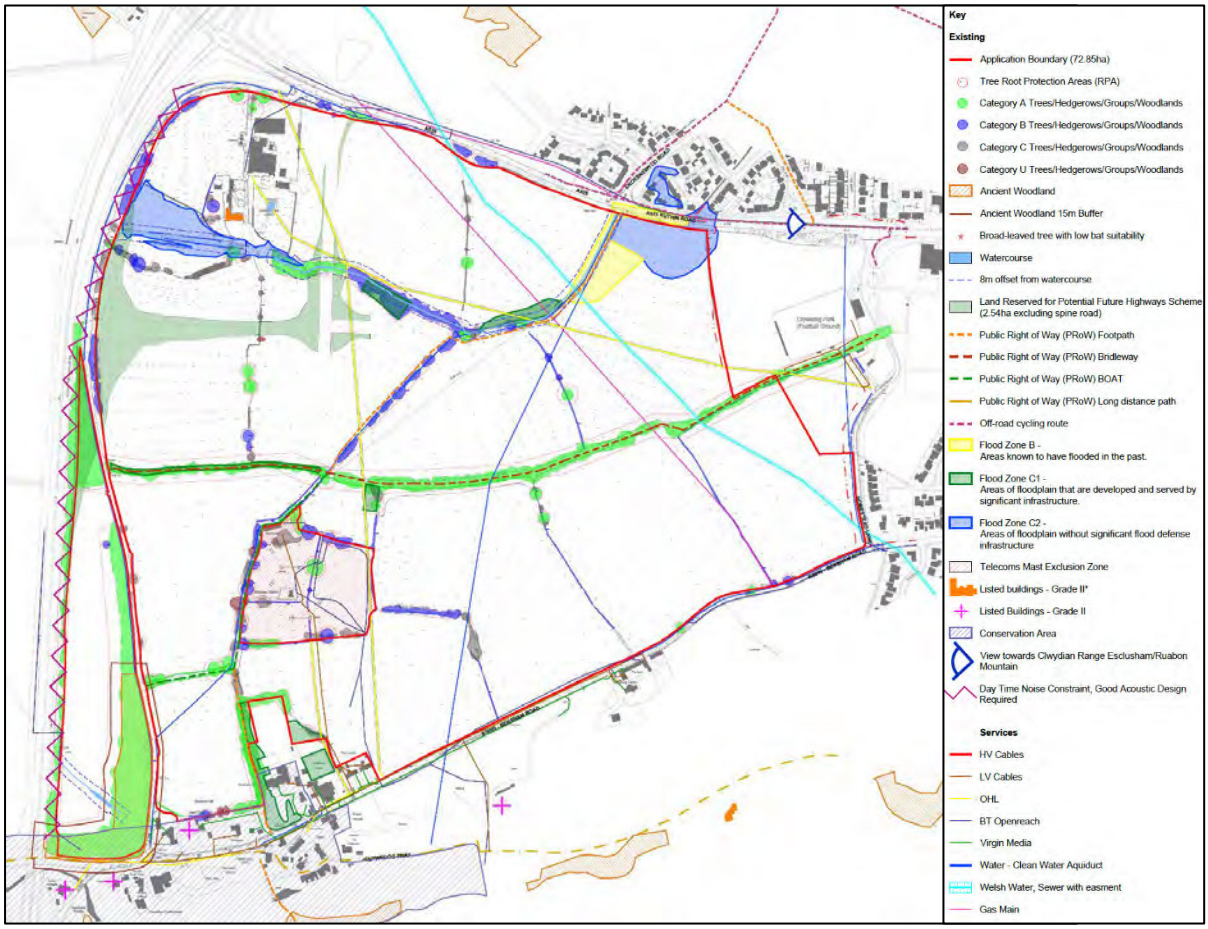


Figure 3.8: Environmental Constraints Plan

4 The Proposed Development

4.1 Introduction

4.1.1 This section of the ES describes the proposed development that has been assessed in the EIA. Schedule 4, Part 1 of the EIA Regulations outlines the information that should be provided within an ES. This chapter includes a 'Description of the Development', including in particular:

- *a description of the physical characteristics of the whole development, including, where relevant, requisite demolition works, and the land-use requirements during the construction and operational phases.*
- *a description of the main characteristics of the operational phase of the development (in particular any production process), for instance, energy demand and energy used, nature and quantity of the materials and natural resources (including water, land, soil and biodiversity) used.*

4.1.2 This chapter and the accompanying figures define the application areas, the maximum quantum of development applied for within the outline elements, and the details of the means of access. A description of the broad construction strategy is presented towards the end of this chapter.

4.1.3 The information presented in this chapter forms the basis of the EIA and provides the level of detail required to enable the assessment of environmental effects in line with the EIA Regulations.

4.2 The Planning Application

4.2.1 The applicant has prepared an outline planning application, which seeks planning permission for the following:

> *Residential development for up to 1,450 dwellings, plus associated roads, open space, community facilities and a site for a primary school.*

4.3 Assessment Parameters

4.3.1 A series of parameter plans have been prepared in support of the outline element of the planning application, which present the land uses, maximum building heights, strategic landscaping and movement framework for the site. The plans are presented as Figures 4.1, 4.9 and 4.10 and are submitted for approval. Forthcoming applications for the approval of reserved matters will be submitted in accordance with the development parameters set out in these plans.

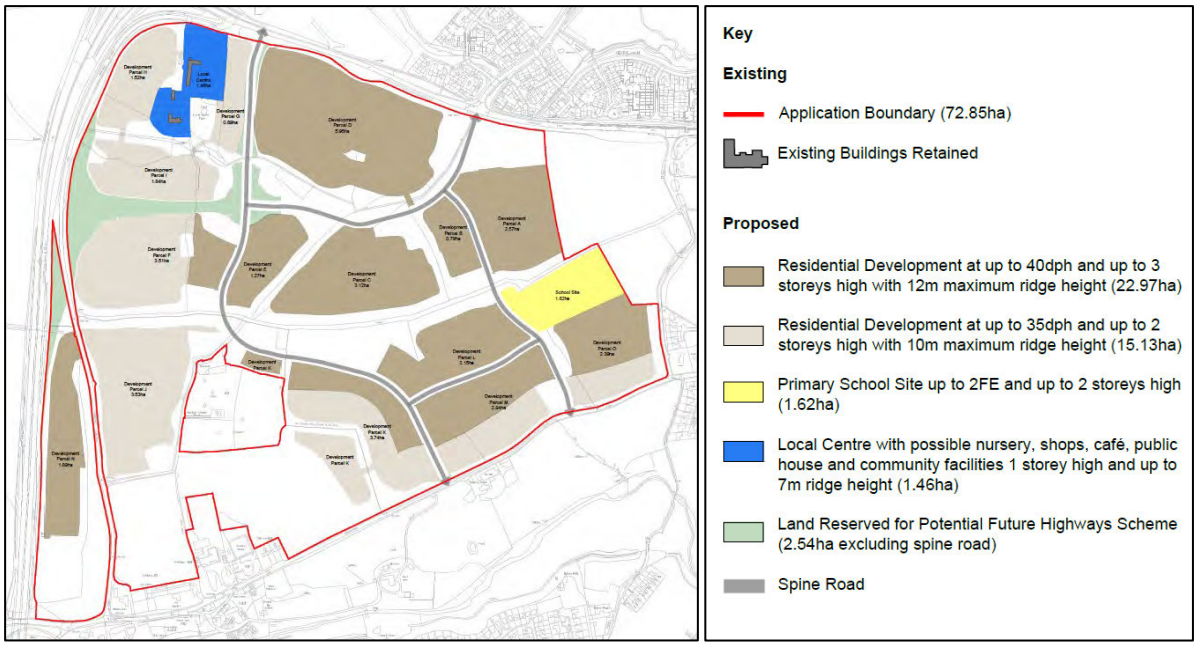


Figure 4.1: Land Use and Building Heights Parameters Plan

4.3.2 The application plans for approval, and which have been used for the assessment of environmental effects, are presented in Table 4.1 below.

Table 4.1: Plans for Approval

Assessment Parameters	Purpose	References
Planning Application Boundary	To define the extent of the site to which the planning application relates	Figure 3.1 (Drawing Ref: D9730.004A)
Land Use and Building Heights Parameters Plan	To define the land uses and maximum building heights that are permissible within the various areas of the site.	Figure 4.1 (Drawing Ref: D9730.009F)
Demolitions Plan	To define the buildings for demolition	Figure 4.3 (Drawing Ref. D9730.003)
Ruthin Road Access 1	Details of the access to the site	Figure 4.4 (Drawing Ref: SCP/210187AC01)
Ruthin Road Access 2	Details of the access to the site	Figure 4.5 (Drawing Ref. SCP/210187/AC02)
Bersham Road Access 1	Details of the access to the site	Figure 4.6 (Drawing Ref: SCP/210187/AC03)
Bersham Road Access 2	Details of the access to the site	Figure 4.7 (Drawing Ref. SCP/210187/AC04)
Access and Movement Parameters Plan	To identify the main access locations and means of pedestrian and vehicular movement throughout the site.	Figure 4.8 (Drawing Ref. D9730.011D)
Landscape and Open Space Parameters Plan	To identify the strategic areas of open space and landscaping at the site.	Figure 4.9 (Drawing Ref. D9730.010B)

4.3.3 The development of the site will be undertaken in accordance with the outline parameters and detailed application plans defined in Table 4.1, above. In respect of the outline elements, the compliance of subsequent reserved matters applications with these parameters will be secured via the imposition of a planning condition. In relation to the detailed elements of the scheme, the development will be brought forward in strict accordance with the detailed plans.

4.4 Description of the Proposals

4.4.1 The illustrative masterplan, presented as Figure 4.2, shows how the site could be built out in accordance with the development parameters defined above. The layout is indicative and a different layout may be progressed through the reserved matters applications, depending on client requirements, but within the confines of the approved parameters.

4.4.2 The majority of the development is for residential use, which would be delivered on a phased basis over approximately 15 years. The planning application proposes the development of up to 1,450 dwellings. This would include a mix of house type and size, ranging from 2 to 4-bed units, of 2 or 3 stories (10m or 12m to ridge respectively) in height, and will include 15% affordable homes in accordance with local planning requirements.

4.4.3 Other uses are proposed to support the residential elements of the scheme. A neighbourhood centre will be delivered on a 1.46ha plot in the north-west corner of the site, making use of the existing buildings at Lower Berse Farm and supplementing these with sensitively designed new build elements. This local centre will include local services such as a neighbourhood shop, café, pub, nursery and community facilities. in order to deliver this element of the scheme, the modern outbuildings around Lower Berse Farmhouse will be demolished but the Farmhouse and older outbuildings will be retained and refurbished in a manner sensitive to their historic value.

4.4.4 A primary school is proposed in the east of the site, which has been sized to accommodate the needs of the new residents. The school site, which totals 1.62ha, is provided with outside play space appropriate to the size of the school.

4.4.5 Play and open space is provided throughout the site, with parkland in the south-west, play areas located throughout the site, and green pathways created throughout the site. The planting of trees and hedgerows in public spaces will feature throughout the development.

4.4.6 Drainage infrastructure is also shown on the masterplan. Ponds are located alongside each plot, which will provide rainwater storage to avoid flooding and to enable the slow release of water into watercourses and groundwater.

Figure 4.2: Illustrative Masterplan



Key

Existing

- Application Boundary (72.85ha)
- Trees/Woodland
- Hedgerow
- Watercourse
- Public Right of Way (PRoW) Footpath
- Public Right of Way (PRoW) Bridleway
- Public Right of Way (PRoW) BOAT

Proposed

- Residential Development in the region of 1,450 dwellings (38.10ha)
- 2FE Primary School Site (1.62ha)
- Local Centre with possible nursery, shops, cafe, public house and community facilities subject to viability(1.46ha)
- Land Reserved for Potential Future Highways Scheme (2.54ha excluding spine road)
- Telecom Mast Exclusion Zone
- Spine Road with Tree Avenue, Landscape Verge and Swale
- Secondary Road/Shared Drive
- Emergency Access
- Footpath
- Footpath Cycleway
- Footpath Cycleway Off Road
- Public Open Space (15.39ha)
- Strategic Open Space (7.89ha)
- Drainage Attenuation (1.96ha)
- Tree Planting
- Hedgerow Planting
- Neighbourhood Equipped Area for Play (NEAP)
- Multi Use Games Area (MUGA)
- Locally Equipped Area for Play (LEAP)
- Local Area for Play (LAP)

Refurbishment of the Listed Building

4.4.7 Lower Berse Farmhouse is a Grade II* Listed Building that will be retained and refurbished as part of the proposed development. Its curtilage structures that pre-date 1948 are also considered to be part of the listing and are also proposed for retention and refurbishment. Modern structures including storage sheds and silos are proposed for demolition and due to their modern construction are not considered to be part of the listing. In Figure 4.3, below, the buildings for demolition are shaded orange, with the structures that form part of the listing shaded grey.



Figure 4.3: Demolitions Plan

4.4.8 The proposals for the Listed Building and its curtilage structures are submitted in outline at this stage to establish the principle of redevelopment, but the details of the redevelopment will be subject to reserved matters and listed building consent at subsequent stages of the planning process.

4.4.9 The mix of uses proposed within the local centre on the parameters plan, which include nursery, retail, pub, community or medical uses, represent the potential future uses of the farmhouse and its outbuildings.

4.4.10 In order to ensure an appropriate form of development of the Listed Building, Chapter 9: Archaeology and Heritage includes recommended design principles that should be conditioned and complied with at the subsequent planning and construction stages.

4.4.11 In addition to the design principles, the parameters plan shows a significant standoff of residential development from the listed building, and the specification of lower building heights for those dwellings in closest proximity.

Movement and Access

4.4.12 The proposals include four new access points from the surrounding highways network. Two from the south off Bersham Road and two from the north off Ruthin Road. The access arrangements are applied for in detail and duplicates of the plans submitted for approval are presented below in Figures 4.4 – 4.7.

4.4.13 A primary road network provides routes through the site and links to secondary roads and development plots within the site. These primary routes will include pedestrian and cycle paths and will be tree lined. Swales for surface water management will also be provided along these routes. A network of smaller roads branching off of the primary road will provide access to the homes and other uses.

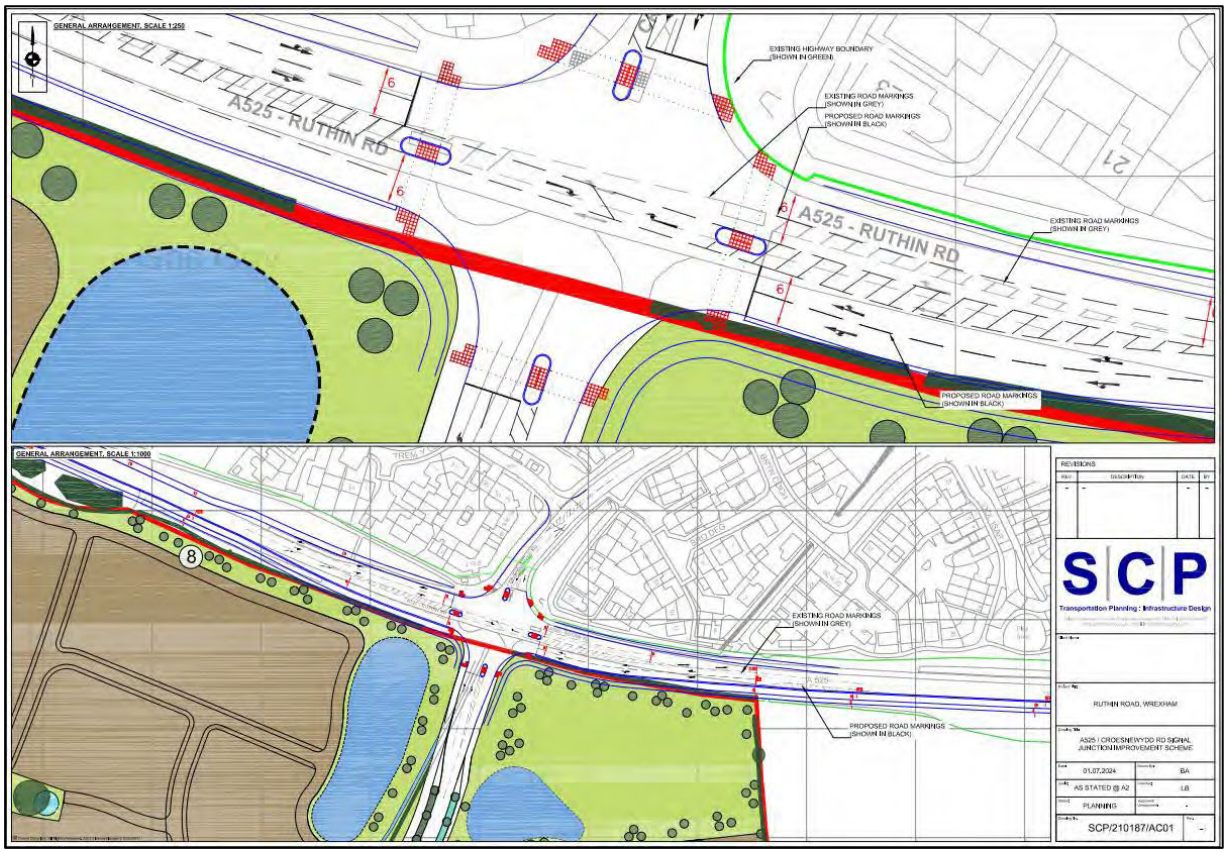


Figure 4.4: Ruthin Road Access 1

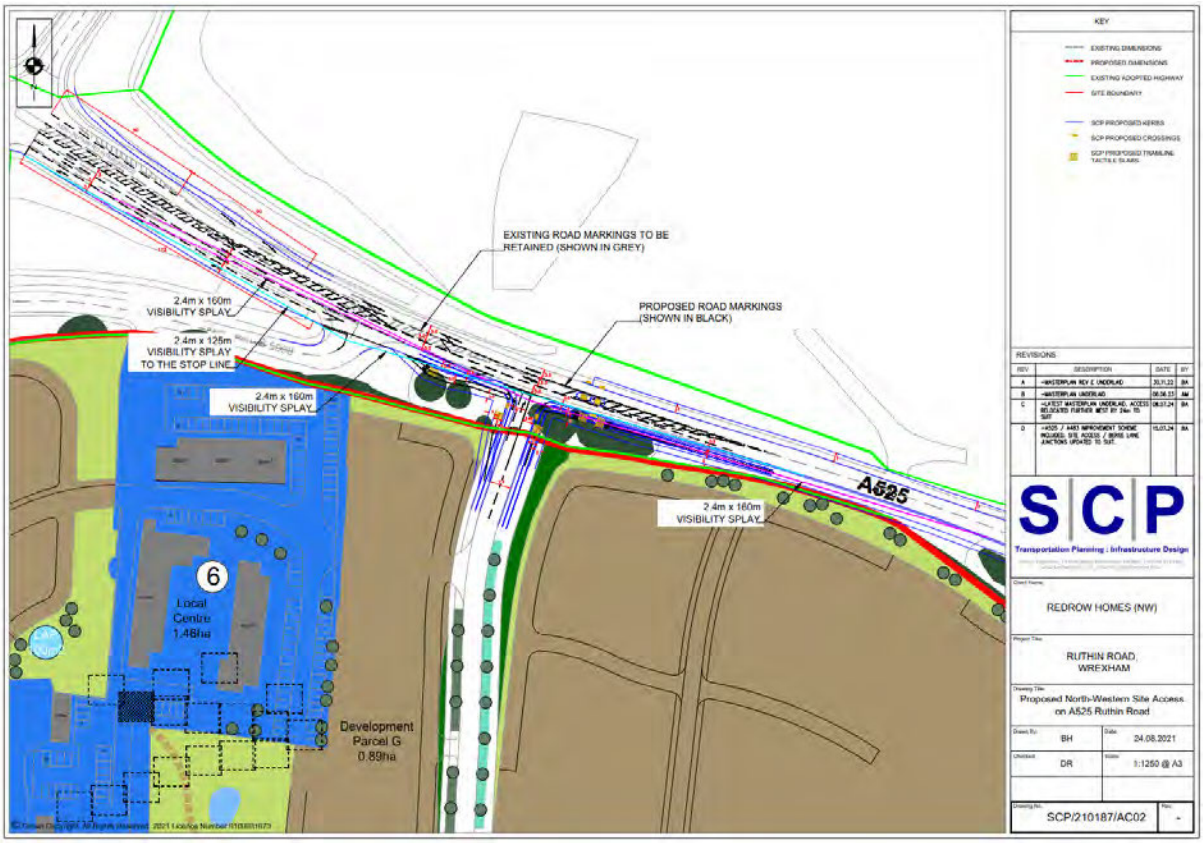


Figure 4.5: Ruthin Road Access 2

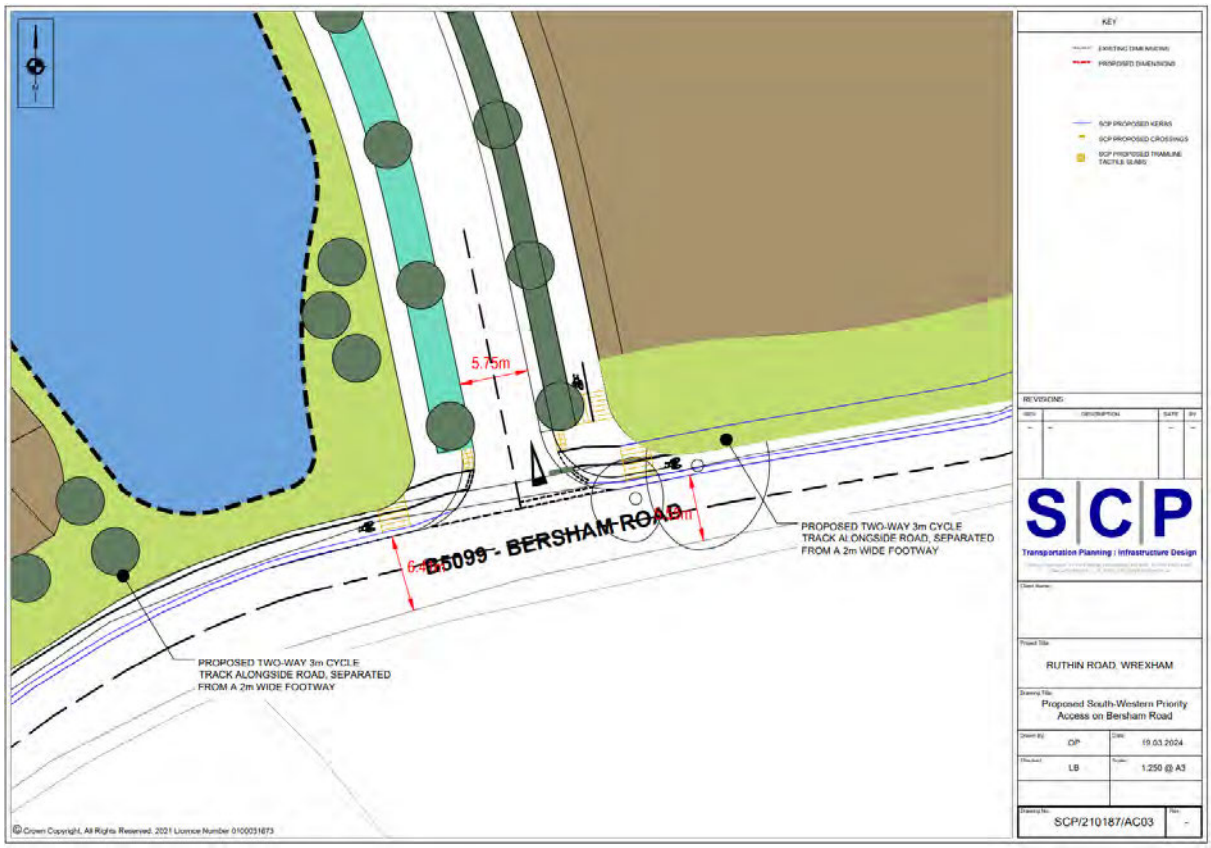


Figure 4.6: Bersham Road Access 1

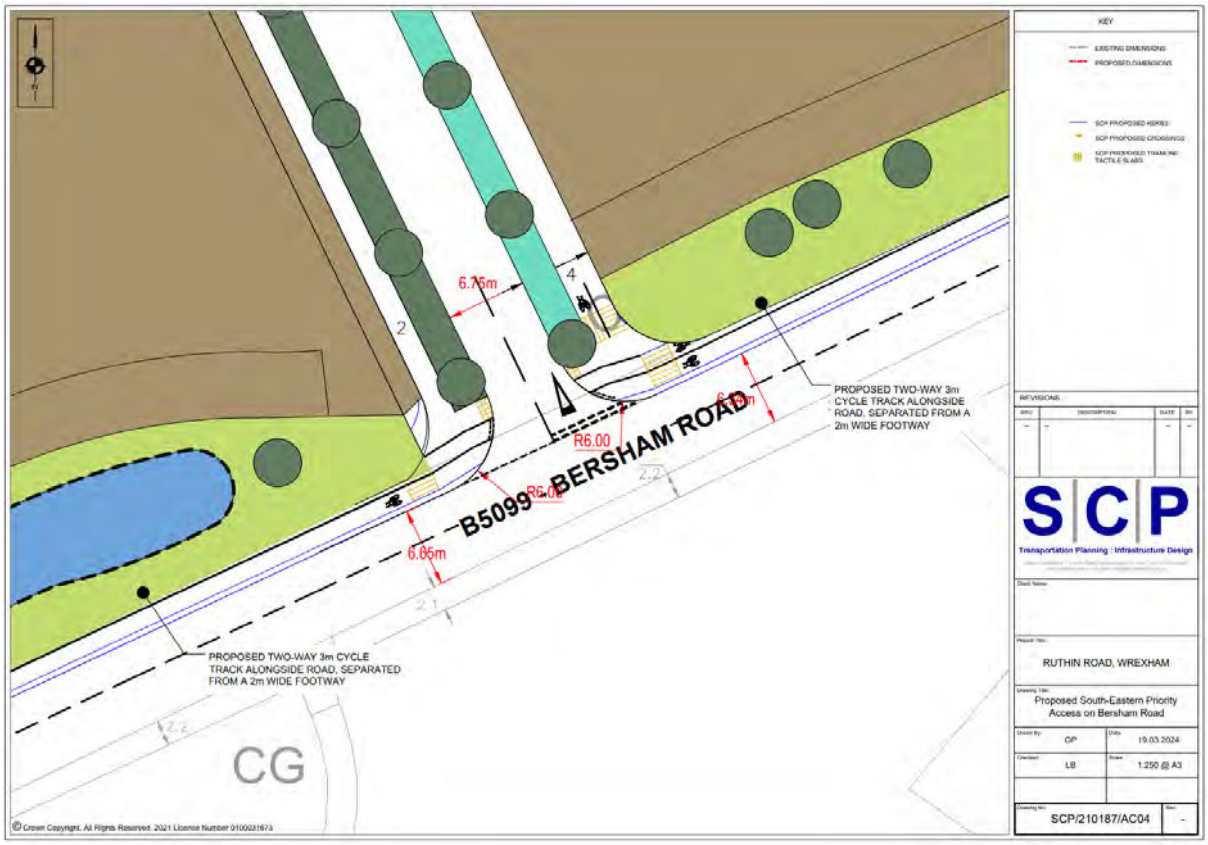


Figure 4.7: Bersham Road Access 2

4.4.14 In addition to the detailed access plans, Figure 4.8 presents the overarching movement strategy for the site, which includes a network of footpaths, bridleways and cycleways to encourage sustainable travel choices, as well as vehicular connections.

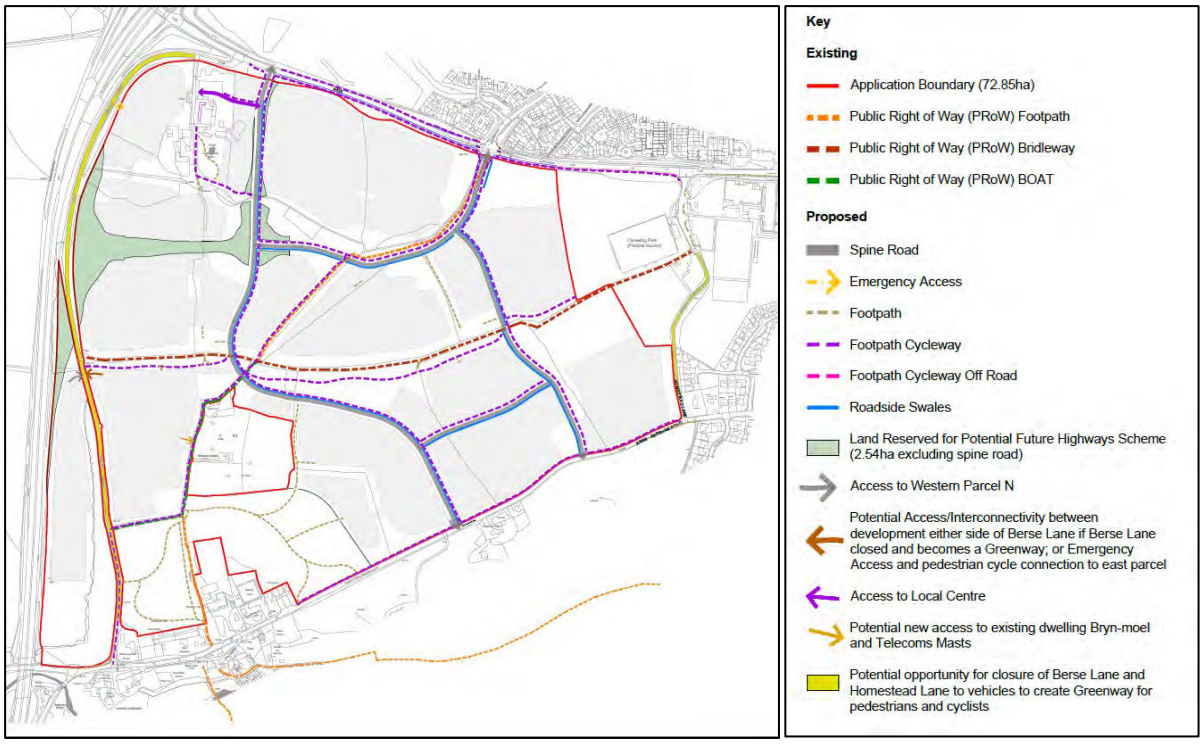


Figure 4.8: Access and Movement Parameters Plan

Landscape and Open Space Strategy

4.4.15 The site-wide landscape strategy is presented on the landscape and open space parameters plan at Figure 4.9.

4.4.16 The landscape strategy is based around the principle of retaining and enhancing the key features of the site and maintaining green corridors throughout the site for the benefit of residents and wildlife. In this regard, hedgerow have been retained wherever possible and the field boundary structure has been used as the basis for the site layout.

4.4.17 A 15m no development buffer to the ancient woodland has been incorporated into the parameters plan.

4.4.18 A park will be created in the south-west corner of the site, which serves as a natural buffer to the adjacent Conservation Area as well as providing high quality, managed and accessible open space for use by new and existing residents.

4.4.19 Primary vehicular routes will be lined with tree, shrub and hedgerow planting as well as swales for surface water attenuation. Further surface water attenuation will be delivered through the creation of attenuation basins that will also provide new landscape features of interest and potential habitat for protected species.

4.4.20 Local areas of play are proposed throughout the site, three of which will be equipped with play equipment. A multi-use games area (MUGA) and a neighbourhood area of play will be positioned centrally within the site. This distribution of play areas and the varied type of provision will ensure that open space for children is easily accessible for all new residents.

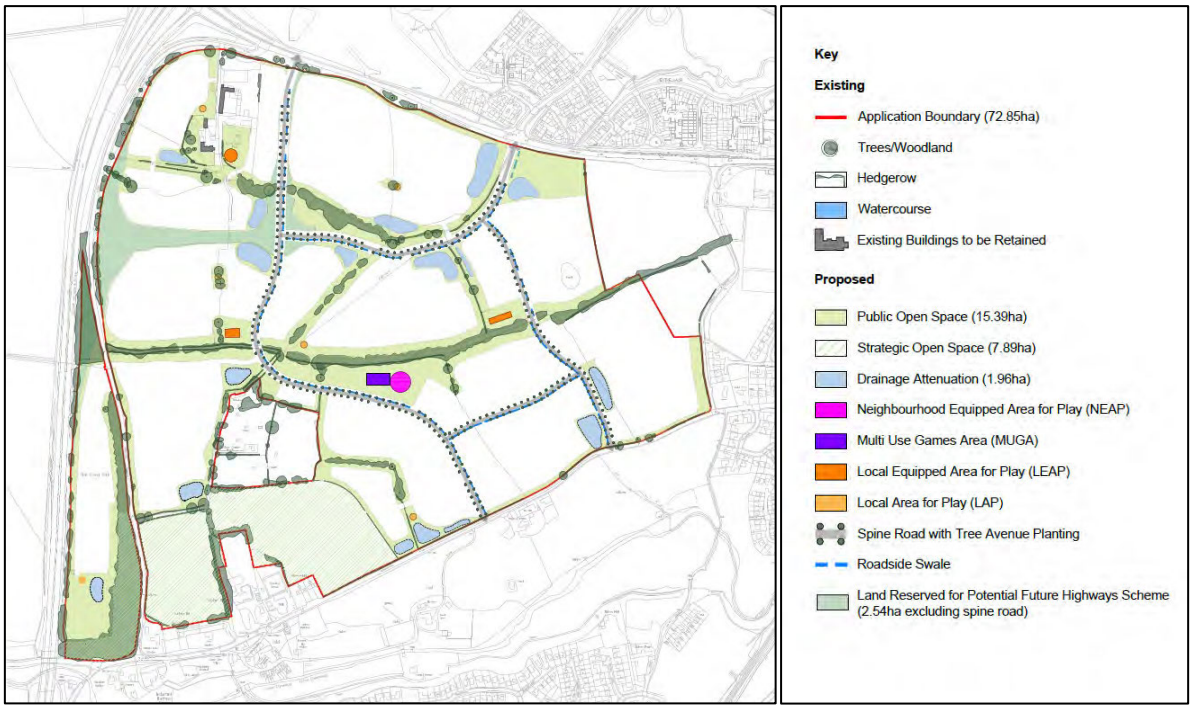


Figure 4.9: Landscape and Open Space Parameters Plan

Land Reserved for A483 Junction 4 Highway Improvement Scheme

4.4.21 An area in the north-west of the site has been safeguarded for a potential future Welsh Government highways scheme, which would see the creation of a new roundabout as a replacement Junction 4 on the A483, with a connection through the site to the A525 Ruthin Road (See Figure 3.7 in Chapter 3).

4.4.22 Local Plan Policy SP3 identifies improvements to Junction 4 as 'enabling infrastructure', which is defined as 'infrastructure that is required prior to the commencement of development or relevant phases of development'. However, there is currently significant uncertainty over its delivery, given it was identified as a preferred option in 2022, was withdrawn under the Roads Review in 2023 and, most recently, it has been indicated by Welsh Government that the scheme will be reconsidered under the National Transport Delivery Plan in 2024.

4.4.23 Given this uncertainty and a lack of information on the timing of delivery, scheme design or traffic/environmental impacts, the applicant has progressed the design of highways improvement works that would enable the proposed development to progress in advance/absence of the Junction 4 improvements. This approach ensures that the 'enabling' component of Policy SP3 has been satisfied in the absence of detailed plans for Junction 4 and that the scheme may proceed independently of the Junction 4 works.

4.4.24 Given the above, the potential future highways scheme at Junction 4 does not form part of the planning application to which this ES relates. Instead, the safeguarded area has been retained as open greenspace on the east-west leg, and used as an internal estate road on the north-south leg. These uses do not conflict with the proposed Junction 4 scheme and would not

prejudice its delivery.

4.4.25 In the event that the Junction 4 does progress in the future it is expected that this scheme would be subject to an appropriate level of environmental assessment and would take into account the potential effects on and in conjunction with the proposed development at Lower Berse Farm.

Surface Water Drainage Strategy

4.4.26 The details of the drainage design are reserved for future determination. However, the principles of the sustainable drainage system are as follows:

- Infiltration techniques will be utilised where possible such as private soakaways in gardens. Infiltration potential is variable across the site and as such infiltration techniques will not be suitable across the entire development.
- Where infiltration techniques are not feasible, discharge will be made to watercourse by gravity.
- Where discharge to watercourse is proposed, discharge will be limited to the existing 1 in 1-year greenfield runoff rate. This will provide flood risk reduction during more extreme events i.e., the 1 in 30 year and 1 in 100-year event.
- Attenuation storage will be provided for the 1 in 100-year plus 40% climate change event.
- Attenuation storage will be provided in the form the SuDS, the preference being attenuation ponds distributed across the site.
- Other SUDS including swales and permeable paving on private driveways will also be proposed.

4.4.27 The majority of the proposed development, including all properties, the school and local centre, will be located within Flood Zone A, which has a less than 0.1% annual probability of flooding. The site access off Ruthin Road will encroach into Flood Zone C2. Road levels will be raised as to be flood free during the 0.1% annual probability flood extent and compensatory flood storage provided to ensure no impact on flood risk elsewhere.

4.4.28 The watercourse which crosses through the northern extent of the site will be enhanced from a flood risk and ecological perspective with additional channel capacity proposed to convey and store flood flows.

Foul Water Drainage Strategy

4.4.29 Due to the elevated levels of phosphorus in the River Dee catchment, new developments in this area must demonstrate that they are able to achieve nutrient neutrality if they are to obtain planning permission.

4.4.30 Foul flows from the development site will be discharged to the public sewer system and onwards to the Welsh Water Five Fords Wastewater Treatment Plant. As stated in Chapter 3, the Five

Fords Wastewater Treatment plant has a discharge permit, issued by Natural Resources Wales, which sets a phosphate limit. The Five Fords Wastewater Treatment plant has phosphate stripping technology to achieve the phosphate limit and Welsh Water has confirmed that it can accommodate foul flows from the proposed development whilst operating within their phosphate limits. As such, the development would not have a detrimental impact on the River Dee SAC in terms of phosphates.

4.4.31 A Hydraulic Modelling Assessment of the public sewer system has been undertaken by Welsh Water and sets out the required upgrades to the sewer network to accommodate foul flows from the development. The sewer network upgrades will be undertaken (prior to first occupation) and as such a new wastewater treatment plant is not required on site.

Energy Strategy

4.4.32 The aim of the energy strategy is to minimise carbon dioxide emissions from the development and the associated impact of climate change by adhering to the energy hierarchy. In accordance with the energy hierarchy, a 'fabric first' approach will be taken to minimising space heating demand on the site by making new buildings highly energy efficient. Additionally, internal lighting designs will specify low energy LED fittings to minimise electricity demand throughout.

4.4.33 The technology to be employed will be determined at the detailed design stage, but a variety of low and zero carbon technologies will be considered. Solar PV and Air Source Heat Pumps are feasible technologies based upon the characteristics of the site and the proposed development. The exact nature of the energy systems will be confirmed as part of the reserved matters applications once occupiers have been identified and their requirements established.

Waste Management Strategy

4.4.34 Operational waste and recyclables from residential dwellings will be collected by council services and funded by council tax receipts in the standard fashion. Commercial waste and recyclable collections will be arranged by occupiers on a commercial basis.

4.4.35 Dedicated areas for refuse and recyclables sorting, storage and collection will be provided within the curtilage of each dwelling to meet local requirements that apply at the time of reserved matters submissions.

4.4.36 Commercial waste storage areas will also be provided in compliance with local guidance, with details provided at the reserved matters stage.

Lighting Strategy

4.4.37 The lighting strategy for the site will be subject to detailed design at the reserved matters stage, but the following best practice principles have been assumed as the minimum requirements to be complied with at the detailed design stage:

- the use of luminaires with minimal to zero direct contribution to upward light;

- minimising luminaire uplift angles;
- careful aiming and positioning of luminaires to minimise impacts on sensitive receptors;
- careful selection of luminaires;
- the use of optimal light distributions for their specific location and orientation;
- optimisation of luminaire mounting heights;
- the adoption of the lowest intensity LED modules practicable (potentially by using larger dimmed down light sources); and
- minimising the task illuminance level.

Vegetation and Tree Clearance and Protection

4.4.38 Tree removals have been identified in the Arboricultural Impact Assessment at Appendix 8.4.

4.4.39 Any trees with bat roost potential that are identified for removal as part of the development will be subject to an updated bat survey by a suitably qualified ecologist prior to felling, and NRW licensing procedures will be followed where any bat roosts are found.

4.4.40 Tree and vegetation clearance will take place outside of the bird breeding season (February-August inclusive) to avoid any inadvertent disturbance of nesting birds. Where any tree or vegetation removal is required within the bird breeding season, a qualified ecologist will be present to confirm the absence of any occupied nests before removal and, if occupied nest are encountered, removal of those trees will be postponed until the nest is vacated.

4.4.41 Where trees and other areas of vegetation are to be retained, either permanently or until removal as part of a later phase, these will be protected from disturbance during the construction period through the use of protective fencing in accordance with best practice guidance set out in BS 5837:2012, wherever required.

4.4.42 A 15m no development buffer around the area of Ancient Woodland has been embedded into the parameters plan. This area will be suitably protected and no construction activity will take place in this zone.

Hours of Work

4.4.43 Working hours will be subject to agreement with Wrexham CBC. However, it has been assumed that standard working hours would be as follows:

- Monday – Friday: 08:00 - 18:00,
- Saturday: 08:00 - 14:00, and
- No working on Sundays or Bank Holidays.

4.4.44 Exceptions may arise, for example when abnormal loads are delivered or when specialist activities are conducted, when works may be required outside of these times. The applicant

acknowledges that should these circumstances arise, the appropriate permissions and notifications would be sought from Wrexham CBC.

Site Compounds

4.4.45 It is proposed to utilise site compounds to offload, store and handle materials as well as to provide welfare facilities and any temporary site offices.

4.4.46 Compounds will be sited away from any valued ecological receptors that are to be retained and protected through the course of that phase of development, and away from adjacent residential receptors. To minimise the movement of materials around the site following delivery, the compound is anticipated to move as the development progresses, so that it is located in close proximity to the development area.

4.4.47 It is envisaged that strict management of loading zones will be implemented by way of a delivery booking system, which will ensure that material movements are efficiently managed and will also facilitate a 'just in time' delivery regime. Where possible, material movements will be managed to coincide with quiet periods on the highways network.

Construction Environmental Management Plan

4.4.48 It is recommended that a Construction and Environmental Management Plan (CEMP) is secured by condition, which will outline the methods employed by developers and contractors to manage and where practical minimise the impact of the development's construction activities upon the site and surrounding area. The CEMP would secure the applicant's commitment to achieving high environmental standards during construction works. Furthermore, the CEMP will be developed with and approved by Wrexham CBC and will include best practice measures and those mitigation measures identified through the EIA process.

4.5 Summary

4.5.1 This chapter has presented a description of the proposed development which is supported by a set of parameters plan and detailed drawings. The descriptions of the proposals and the development parameters set out form the basis for the assessments described in this ES.

5 Alternatives

5.1 Introduction

5.1.1 Schedule 4, Part 2 of the EIA Regulations outlines the information that should be provided within an ES. This chapter therefore includes:

> *A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the developer, which are relevant to the proposed project and its specific characteristics, and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.*

5.1.2 Therefore, the information presented in this chapter identifies the alternatives considered by the applicant and the environmental effects of those alternative options.

5.2 Alternative Sites

5.2.1 The applicant has not considered the delivery of the proposed development at any alternative sites as the site has been identified for residential development by the Local Planning Authority in the Local Development Plan (LDP).

5.2.2 Policy SP3 allocates Key Strategic Site 1 (Land at Lower Berse Farm, Ruthin Road, Wrexham) for a residential led mixed use scheme with a minimum of 1,500 new homes. The site was also to provide for highway improvements, a primary school, public open space, community facilities, active travel and public transport.

5.2.3 The application site broadly aligns with the Key Strategic Site allocation area, with two small parcels of land to the east of the site falling within the allocation but outside of the application area due to land ownership constraints. If these parcel were to be brought forward under a separate application, the policy objective of delivering at least 1,500 new homes would be realised.

5.2.4 The application site also includes an area of Green Wedge, lying between the site and Bersham, that is not part of the allocation, but on which only public open space is proposed.

5.2.5 On the basis of the above, this application clearly reflects, and seeks to deliver upon, the policy objectives of the Local Planning Authority for development on this site. Accordingly, the applicant has developed the planning application to specifically respond to the emerging allocation of this particular parcel of land and has not sought to deliver this development on alternative local sites.

5.3 No Development Alternative

5.3.1 It is a requirement of Schedule 4, Part 2 the EIA Regulations that an ES includes:

> *A description of the relevant aspects of the current state of the environment (baseline scenario) and an outline of the likely evolution thereof without implementation of the development as far as natural changes from the baseline scenario can be assessed with reasonable effort on the basis of the availability of environmental information and scientific knowledge.*

5.3.2 In accordance with this requirement, the following sections set out the predicted future environmental conditions at the site in the absence of the proposed development, with reference to each technical assessment topic presented in this ES.

5.3.3 The no development alternative in this case assumes that the site remains in its current conditions, with the primary use being agricultural.

5.3.4 It should be noted, however, that the site is subject of an allocation for residential development in the LDP and has parcel of land within it earmarked for a major highway improvement scheme. Therefore, it is considered highly unlikely that the site would remain undeveloped in the long term. In the event that the applicant did not progress with the development proposals, it is realistic to expect another party to seek permission for development of this site to deliver on the Council's policy objectives. The no development alternative is therefore considered to be an unrealistic option for the future of the site.

Landscape and Visual

5.3.5 In the absence of the development, the no development alternative would likely see the continuing presence of agricultural uses at the site, at least in the short term. Assuming continuation of current practices, this would see the retention of open fields in arable and pastoral use, along with the retention of landscape features of higher value, such as hedgerow and woodland blocks.

5.3.6 The prevailing landscape conditions would continue at least until such time as the proposed highway improvements to Junction 4 of the A483 are implemented. In this case, the agricultural character of the north-western portion of the site would change significantly, both during construction and once operational. This new road would have a notable urbanising effect on this part of the site, even in the absence of the proposed residential development.

5.3.7 It should also be noted that the majority of the high value features are being retained within the proposed development, with development being focused on the agricultural fields. This notwithstanding, the development would clearly have a greater effect on the openness of the landscape compared to the no development alternative.

5.3.8 The potential effects on the landscape must be considered in the context of the allocation of the site for development. Under these circumstances, it is unreasonable to assume, in the absence of the proposed development, that the existing landscape would persist in the long term.

Ecology

5.3.9 In the absence of the proposed development, the existing habitats on the site would remain as they are, with ongoing maturation of trees and wooded areas, the continuing management of hedgerow as functional field boundaries and the dominance of semi-improved agricultural grassland. The majority of high value habitats are being retained within the proposed development, with construction activities being focused on the open agricultural fields, which have more limited ecological value. This being the case, the difference between the impact of the proposed development and the no development alternative is not substantial.

5.3.10 It should be noted that the no development alternative scenario is considered to be unlikely to be deliverable over the long term given the adopted planning allocation that is supportive of the development of the site. Furthermore, there would be some loss of grassland and hedgerow associated with the delivery of the A483 Junction 4 highways scheme, even in the absence of residential development.

Archaeology and Heritage

5.3.11 In the absence of the development the current agricultural setting of the Grade II* Listed Lower Berse Farmhouse would, in the short term, be unaffected. However, the positive effect of the demolition of the very large modern outbuildings would not be realised. There would also be the risk that the condition of the listed building could deteriorate in the absence of development and without a viable long-term use of the structures.

Ground Conditions, Minerals and Soils

5.3.12 In the absence of development, the site would likely continue to be used for agriculture, at least in the short term, which would result in no effect on best and most versatile soils.

5.3.13 With regard to minerals, the absence of the proposed development would most likely see the existing reserves left in situ. It is not expected that the no development alternative would lead to the extraction of the existing reserves. As stated in the minerals assessment at Appendix 10.2, the extraction of these minerals in this location would lead to unacceptable impacts upon neighbouring properties and the environment. A mining operation in this location would be expected to lead to significant dust, noise, visual and traffic effects and is unlikely to be permitted in this location. Furthermore, coal mining is considered a significantly worse option than the proposed development in the context of carbon emissions and the climate emergency.

5.3.14 As stated previously, it is not anticipated that the site will remain undeveloped in the long term due to the emerging allocation. Furthermore, the delivery of the A483 Junction 4 scheme would

result in localised impacts upon Grade 2, 3a and 4 agricultural soils as well as upon mineral safeguarding areas for coal, clay and aggregates.

Drainage

5.3.15 In the absence of the development there would be no significant effect on drainage or flood risk at the site as there would be no significant changes to the proportion of permeable surfaces across the site or existing the drainage flow routes.

5.3.16 In terms of foul drainage and phosphorous, the assessment of nutrient neutrality identified that the current agricultural uses of the site are likely to be responsible for a very similar quantity of phosphorous generation as the proposed development. However, given that foul discharges will be treated and subject to phosphate stripping at the Five Fords Wastewater Treater Works, this means that the development would, at worst, maintain nutrient neutrality in terms of phosphates entering the River Dee SAC when compared with the 'no development' future baseline scenario.

5.4 Alternative Uses

5.4.1 The site is subject to an allocation in the draft LDP for residential-led development. The preparation of the LDP involved the consideration of the residential, employment, retail and natural environment needs of the entire borough. The resulting plan allocates land for the type of development which is most appropriate and where there is most need. The LDP adoption process was subject to extensive consultation and scrutiny including an examination in public. The resulting allocations provide clear guidance on the acceptable uses for allocated parcels of land. Therefore, the applicant has not considered alternative uses for this site as they would not comply with the Council's planning objectives.

5.5 Alternative Layouts and Design Evolution

5.5.1 The proposed development has been subject to an ongoing and iterative design process over several years. In this time, significant changes have been made to the potential layout of the site. As can be seen in Figure 5.1, the earliest draft layouts did not include the redevelopment of Lower Berse Farmhouse and its outbuildings and the local centre and school were proposed in the north-eastern corner of the site, which would have required the loss of playing pitches.



Figure 5.1: 2016 Layout Design

5.5.2 As can be seen on Figure 5.2, the masterplan evolved in the period to 2021, and the layout included land safeguarded for a proposed Welsh Government highways improvement scheme to Junction 4 of the A483, that is shown shaded purple on the plan. This required the inclusion of a retained area of greenspace that would not be developed by the applicant but would instead be retained for future strategic highway improvements.

5.5.3 By this time, the Lower Berse Farmhouse plot had been incorporated into the scheme, enabling the local centre to move into this area and secure the long-term future of the listed building and the retention of existing playing pitches.

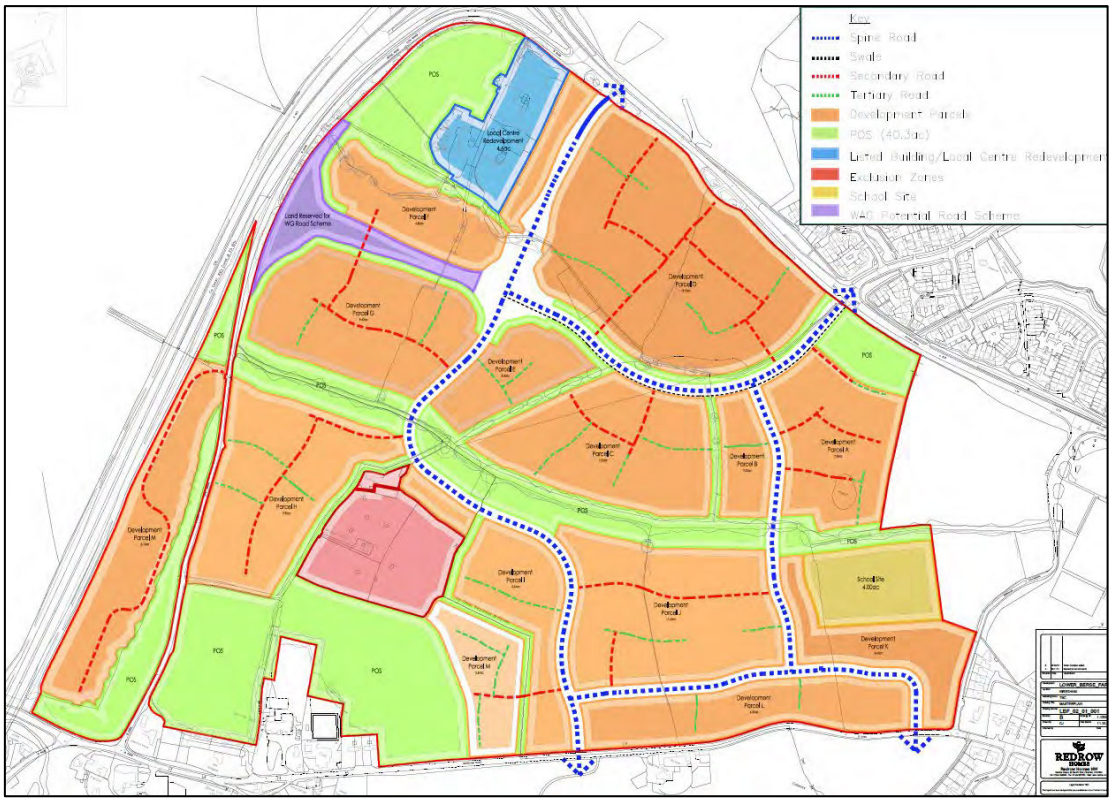


Figure 5.2: 2021 Layout Design

5.5.4 The layout was further refined during 2022 in response to the requirements of Natural Resources Wales (NRW) with regard to wastewater treatment and the removal of phosphates from foul discharge. This requirement relates to recorded exceedances of phosphates in the River Dee SAC (the site is located within the catchment of the River Dee) and insufficient phosphate removal capability in existing wastewater treatment works. Accordingly, all new development proposals put forward during this period were required to include their own treatment facilities that would remove phosphates from wastewater.

5.5.5 The masterplan at Figure 5.3 is from 2022 and includes a WWTW at the far eastern corner of the site, which would treat all foul water from the site and remove phosphates. This was confirmed through the specification of the WWTW and a nutrient neutrality assessment carried out as part of the EIA process.



Figure 5.3: 2022 Layout Design

5.5.6 In 2023, the Welsh Government confirmed that the potential strategic highways improvement plan for the adjacent A483 would not be progressed. Therefore, the area that was safeguarded for this future use was repurposed to increase the developable area. This allowed the plans to be more closely aligned with the number of dwellings specified in the draft LDP planning policy.

5.5.7 This version of the masterplan shown in Figure 5.4, below, was submitted with the planning application in 2023. It was submitted as one of two illustrative options, the second of which did not include the WWTW, instead replacing it with residential development to allow for the scenario where the Five Fords WWTW was upgraded such that an onsite treatment solution was not required. This version of the masterplan included up to 1,520 dwellings.



Figure 5.4: 2023 Layout Design

5.5.8 Further to the submission of the planning application, it was confirmed by Welsh Water in 2024 that the Five Fords Wastewater Treatment plant had added phosphate stripping technology to achieve the phosphate limit specified by NRW. Welsh Water also confirmed that it can now accommodate foul flows from the proposed development at Five Fords, whilst operating within their mandated phosphate limits. As a result, the onsite WWTW was removed from the proposals in June 2024 and that area of the site is now proposed only for residential development.

5.5.9 During meetings Highway Officers from Welsh Government and Wrexham CBC in 2024, it was confirmed that the A483 Junction 4 improvement scheme had been restored as an option and that the safeguarded corridor to enable its future construction should be reinstated in the proposed development plans. Accordingly, the corridor was reinstated in the current version of the masterplan, as shown on Figure 5.5 below, and on the parameters plans that have been assessed in this ES and underpin the revised version of the planning application.



Figure 5.5: The 2024 Masterplan

5.6 Summary

5.6.1 This chapter has identified the alternatives considered by the applicant when developing the design of the proposed development, in accordance with the requirements of the EIA Regulations. It describes the planning policy influences on the approach to the design of the proposals, the iterative process of environmental assessment and the key design responses to environmental challenges.

5.6.2 The chapter also presents a summary of the no development scenario, which is the potential future conditions if the development were not to be progressed. It is concluded that there would be some beneficial outcomes of the no development option compared with the development progressing; notably these include lower levels of traffic on the surrounding roads and the retention of green infrastructure on the site. However, given the allocation on the site, the likelihood of the site remaining undeveloped is considered remote and, therefore, the no development alternative is considered to be unrealistic in the longer term.

5.6.3 On the basis of the above, the proposals comply with the objectives of emerging local planning policy and have been developed alongside the EIA process to ensure that any environmental effects are mitigated as far as possible.

Planning Policy Context

6.1 Introduction

6.1.1 This chapter outlines the prevailing planning policy framework which should be treated as a material consideration in determining this application. The detailed analysis of how the proposed development complies with national and local planning policy is set out within the supporting Planning Statement prepared by The Planning Consultancy, which is submitted with the planning application. Policies of relevance to the specific technical assessments within this ES are summarised within each technical chapter for ease of reference.

6.2 National Planning Policy

Planning Policy Wales

6.2.1 The 12th Edition of Planning Policy Wales (PPW) was published in February 2024 and sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales.

6.2.2 The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales.

6.2.3 PPW provides extensive guidance in relation to development and the natural environment. PPW and TAN policies are summarised in the relevant technical chapters, but include Minerals, The Historic Environment, Green Infrastructure, Landscape, Biodoversity and Ecological Networks, Water and Flood Risk, Air Quality and Soundscape, and Lighting.

6.3 Local Planning Policy

Wrexham Local Development Plan

6.3.1 Wrexham County Borough Council (the Council) adopted its new Local Development Plan (LDP), which covers the period between 2013 and 2028, in December 2023.

6.3.2 Some of the most significant policies within the document of relevance to the current application are summarised as follows:

- **Policy SP1** makes provision for 8083 new dwellings, of which 770 will be affordable, in order to deliver a requirement of 7,750 over the Plan period
- **Policy SP3** allocates Key Strategic Site 1 (KSS1) (Land at Lower Berse Farm, Ruthin Road, Wrexham) for a residential-led mixed-use scheme comprising a minimum of 1500

dwellings, 400 of which will be delivered during the plan period following completion of works to Junction 4. Development will include an element of affordable housing and associated community uses, along with enabling and necessary infrastructure which will be delivered in a phased manner with specific details tied into planning consents:

  - Enabling Infrastructure:
    - Highway improvements to address known infrastructure capacity constraints at junction 4 of the A483(T) Road with the A525.
  - Necessary Infrastructure:
    - Education: on site provision of a 420 place primary school and contributions towards secondary provision in the vicinity of the site;
    - Public open space;
    - Community Facilities;
    - Active Travel; and
    - Public transport.
  - Affordable Housing:
    - The starting point for negotiation will be the delivery of 15% affordable housing.
    - Affordable housing will be expected to be delivered on site in the first instance and only in exceptional circumstances will off site or commuted sum contributions be accepted in lieu of on-site provision.

- **Policy SP6: Green Wedges** recognises that Green Wedges are designated between settlements to ensure the protection and openness of the land during the Plan period.
- **Policy H1: Housing Allocations** confirms the land at Lower Berse Farm as a key strategic site for delivering the Council's houding requirements.

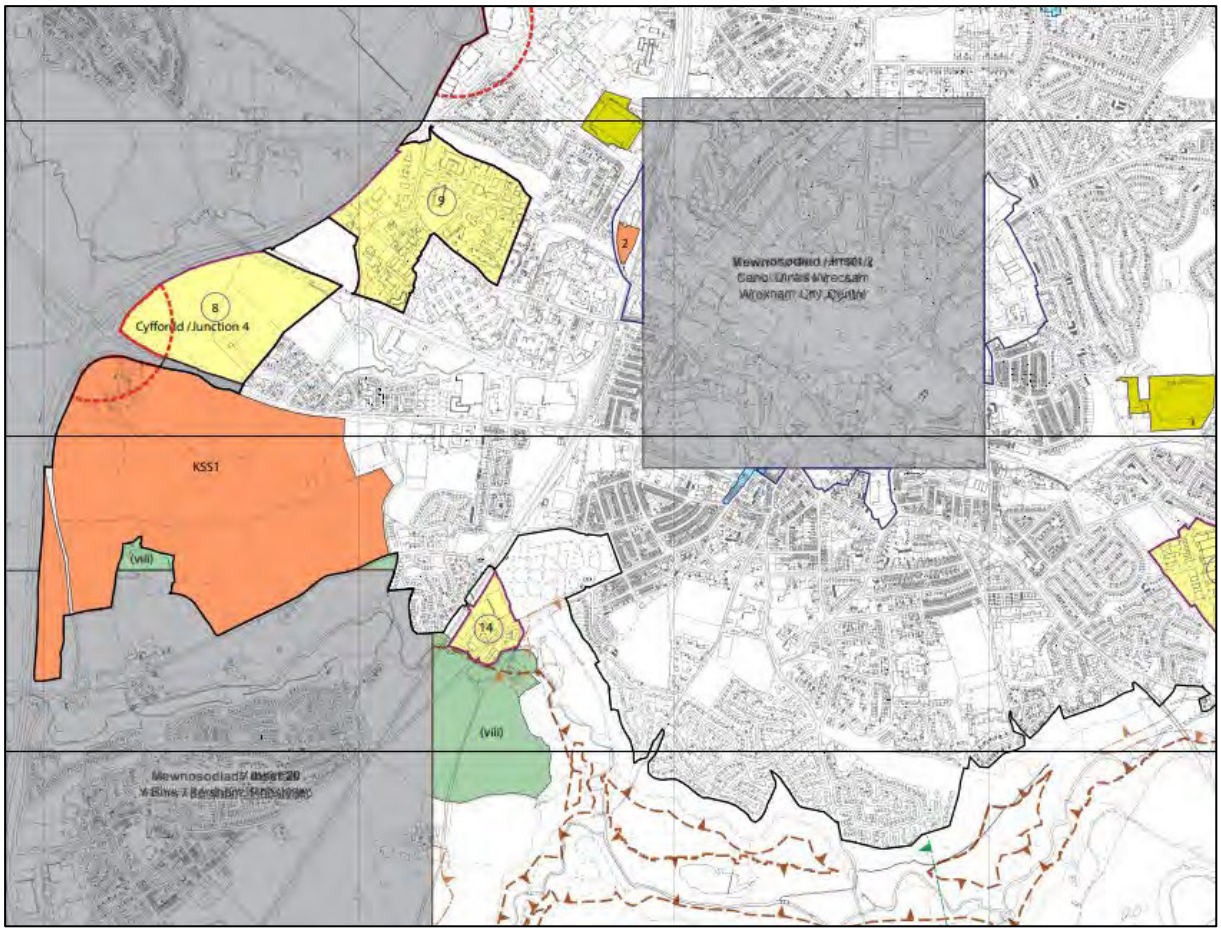


Figure 6.1: Extract from LDP Proposals Map 1 Showing Allocation KSS1 (shaded orange)

6.3.3 The LDP includes a wide range of environmental policies, which are referenced in the technical chapters of the ES where relevant. These include:

- Policy SP14: Natural Environment
- Policy SP15: Historic and Cultural Environment
- Policy SP16: Minerals Supply and Safeguarding
- Policy SP18: Climate Change
- Policy SP19: Green Infrastructure
- Policy NE1: International and National Nature Conservation Designations
- Policy NE2: Local Designations for Nature Conservation and Geological Importance
- Policy NE3: Trees, Woodlands and Hedgerows
- Policy NE4: Areas of Outstanding Natural Beauty
- Policy NE5: Special Landscape Areas
- Policy NE6: Waste Water Treatment and River Water Quality
- Policy T1: Managing Transport Impacts
- Policy T2: Active Travel
- Policy MW1: Minerals Safeguarding

6.4 Summary

6.4.1 This section of the ES summarises the planning policy context in which the application is made. It presents the policies of relevance to the application, which have informed the applicant's development of the proposals and against which the application will be evaluated by the Local Planning Authority.

6.4.2 The site is located primarily within the allocation referred to as Key Strategic Site 1 in Policy SP3 of the Local Plan, which sets out the specific requirements for the development of this area. The southern corner of the site, adjacent to Bersham Road, remains in the Green Wedge.

7 Landscape and Visual

7.1 Introduction

7.1.1 This chapter considers the potential effects of the Proposed Development on landscape character and visual amenity.

7.1.2 The chapter has been written by Chartered Landscape Architects at The Environment Partnership (TEP) Limited, a Landscape Institute Registered Practice.

7.1.3 The purpose of LVIA is twofold:

- It provides a systematic and objective assessment of the potential effects of development on baseline landscape and on visual amenity; and
- It informs design of development to avoid, reduce or minimise impact on important baseline resources.

7.1.4 This chapter includes a review of published landscape documentation relevant to the Site; a description of the baseline conditions on the Site and the surrounding area; a description of existing visual amenity and views towards the Site and a description of the Proposed Development including embedded mitigation measures. The LVIA assesses the potential effects of the Proposed Development on landscape character and landscape features, and effects on visual amenity during construction and operation.

7.1.5 Potential impacts have considered the principles set out in the Parameter Plans (Drawing Refs: D9730.009F, D9730.010B and D9730.011B) and landscape design proposals illustrated on the Masterplan Framework (Drawing Ref: PS9730.001G) are also considered in the assessment of effects.

7.1.6 This LVIA has been undertaken in accordance with the method set out in 'Guidelines for Landscape and Visual Assessment, Third Edition' (GLVIA3) (2013) produced by the Landscape Institute (LI), and the Institute of Environmental Management and Assessment (IEMA). The assessment method is summarised in Section 7.3 below and is provided in detail at **Appendix 7.1**.

7.1.7 This LVIA is supported by a series of Figures provided in **Appendix 7.2** to this report. Figures show relevant landscape and environmental designations, topography, and published landscape character assessment data; identify visual receptors; and show viewpoint locations. Photographs from selected viewpoints are presented at **Figures 7.11 to 7.33**.

7.2 Planning Policy Context

The European Landscape Convention

7.2.1 The European Landscape Convention (ELC) came into force in the UK on 1st March 2007; the principal component of the ELC is the need to develop a framework of policies (economic, social, and environmental) dedicated to the protection, management and planning of landscape, and raising awareness of landscape issues at all levels.

7.2.2 The ELC adopts a broad definition of landscape: *"landscape means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors."*

7.2.3 This places a broad emphasis on landscapes everywhere and in any condition – land, inland water, marine, natural, rural, and peri-urban, outstanding, ordinary or degraded. It therefore provides the focus on landscape as a resource in its own right.

7.2.4 The ELC recognises that today's landscapes are the result of continuous change and that this change will continue in the future. The ELC Implementation Framework places the emphasis on the effective planning, good design and sensitive management of landscapes with people in mind. UK planning policy is compliant with this approach.

Planning Policy Wales

Planning Policy Wales (PPW) sets out the Government's planning policies for Wales and how these are expected to be applied at a local level in development plans and how developers should adhere to them. PPW places great emphasis on plans and developments contributing to sustainable development. The following chapters of PPW are applicable to the LVIA.

Chapter 3: Strategic and Spatial Choices

7.2.5 PPW emphasises the importance of good design in creating sustainable places. Design is taken to mean *'the relationship between all elements of the natural and built environment and between people and places. To achieve sustainable development, design must go beyond aesthetics and include the social, economic, environmental, and cultural aspects of the development'.* PPW states that good design can help to ensure high environmental quality, with landscape and green infrastructure being integral parts of the design process.

7.2.6 PPW further highlights that the special characteristics of an area *'should be central to the design of the development'* and that *'the layout, form, scale and visual appearance of a proposed development and its relationship to its surroundings are important planning considerations'*.

Chapter 6: Distinctive and Natural Places

7.2.7 PPW identifies the importance of valuing the quality of Welsh landscapes and historic environment. PPW states that *'the characteristics and environmental qualities of places varies*

across Wales, creating distinctive or unique features associated with their particular natural or cultural heritage and these should be recognised and valued, in and of, themselves and should be protected and enhanced.'

7.2.8 PPW recognises the value of green infrastructure, stating that *'distinctive and natural places must maintain or incorporate green infrastructure, recognising the wide ranging role it can play, as key components of their natural and built fabric*.' A Green Infrastructure Statement is submitted with the application.

7.2.9 Section 6.3 Landscape recognises the value that trees, woodlands and hedgerows make to landscape character and sense of place. Paragraph 6.4.39 states that *'planning authorities must protect trees, hedgerows, groups of trees and areas of woodland where they have ecological value, contribute to the character or amenity of a particular locality, or perform a beneficial and identified green infrastructure function'.*

Technical Advice Notes (TANs) (to be read in conjunction with PPW)

7.2.10 TAN 16 (Sport, Recreation and Open Space) outlines different open space typologies and provides benchmark standards for POS provision within new developments which has been considered in the development of the site masterplan.

Wrexham Local Development Plan 2013 – 2028

7.2.11 The Wrexham LDP is the planning policy document for the County Borough of Wrexham. It sets out key policies and land use allocations that will shape the future of Wrexham and guide development up to 2028. The Wrexham LDP replaces the Wrexham Unitary Development Plan.

7.2.12 The LDP has removed the Site from the Green Barrier and from the Special Landscape Area (SLA) previously identified in the Wrexham Unitary Development Plan 1996 - 2011.

7.2.13 Policies of relevance to landscape and visual matters are outlined below.

Policy SP6: Green Wedge

7.2.14 Policy SP6 recognises that Green Wedges are designated between settlements to ensure the protection and openness of the land during the Plan period. Green Wedge viii. Wrexham, Bersham, and Rhostyllen lies within the Site boundary.

Policy SP12: Design Principles & Masterplanning Framework

7.2.15 Policy SP12 states that '*all development will be required to be of a high quality, sustainable design which makes a positive contribution to the creation of locally distinctive places by complying with the masterplanning framework SPG and KSS schematics'*. The development proposals must demonstrate how they have taken account of local characteristics of the

surrounding areas and how innovative design solutions will enhance the quality of the built and natural environment.

Policy SP14: Natural Environment

7.2.16 Policy SP14 highlights that development will only be permitted where it *'seeks to protect, conserve and enhance the natural environment including:*

- *Special Areas of Conservation, Special Protection Areas, and Ramsar Sites;*
- *Sites of Special Scientific Interest and National Nature Reserves;*
- *Protected Species and their habitat;*
- *The Clwydian Range and Dee Valley Area of Outstanding Natural Beauty;*
- *Local Wildlife Sites;*
- *Local Nature Reserves;*
- *Special Landscape Areas;*
- *Natural landscape features and Green Infrastructure such as trees, hedges and woodland which contribute to the quality and diversity of the natural environment and play an important role in mitigating the impact of climate change;*
- *The quality of natural services including water, soundscape, air and soils; and*
- *Habitats and species of principal importance to Wales.'*

Policy SP15: Historic and Cultural Environment

7.2.17 Policy SP15 states that development will only be supported *'where it conserves, protects, preserves or enhances the following cultural and historic assets of the County Borough and their setting:*

- *Listed Buildings;*
- *Conservation Areas;*
- *Pontcysyllte Aqueduct and Canal World Heritage Site;*
- *Registered Historic Parks, Gardens and Landscapes; and*
- *Scheduled Monuments and Archaeological Remains.'*

Policy SP19: Green Infrastructure

7.2.18 Policy SP19 recognises that Wrexham's distinctive natural heritage provides a network of green and blue infrastructure and that the protection, conservation and enhancement of these needs to be reconciled with the benefits of development.

7.2.19 This policy further states that *'development will be required to maintain the extent, quality and connectivity of multi-functional green infrastructure on or near a site, and, where appropriate to enhance it by:*

- *Creating new interconnected areas of green infrastructure between the proposed site and the existing network;*
- *Filling gaps in the existing network to improve connectivity;*
- *Protecting the features most valuable for both nature and people; and*
- *In instances where loss of green infrastructure is unavoidable, provide mitigation and compensation for the lost assets on a site-specific basis.'*

Policy NE3: Trees, Woodlands and Hedgerows

7.2.20 Policy NE3 highlights that *'development will only be permitted where it does not cause unacceptable harm to trees, woodland and hedgerows of significant public amenity, natural or cultural heritage value or those that provide ecosystem services'*.

Policy NE4: Area of Outstanding Natural Beauty

7.2.21 Policy NE4 emphasises that within the Area of Outstanding Natural Beauty (AONB) development will only be permitted where it conserves or enhances the natural beauty of the area and its setting, with cumulative impacts also being taken into consideration. Under this policy development must:

- *'Not have an adverse impact on the special qualities of the AONB or the resources and ecosystem services on which the local economy and well-being of the area depends;*
- *Contribute to the social, economic and cultural well-being of the local community;*
- *Be of a scale, form, design, density and intensity of use that is compatible with the character of the AONB; and*
- *Be designed to an appropriately high standard in order to integrate with the existing landscape and where feasible enhance the landscape quality'.*

7.2.22 Policy NE4 also highlights that development proposals that are outside, but closely interlinked with the AONB must not have an adverse impact on the natural beauty of the AONB.

Policy NE5: Special Landscape Areas

7.2.23 Policy NE5 states that priority protecting, managing and enhancing the character and quality of the Special Landscape Areas (SLAs) as shown on the Wrexham LDP proposals map. There is not an SLA in the immediate or local vicinity of the Site.

Wrexham LANDMAP Supplementary Planning Guidance (SPG) (2007)

7.2.24 The Wrexham LANDMAP SPG was adopted in 2007 and provides a simplified version of the Wrexham LANDMAP - Technical Appendices adopted in 2004. The SPG identifies the 27

different Landscape Character Areas in Wrexham and summarises the key elements and features of the landscape. The SPG is described further in **Section 7.4**.

Local Planning Guidance Note No.7: Landscape and Development

7.2.25 The Guidance Note aims to provide clarity on landscape information requirements and help applicants to have a better understanding of landscape issues, with the objective of improving design standards.

Local Planning Guidance Note No.10: Public Open Space in New Housing Development

7.2.26 The Guidance Note highlights the importance of public open space for people's quality of life, providing opportunities for informal recreation and enhancing the visual appearance of an area. The note aims for developers to gain a better understanding of public open space requirements and funding.

Local Planning Guidance Note No.17: Trees and Development

7.2.27 The Guidance Note highlights the importance of protecting trees and the benefits of trees as an integral part of development design. The term "Tree" is used throughout this document, however much of the guidance is also applicable to hedgerows and large significant shrubs.

Local Planning Guidance Note No.30: Design

7.2.28 The Guidance Note provides guidance for developers and architects when designing residential developments. The Guidance Note states that landscaping is an integral part of a development scheme and should not be considered as an afterthought. Of particular relevance to the Site is guidance to retain and enhance biodiversity and provide new habitats and links such as green wedges, buffers and links between existing landscape features within and adjacent to the site to connect habitats.

7.3 Approach

Assessment Methodology

7.3.1 This LVIA has been undertaken in accordance with GLVIA3 (LI and IEMA, 2013), and with consideration to:

- An Approach to Landscape Character Assessment (Natural England, 2014);
- Technical Guidance Note 06/19 Visual Representation of Development Proposals (The Landscape Institute, 2019); and

- Technical Guidance Note 02/21 Assessing landscape value outside national designations (Landscape Institute, 2021).

7.3.2 GLVIA3 defines landscape as: *"an area, as perceived by people, the character of which is the result of the action and interaction of natural and/or human factors." Landscape character is defined in GLVIA3 as: "a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse."*

7.3.3 The method, including assessment criteria, is described in detail in **Appendix 7.1**, and is briefly discussed below.

7.3.4 The duration and reversibility of landscape and visual impacts have been assessed with the following considerations:

- Short term: 0-5 years during the construction period and during the operation of the finished Development;
- Medium term: 5-15 years, which represents the establishment phase of planting proposed, where relevant; and
- Long term: 15 years onwards for the life of the Development.

7.3.5 The LVIA is based on field assessment undertaken between March 2021 and October 2022. Seasonal differences in effects arising due to varying degrees of screening and filtering from vegetation are mentioned where relevant.

7.3.6 The LVIA involved the following key stages:

- Desk based assessment involving a review of relevant information, guidance and planning policy relating to the type of development proposed and to landscape and visual amenity;
- Site survey and assessment to augment the baseline assessment, assess the impacts of the Development and undertake photography at viewpoint locations;
- Baseline reporting and preliminary assessment;
- Preparation of baseline drawings to inform the assessment;
- Assessment and reporting of effects;
- Assessment of in-combination effects; and
- Assessment of residual effects following identification of additional mitigation.

Scope

7.3.7 An initial step in the assessment process involves defining the scope of the assessment. The scope of this LVIA has been informed by:

- Desk study, including the identification of designated landscapes, key viewpoints, and landmarks; analysis of landform and analysis of Zone of Theoretical Visibility (ZTV) mapping (as shown on **Figures 7.1 – 7.10**); and
- Field assessment, including analysis of Site features and features of the surrounding townscape and landscape; and analysis of landform and screening by built-form and vegetation in the Site's immediate context, and in its surroundings.

7.3.8 A study area extending up to 5km from the Site boundary has been identified as providing sufficient context within which an assessment of potential townscape, and landscape impacts, and an assessment of potential impacts on people's views, can be framed.

7.3.9 Beyond this study area, it was concluded that the Proposed Development would not have significant impacts on landscape and visual amenity due to the dense built form within the urban context and screening effects of intervening vegetation.

7.3.10 The study area includes parts of the Clwydian Range and Dee Valley National Landscape, which until late November 2023 was known as the Clwydian Range and Dee Valley Area of Natural Beauty (AONB). The change of designation from AONB to National Landscape applies to all 46 designated sites in England and Wales. This LVA uses the term National Landscape, except when referring to published documents.

Consultation

7.3.11 A summary of consultation which has been undertaken in relation to the LVIA is included in **Table 7.1** below, in chronological order.

Table 7.1: Consultation Summary

Date	Event	Comments	Response
10th June 2021	EIA Scoping Response from Natural Resources Wales	NRW advised that: *'The Clwydian Range and Dee Valley AONB lies 2.5km to the west of the proposed development site adjacent to the established urban centre of Wrexham. At this distance we do not consider significant visual effects to be likely. The AONB therefore does not need to be scoped into the EIA.*	Viewpoints from within the National Landscape (formerly the AONB) are discussed further in Section 7.4. The principles of the proposed development have considered the landscape constraints and opportunities of the Site. Throughout the landscape and visual assessment, potential

Date	Event	Comments	Response
		The LPA should expect a Development Strategy and Masterplan for the site to be submitted, to explain how TAN12 Design and PPW11 Placemaking, Green infrastructure, Active social places, Recreational Spaces, Distinctive and natural places have been addressed within an integrated scheme. Once the LPA is satisfied with the strategy and indicative layout the EIA assessment of impacts can be undertaken, to identify any residual effects that require mitigation. Landscape professionals with landscape design, residential site master planning and impact assessment experience should be procured to provide input for the planning submission'.	effects were reviewed and assessed as part of this iterative design.
14th July 2021	EIA Scoping Response from Councillor Phil Wynn	*'The bridal* [sic] *way through the middle of the site is a significant feature of the landscape and due to it possibly* [sic] *being an ancient drover pathway ought to be researched further to establish its significance as a rare national example of a drove way. Any impact on the hedged bridal way ought to be minimal and as such a development barrier ought to be established to protect this feature'.*	PRoW Bersham Bridleway BER/3 which runs east-west through the Site will be retained as part of an area of Public Open Space.
19th July 2021	EIA Scoping Response from Wrexham County Borough Council	*'Notwithstanding the existing UDP designations of the site as Green Barrier and Special Landscape Area, in landscape terms the site is relatively self contained, being bounded by existing development and roads. The development will inevitably have a significant impact upon the landscape at site level. However taking into account the context of the site, the development will not have a significant impact upon the wider landscape surrounding Wrexham.* *Whilst a formal application will need to be accompanied by a landscaping and visual impact assessment, this does not need to be included within the scope of the Environmental Statement'.*	Section 7.6 of this Chapter considers the effects of the Proposed Development on landscape receptors at the Site level and local level. Whilst the LVIA was not scoped to be within the EIA it has been presented as a chapter in the ES rather than as a standalone report

Date	Event	Comments	Response
23rd October 2023	Wrexham County Council's Conservation Officer Comments	*'The proposals are for a new housing development on the fields between Bersham and Ruthin Road, and aims to provide up to 1520 new dwellings. This would result in the infilling of the gap between Wrexham and Bersham which currently has a semi-rural character and would irreversibly change the site from a largely unchanged agricultural landscape to an urban one with houses, new road infrastructure, lighting, traffic, people etc. The current fields provide a welcome break in the urban sprawl of the city, their development would bring the Wrexham and Bersham together, eroding the character of the conservation area and its sense of identity as an outlying village.*	Section 7.6 of this Chapter considers the effects of the Proposed Development on landscape receptors at the Site level and local level. Effects on the Conservation Area are considered within the Historic Environment Assessment Chapter.
23rd October 2023	Wrexham County Council's Conservation Officer Comments	*'The masterplan shows that the development along Ruthin Road is set back in order to create a green frontage to the road, the development fronting Bersham Road is similarly set back though seemingly to a lesser extent. The view eastwards from the conservation area to the city is from an elevated position, this view is important as it highlights the separation from Wrexham and the semi-rural character of the village. Under these proposals this would be infilled and the higher level of Bersham would mean views would be across and over the new development.*	Section 7.6 of this Chapter considers the effects of the Proposed Development on visual receptors at the Site level and local level. Effects on the Conservation Area are considered in the Historic Environment Assessment Chapter.

Significance Criteria

Assessing the Significance of Landscape Effects

7.3.12 The assessment of the likely significant effects of the Proposed Development on landscape receptors considers receptor sensitivity (determined by susceptibility to change and value of the landscape or townscape) and the magnitude of the impact (size or scale; geographical extent; negative, positive or neutral nature of the effect and its duration and reversibility).

7.3.13 Landscape sensitivity is a judgement that combines evaluations of landscape or townscape value and landscape or townscape susceptibility to change to the development proposed. Sensitivity is classified as either high, medium or low in accordance with the full method at **Appendix 7.1**.

7.3.14 The relative value or importance attached to the landscape has been classified on a scale of international, national, regional, local and community. Value can be expressed through a range of factors including designations, associations and cultural heritage. Further details are provided in the full method at **Appendix 7.1**.

7.3.15 The susceptibility of a landscape to change is dependent on the characteristics of the receiving landscape and the type and nature of the development proposed. The assessment of susceptibility will be specific to the development proposed and the character or special qualities of the receiving landscape. The judgement on the susceptibility of a landscape to change from the Development will be recorded as high, medium, or low.

7.3.16 The landscape effects during construction and following the completion of the Development have been assessed using standard criteria regarding the magnitude of impact. The degree and type of impact has been classified as either positive, negative, or neutral on a scale of high, medium, low or negligible.

Assessing the Significance of Visual Effects

7.3.17 The assessment of the likely significant effects of the Proposed Development on visual receptors considers receptor sensitivity (determined by susceptibility to change and value of the view) and the magnitude of the impact (size or scale; geographical extent; negative, positive or neutral nature of the effect and its duration and reversibility).

7.3.18 Visual receptor sensitivity is a judgement that combines evaluations of visual value and visual susceptibility to change to the development proposed. Sensitivity is classified as either high, medium or low in accordance with the full method at **Appendix 7.1**.

7.3.19 The relative value or importance attached to views has been classified on a scale of international, national, regional, local and community. Value can be expressed through a range of factors including designations, associations and cultural heritage. Further details are provided in the full method at **Appendix 7.1**.

7.3.20 The susceptibility of different visual receptors to potential changes in views and visual amenity is mainly a function of:

- *"the occupation or activity of people experiencing the view at particular locations; and*
- *the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations."*

7.3.21 The visual effects during construction and following the completion of the Development have been assessed using standard criteria regarding the magnitude of impact. The degree and type of impact has been classified as either positive, negative, or neutral on a scale of high, medium, low or negligible.

Criteria for assessing Significance

7.3.22 The assessment considers the sensitivity of the landscape, and the magnitude of the impact, to come to an overall judgement on the significances of effects, in accordance with the LVIA Method at **Appendix 7.1**. Effects can be:

- Major Beneficial;
- Moderate Beneficial;
- Minor Beneficial;
- Negligible;
- Minor Adverse;
- Moderate Adverse; and
- Major Adverse.

7.3.23 The focus of the Environmental Statement should be on likely significant effects and for the purposes of this assessment effects of moderate significance or greater are deemed those which would be reported to be significant.

Assumptions and Limitations

7.3.24 Field assessment was carried out during the daytime in March 2021 and October 2022. Views were surveyed from publicly accessible locations only. Where the views from private properties have been considered, the assessment has been carried out from the nearest publicly accessible viewpoint.

7.3.25 Consideration has been given to the seasonal differences in effects arising from the degree of vegetative screening and/or filtering of views that would apply in summer and winter. The assessment has been provided for "worst-case" situations (being the season with least leaf cover and therefore minimal vegetative screening).

7.3.26 It is envisaged that construction activity would commence in 2025 with completion anticipated and the Development becoming fully completed and operational during 2040. Whilst construction will be phased across the Site, for the purposes of this assessment, it has been assumed that works would all be undertaken simultaneously as this represents the worst-case scenario.

7.3.27 This LVIA is based on the Masterplan Framework, which set out the key principles of the scheme including the location of access and development and areas of proposed planting.

7.3.28 In assessing both landscape and visual effects the influence of time, particularly the growth of new vegetation can be substantial. The post-completion effects have therefore been assessed at two stages (Year 1 and Year 15).

7.3.29 The time that new planting takes to establish is dependent on species, stock size, the nature of the growing conditions and other factors such as maintenance and vandalism. It is assumed that planting will be implemented in Year 1 with an average growth rate of 300-400mm/year.

7.3.30 The Screened ZTV, and the LVIA have assumed that existing woodland and trees beyond the Site will be retained and managed in accordance with good practice.

7.4 Baseline Conditions

7.4.1 This section identifies the current landscape and visual conditions of the Site and the study area.

Landscape Baseline

7.4.2 This section considers the relevant designations present in the study area, summarises characteristics of the landscape described in published landscape character assessments and provides a description of the Site within this context. The relevant information is presented on **Figure 7.1** - Landscape and Environmental Designations, **Figure 7.2** – Wrexham LANDMAP SPG Landscape Character Areas, **Figures 7.3 to 7.7** which show LANDMAP layers, **Figure 7.8** – Topography and **Figure 7.9** – Landscape Context.

7.4.3 A 5km study area has been used to set the Site in a context where a range of designations relating to environmental quality can be identified. The nature of the Proposed Development and the Site means that effects on landscape and views are likely to be contained within the area as shown at **Figure 7.10**.

Landscape and Environmental Designations

7.4.4 In accordance with GLVIA3, relevant designations are considered as part of determining the value of the landscape potentially affected by the Proposed Development. The LVIA does not consider effects on each asset's conservation interest or its appreciation and understanding.

7.4.5 The Site is not covered by any national or local landscape designations. The study area incorporates statutory and non-statutory designations in relation to landscape, heritage and ecology which are described further below.

Clwydian Range and Dee Valley National Landscape

7.4.6 The Clwydian Range and Dee Valley National Landscape lies approximately 3km to the west of the Site at its nearest point. National Landscape are recognised as being exceptional landscapes of distinctive character and natural beauty. They are of national importance and receive special protection from Welsh Government. There is intervisibility between the National Landscape and the Site due to the higher topography of the National Landscape which allows some long distance and wide panoramic views over Wrexham. Following receipt of the Scoping Opinion from Wrexham Borough County Council potential effects on the National Landscape have been scoped out of this assessment.

Sites of Special Scientific Interest (SSSIs)

7.4.7 There are four SSSIs scattered around the study area. The closest to the Site is the Gatewen Marsh SSSI which lies approximately 1.3km to the north. This SSSI occupies the flat valley bottom of a tributary of the River Gwenfro and creates suitable conditions for the development of wetland vegetation. It is unusual in containing substantial stands of Great Reedmace in shallow water with Brooklime, Water Plantain and Bottle Edge. The SSSI designation does not relate to landscape and its value is because of nature conservation interests that do not manifest particularly in the landscape.

Special Areas of Conservation (SACs)

7.4.8 The Johnstown Newt Sites SAC lies approximately 1.9km to the south of the Site. These are post-industrial sites where coal and clay have been extracted and they are designated for its population of great crested newts, which is one of the largest known in Great Britain. The SAC designation does not relate to landscape and its value is because of nature conservation interests that do not manifest particularly in the landscape.

Listed Buildings

7.4.9 There is one Listed Building within the Site boundary, which is the Grade II* Lower Berse Farmhouse in the north-west corner of the Site.

7.4.10 There are several Listed Buildings in close proximity to the Site and scattered throughout the study area. Outside of the Site boundary, the closest is Grade II Listed Nos. 9 and 10 Bunkers Hill, Bersham, Clwyd, which are adjacent to the south of the south-western corner of the Site.

Scheduled Monuments

7.4.11 There are several Scheduled Monuments scattered throughout the study area. The closest to the Site is the Bersham Ironworks Scheduled Monument, which lies approximately 170m to the west of the Site. There is no intervisibility between the Site and the Scheduled Monument beyond intervening tree cover.

Registered Historic Park and Gardens

7.4.12 There are two Registered Historic Parks and Gardens (RHPG) in the study area. The closest to the Site is the Wrexham Cemetery RHPG which lies approximately 415m to the west and is a late 19th Century garden cemetery with surviving layout and planting which consists of ornamental trees and shrubs, both deciduous and coniferous. Due to intervening built form and vegetation, there is no intervisibility with the Site.

7.4.13 The Erddig RHPG lies approximately 450m to the south-west of the Site. The grand formal gardens of the RHPG dates from the early 18th Century and was designed in the Dutch style

around an ornamental canal. On the Lle Geo-Portal for Wales map, there is a significant view from the Erdigg RHPG to the north-west towards the vicinity of the Site, this was considered further during the field survey. Due to intervening built form, landform and vegetation, there is no intervisibility with the Site.

Conservation Areas (CA)

7.4.14 The Bersham CA adjoins the south-west corner of the Site and extends beyond to the south and west. The CA is designated due to its special character which has been greatly influenced by the valley landscape setting and the historical and architectural association with John Wilkinson's ironworks and the Plas Power Estate. There is intervisibility with the CA in the south-western part of the Site.

7.4.15 Other CAs within the study area, including the Grosvenor Road CA, Wrexham Town CA, Salisbury Town CA, Fairy Road CA and Hightown Barracks CA which all lie beyond 900m to the east and north-east of the Site in and around Wrexham Town Centre. There is no intervisibility with these CAs.

Review of Published Landscape Character Assessments

7.4.16 This section summarises key characteristics of the landscape described in published landscape character assessments followed by an analysis of the local landscape based on fieldwork undertaken in March 2021 and October 2022 by a Chartered Landscape Architect. The location of the Site in relation to published landscape character areas is shown on **Figure 7.2**.

7.4.17 The relevant published landscape character assessments are:

- National Landscape Character Areas (Natural Resources Wales, 2014);
- LANDMAP; and
- Wrexham LANDMAP Supplementary Planning Guidance (2007).

National Landscape Character Areas (Natural Resourced Wales, 2014)

7.4.18 National Landscape Character Areas (NLCAs), identified by Natural Resources Wales (NRW), form the broadest scale of landscape character assessment in Wales.

7.4.19 The Site is in NLCA 13: Deeside and Wrexham and it is described as a border area, extending from the mouth of the Dee along the coast as far as Point of Ayr, and inland as far south as the Ceiriog Valley. It includes several settlements and centres of population, the principal being the towns of Chirk, Wrexham and its main satellites Ruabon and Rhosllanerchrugog in the south. Parts of the character area are heavily industrialised, and the pre-20th Century industrialisation of the Wrexham area took advantage of its resources of coal, iron-ore, clay and limestone, as well as free-flowing streams to turn industrial water-wheels.

7.4.20 The area includes busy developed areas around Connah's Quay, Queensferry and Wrexham with transport links such as the A55 Expressway, the A548 coast road and the A483 and A494 trunk roads, presenting traffic noise, movement and night lighting.

7.4.21 Key characteristics of NLCA 13 include:

- *'Lowland, foothills and levels - sloping down to the lower Dee and Dee Estuary. Carboniferous Coal Measures interspersed with outcrops of Millstone Grit, Holywell shales and Cefn-y-Fedw sandstones. Glacial till, fluvio-glacial and river terrace drift overlay in parts of the valley floor, giving rise to localised gentle land form variation.*
- *A single large river, the Dee, traverses the area. The Dee opens out into a broad estuary with tidal sand and mud flats. A number of minor rivers dissect the landscape, for example, the Alyn and Eitha, and associated streams.*
- *Narrow, incised, wooded tributary valleys – many running down from the west.*
- *Mixed pasture and some arable - and farm woodland cover.*
- *Archaeology - variety of historic sites indicate the former strategic importance of the coastal route and the turbulent history of the Marchlands, including Offa's Dyke and Wat's Dyke. Late Medieval parklands and ecclesiastical and funerary sites.*
- *Urban settlements - a strongly settled character is apparent in the central and southern parts of the character area, with the relatively large, almost linked settlements of Holywell-Connah's Quay-Mold-Wrexham-Ruabon.*
- *Small settlements – outside urban areas, compact villages associated with landed estates and isolated farmsteads, or coalesced ribbon developments and encroachment upon commons, which are the legacy of the former coal and lead mining industries.'*

7.4.22 The Site and its surroundings exhibit some of the characteristics of the NLCA including arable land and woodland cover.

7.4.23 NRW's NLCA descriptions provide a very broad assessment, covering a large area. They do not provide details directly relevant to the Site or its immediate surroundings, other than to establish the underlying characteristics of the wider landscape. A more detailed and Site relevant landscape character assessment is provided later in this section.

LANDMAP

7.4.24 LANDMAP (Landscape Assessment and Decision Making Process) is landscape guidance for Wales developed by the Countryside Council for Wales (CCW) and the Wales Landscape Partnership Group. Landscape characteristics, qualities and influences on the landscape are recorded and evaluated into a nationally consistent data and retained as a Geographical Information Systems (GIS) based landscape resource. The information is recorded in five layers comprising:

- Geological Landscape;

- Landscape Habitats;
- Visual and Sensory;
- Historic Landscape; and
- Cultural Landscape.

7.4.25 NRW guidance on the application of LANDMAP explains that the use of all five layers of information promotes sustainable landscape decision-making as what may be of low importance in one particular layer may be of high importance in another.

7.4.26 Within each of the five layers, there are 'aspect areas'. Each 'aspect area' is evaluated and given a score. The evaluation categories are as follows:

- Outstanding - sites or areas of international or national importance;
- High - sites or areas of regional or county importance;
- Moderate - sites or areas of local importance;
- Low - sites or areas of low value;
- Unknown - insufficient information exists to allow the element to be evaluated.

7.4.27 Results of the evaluation matrix for 'aspects' of the Site across LANDMAP are referred to below.

Landscape Habitats

7.4.28 The Site is in Landscape Habitat Area WRXHMLH031 – Talwrn Grassland**.** This area incorporates a large area of small and medium sized fields and hay meadows bounded by hedges and areas of woodland.

7.4.29 The overall value of these habitats is reported to be high.

Visual and Sensory

7.4.30 The Site is within Visual and Sensory Area WRXHMVS065- A483 Mold Road Corridor (see **Figure 7.4**). The area comprises the hinterland low lying land around Wrexham town and its outlying urban villages, generally rural in nature but often with significant noise from A483, adjacent roads and the railway. The area is generally low lying open farmland with a large open field pattern with well-defined hedgerow boundaries. The original rural character has been significantly weakened by urban influences with some pockets of interest. The area is classified as rolling lowland farmland but heavily influenced by the A483, Mold Road. Other roads and rail corridors subdivide the wider area, with pylons, views of housing and industry, mining and quarrying a frequent occurrence.

7.4.31 The overall value of the area is considered to be moderate – '*The aspect engenders many of the visual and sensory responses of road corridors throughout the area and displays no or few features that are either rare, representative or of particular value to adjacent aspect areas or visual and sensory criteria. There is a relatively strong visual unity within the aspect due to the*

constant presence of the road corridor and the elements associated with that. However the general quality of the wider rural area and standard of management is of a higher evaluation than the adjacent areas'.

Geological Landscape

7.4.32 The Site is within Geological Landscape Area WRXHMGL064 – The Wauns - Berse. See **Figure 7.5**. This area is reported to be of high value with fluvioglacial features of regional importance.

7.4.33 The condition is considered to be fair, with the area modified by development.

Historic Landscape

7.4.34 The Site is within Historic Landscape Area WRXHMHL008 – Windy Hill. See **Figure 7.6**. The aspect area is characterised by predominantly hedged fields with isolated post-medieval farmsteads and a variety of mines, collieries and tile works.

7.4.35 The area is reported to be of high value.

Cultural Landscape

7.4.36 The Site is in Cultural Landscape Area WRXHMCLS139 – A483 Mold Road Corridor. See **Figure 7.7**.

7.4.37 This is an area now devoted largely to sheep-rearing but which has historically been exploited for lead and coal. The lead-mining history of the area is interpreted at Minera. The value is reported to be high and the condition is fair.

Wrexham LANDMAP Supplementary Planning Guidance (SPG) (2007)

7.4.38 The Wrexham LANDMAP SPG has considered the detailed LNADMAP layers in characterising the area into Landscape Character Areas. It identifies that the Site is in LCA 7d: West Wrexham Ridges and Valleys.

7.4.39 Key characteristics of LCA 7d: West Wrexham Ridges and Valleys include:

Visual character:

- Visually varied and complex, including lowland, valleys and hill and scarp areas;
- Characteristic undulating hill slopes with wooded valleys;
- Views towards Wrexham and the lowlands;
- Urban villages and Wrexham linked by roads crossing open lowland farmland area;
- Scattered groups of buildings in local Cefn sandstone and stone-built village cores, individuality in later additions but much standardised modern housing development.

Geological character:

- The complex landform is related to geological faults, with alternating series of resistant sandstone ridges, and Coal Measure valleys of Carboniferous age;
- Villages are built on outcrops of Cefn Rock (sandstone) which has been quarried for local building stone;
- Glacial till covers much of the lower areas, with glacial sands and gravels towards Wrexham;
- Many artificial landforms including the former Brymbo steelworks site.

Ecological character:

- Much of the non-built area is improved grassland or arable of relatively low value;
- Important wetlands include reed mace swamp at Gatewen Moss and rich swamp and marshy grassland at Higher Berse Marsh. Gwenfro valley has wet woodland and areas of valuable lowland pasture;
- Plas Power tip and the former Brymbo Steelworks site are being restored mainly to broadleaved woodland.

Historical character:

- Countryside has remnants of ridge and furrow, regular and irregular fields, but much land has been disturbed;
- Most settlement is related to 19th and 20th Century mining and industry;
- Remnants of Bryn y Gaer prehistoric military hillfort at Pentre Broughton and the route of Offa's dyke can be identified;
- Brymbo steelworks heritage area and Plas Power colliery buildings have been preserved;
- Network of disused industrial railway lines crosses area.

Cultural character:

- Urban villages retain their own cultural identity, but this is becoming weakened;
- Area is affected by A483 corridor, which separates it from Wrexham, but increases accessibility to commuters;
- Agriculture is still of some importance but horsiculture is an increasing land use.

7.4.40 In terms of landscape sensitivity for LCA 7d: West Wrexham Ridges and Valleys, the Wrexham LANDMAP SPG advises that this area continues to accommodate profound changes, but is vulnerable to further loss of local distinctiveness, and coalescence of villages because of continuing development pressure. The small scale of the ridges and valleys means they are

sensitive to large scale development, masts and power lines, and inappropriate engineered landforms.

7.4.41 Neighbouring character areas include LCA 10: Wrexham Town to the east, LCA 9a: Clywedog Valley Plas Power and Bersham to the south and south-west and LCA 13a: Welsh Maelor to the south-east.

7.4.42 LCA 9a: Clywedog Valley Plas Power and Bersham encompasses areas of countryside, and wooded valley to the east of Wrexham town. Woodland within this LCA is of high nature conservation value. There are many opportunities for recreation including country parks at Nant Mill and Minera. Bersham, now a Conservation Area, was a centre for iron working, and originally the trees from the valley provided charcoal for smelting.

7.4.43 LCA 10: Wrexham Town is centred on the historic market town, which is the largest town in North Wales. The town is located on a lowland plateau surrounded by farmland, historic estates and sand quarries. There are extensive post-war residential housing estates and St Giles Church is a skyline feature.

7.4.44 LCA 13a: Welsh Maelor comprises an area of undulating, mainly pastoral lowland farmland. The landscape is generally well-manged with intact hedges, hedgerow trees and small woodlands. Historic designed estates influence a large proportion of this LCA. Erddig estate is important for recreation, tourism, nature conservation and heritage. Wat's Dyke, a linear earthwork, runs north-south through this LCA.

Site and Environs Landscape Character

7.4.45 A site survey was undertaken to assess the landscape character of the Site and its immediate surroundings and to consider the extent to which this is consistent with the findings of the desktop assessment. The site survey was undertaken on 13th October 2022 on a day with good visibility.

Context

7.4.46 The Site comprises agricultural land on the western edge of Wrexham, bounded to the north by Ruthin Road, with the southern and western boundaries defined by Bersham Road and the A483 respectively. East of the Site is Brickfield Rangers FC and Homestead Lane forms the south-eastern site boundary. Berse Lane forms a link between Bersham Road and Ruthin Road. Built form includes Lower Berse Farm to its north-western corner.

7.4.47 Land north of Ruthin Road is characterised by 21st Century suburban residential properties and agricultural land to the northwest. North of the residential development is the extensive Wrexham Maelor Hospital. To the east is Ysgol Clywedog including a large area for sport pitches to the south of the school buildings. Next to Homestead Lane, there is an area of 20th Century suburban residential, with a mix of one and two storey properties. South of Bersham Road is an area of agricultural land which is enclosed by a wooded corridor before land drops down to the River Clywedog. Further west is the small settlement of Bersham on Bersham Road. West of the A483 there are large agricultural fields, and these are enclosed by woodland blocks further to the west.

Topography and Landform

7.4.48 The Site rises from the eastern boundary (approx. 90m AOD) towards the west where it reaches 110m AOD near the A483. There is some localised variation in the landform due to a meandering watercourse in the north-western part of the Site, near to Lower Berse Farm. The land rises to the west to the higher Esclusham Mountain which is within the Clwydian Range and Dee Valley National Landscape.

Rivers and Drainage

7.4.49 There is a small pond to the east of Lower Berse Farm. There are no other waterbodies on the Site.

7.4.50 The River Clywedog runs north-west south-east to the west and south of the Site. The river lies approximately 50m south of the south-west corner of the Site at its closest point.

7.4.51 The River Gwenfro runs north-west south-east to the north of the Site and lies approximately 250m to the north-east at its closest point.

Land Use, Land Cover and Vegetation

7.4.52 A wooded corridor, with hedgerow and trees, runs east-west through the centre of the Site which includes a bridleway linking Homestead Lane and Berse Lane. The wooded corridor is a prominent feature as it occupies slightly higher ground compared with adjacent parts of the Site and includes some evergreen species.

7.4.53 The rest of the site is predominantly medium sized agricultural fields with boundaries in varying condition. Field boundaries north of the bridleway tend to be intact with some hedgerow trees, while some field boundaries are absent south of the bridleway.

7.4.54 West of Berse Lane there is a wide wooded belt enclosing a linear shaped arable field which is next to the A483. The field extends north, near to where the bridleway meets Berse Lane. North of the bridleway, there is a wooded edge to both sides of Berse Lane and the road forms the western boundary of the Site.

7.4.55 There is a telecoms mast in a small field south of the residential property at Bryn-moel.

Landscape Value

7.4.56 The method of assessment described in **Appendix 7.1** explains the factors used to inform judgements about landscape value which are derived from GLVIA3 and the Landscape Institute's Technical Guidance Note 02/21 (LI-TGN 02/21). The assessment below considers the value of the Site and the role of the Site within the wider landscape. Assessments of value in relation to other identified landscape receptors are described in **Section 7.6**.

Natural Heritage

7.4.57 The Site comprises agricultural land and some small patches of woodland.

7.4.58 Whilst there are some ecological designations within the study area, these designations do not relate to landscape and do not look different to areas of the same character that do not have the designation. Their value is because of nature conservation interests that do not manifest particularly in the landscape.

Cultural Heritage

7.4.59 The Site does not have historic landmark features, designed elements, is not part of a historic park or garden and does not demonstrate a particular example of time depth.

7.4.60 There is a Grade II* Listed Building in the north-western corner of the Site, Lower Berse Farmhouse. This is considered in further detail in the Cultural Heritage chapter.

7.4.61 The Bersham Conservation Area is to the immediate south of the Site. The Conservation Area Appraisal does not identify any significant views across the Site.

Landscape Condition

The Site is not in any international and national landscape designations. Part of the Site is designated under Policy SP6: Green Wedge which is designed to protect the openness of the area between Wrexham, Bersham and Rhostyllen.

7.4.62 The key landscape features within the Site are the field boundary hedgerows, which are largely intact with occasional hedgerow trees. The wooded bridleway within the Site forms a Green Infrastructure corridor.

7.4.63 The Site is relatively well contained within the wider landscape by existing vegetation along the Site boundaries and built form in its immediate surroundings.

7.4.64 The Site and its context demonstrate a number of the characteristics described in published landscape assessments at the local level.

Associations

7.4.65 The landscape of the Site has no known associations with renowned artists or writers.

Distinctiveness

7.4.66 The Site does not show rare, unusual, or distinctive features that differentiate it from other areas of agricultural land.

7.4.67 There is no indication from published information on landscape character that the Site and its environs contain features or elements which are considered particularly important examples

Recreational Value

7.4.68 The Site is publicly accessible by the existing PRoW network. PRoW Footpath BER/4 follows a diagonal alignment from Ruthin Road, joining PRoW Byway BER/4 near to a residential property at Bryn-moel. PRoW Footpath BER/5 runs northwards from Bersham Road and links with PRoW Byway BER/4.

7.4.69 PRoW Bridleway BER/3 runs west to east/north-east across the Site, turning into PRoW Footpath WRE/21 for the last section where it adjoins Homestead Lane.

7.4.70 The Site forms part of the landscape context to views and contributes to the visual amenity experienced by walkers using these routes.

Perceptual (Scenic) Quality

7.4.71 The Site's boundaries are defined by existing hedgerows and trees which at certain points creates a sense of enclosure and restricts views into the Site. At other points, a lack of trees and low hedgerow along the boundary allows open views across the agricultural fields in the Site.

7.4.72 In the wider area, the Site forms part of an urban landscape to the north, east and south. To the west of the Site beyond the A483, the landscape is more rural and adjoins the Clwydian Range and Dee Valley National Landscape, which has scenic qualities. The Site is not a distinctive feature in any view.

Perceptual (Wildness and tranquillity) Value

7.4.73 The Site is a managed agricultural landscape with some built form that is currently in use as part of a farm and cannot be perceived as being wild.

7.4.74 The landscape of the Site and its immediate surroundings has some rural character, but it is largely influenced by the surrounding urban area of Wrexham including residential development and the A483, diminishing its sense of tranquillity.

Function

7.4.75 The Site comprises agricultural land.

Conclusions

7.4.76 With consideration of the factors described above, the Site is of **local value**.

Landscape Sensitivity

7.4.77 The assessment considers the sensitivity of the landscape, and the magnitude of the impact, to come to an overall judgement on the significances of effects, in accordance with the LVIA Method at **Appendix 7.1.**

7.4.78 The assessment of landscape sensitivity is a combined judgement about the value of the landscape and the overall susceptibility to change of the landscape.

Landscape Value

7.4.79 As highlighted in earlier in this section, the landscape of the Site and its surroundings is of local value.

Landscape Susceptibility to Change

7.4.80 The susceptibility of a landscape to change is dependent on the characteristics of the receiving landscape and the nature of the Proposed Development.

7.4.81 The Proposed Development would introduce residential development for up to 1450 dwellings, plus associated roads, open space, community facilities and a site for a primary school primary school on greenfield land, adjacent to the existing settlement edge of Wrexham.

7.4.82 Overall, the Site has a medium susceptibility to the change proposed on the basis that:

- There is some built development present in the landscape;
- Some screening is provided by existing vegetation to the south and east of the Site;
- There are some opportunities for landscape mitigation; and
- There is capacity to accommodate the Proposed Development without substantial detrimental effects on the baseline landscape.

7.4.83 All identified landscape receptors, except NLCA 13: Deeside and Wrexham and LCA 10: Wrexham Town, have a medium susceptibility to change. The landscape generally is able to accommodate the operation and construction of the Proposed Development without suffering detrimental effects on its character.

7.4.84 NLCA 13: Deeside and Wrexham and LCA 10: Wrexham Town already includes large areas of built development and the susceptibility to change is low.

Landscape Sensitivity

7.4.85 Landscape sensitivity sequentially combines judgements of the landscape's susceptibility to change to the type of development proposed, and the value attached to the landscape. The sensitivity of each of the identified landscape receptors is summarised in **Table 7.2** below.

Table 7.2: Landscape Receptor Sensitivity

Receptor	Value	Susceptibility	Sensitivity
The Site and its immediate surroundings	Local	Medium	**Medium**
NLCA 13: Deeside and Wrexham	Local	Low	**Low**
LCA 7d: West Wrexham Ridges and Valleys	Local	Medium	**Medium**
LCA 9a: Clywedog Valley Plas Power and Bersham	Local	Medium	**Medium**
LCA 10: Wrexham Town	Community	Low	**Low**
LCA 13a: Welsh Maelor	Local	Medium	**Medium**

7.4.86 LCA 5b: Eastern Slopes of Ruabon Mountain, LCA 1b: Ruabon and Esclusham Mountain and the Clwydian Range and Dee Valley National Landscape have been scoped out of the assessment as there are unlikely to be significant effects on these LCAs.

Visual Baseline

7.4.87 The visual influence of the Site has been determined through a combination of topographic analysis and field evaluation of features affecting visibility, such as built form and trees, hedgerows and woodland that filter and screen views of the development. This analysis work determined the potential visibility of the Site and identified visual receptors.

7.4.88 The study area for views is shown on the Zone of Theoretical Visibility Mapping at **Figure 7.10** and extends up to 5km from the Site to the west and 2km to the south. To the north and east views are foreshortened by existing built form. In the far extents of the study area the Site is barely discernible beyond layers of intervening vegetation and built form.

7.4.89 The field survey considered receptors from where views of the Site are considered likely and what the existing views comprise. The selection of viewpoints are not intended to cover every possible view of the Site, but rather they are representative of a range of receptor types at varying distances and orientations. No access has been sought to private properties or land and where assessments are reported they have been made from the nearest publicly accessible viewpoint.

Visual Receptors

7.4.90 Visual receptors i.e. those individuals who would see the Site and may experience a change in their view as a result of the Proposed Development have been identified as follows:

7.4.91 Users of Public Rights of Way:

- Footpath BER/4;
- Byway BER/4;
- Bridleway BER/3 and Footpath WRE/21;
- Footpath BER/1;

- Footpaths ESC/5 and BER/2 (along River Clywedog); and
- PRoWs to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range.

7.4.92 Motorists, walkers, and cyclists along the following roads:

- Ruthin Road;
- Croesnewydd Road;
- Berse Lane (Lon Berse);
- Bersham Road;
- Homestead Lane (Lon Homestead);
- A483;
- Minor roads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range.

7.4.93 Residents living in properties along the following roads:

- Ruthin Road;
- Bersham Road;
- The Homestead (Y Tyddyn);
- Property at Bryn-moel; and
- Scattered residential properties and farmsteads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range.

7.4.94 Other receptors:

- Users of Brickfield Rangers FC; and
- Users of Ysgol Clywedog Secondary School.

LVIA Viewpoints

7.4.95 Viewpoint photography assists understanding of the baseline landscape and visual environment at the Site and in its context and is used to inform the assessment of effects on the visual receptors listed above.

7.4.96 LVIA viewpoints are listed in **Table 7.3** below, and viewpoint locations are shown on **Figure 7.10**. **Figures 7.11 to 7.33** provide viewpoint photography showing the existing view in the direction of the Site from viewpoints 1 to 13 below.

Table 7.3: LVIA Viewpoints

Viewpoint Reference and Location		Approximate Latitude/Longitude	Direction of View and Approximate Distance to Site
1	PRoW Footpath ESC/13 near The Wern (Clwydian Range National Landscape)	53° 2'44.12"N, 3° 4'45.40"W	Looking east and south-east, 3.5km east of Site
2	Penygelly Road and Properties on Penygelli Road, Coedpath	53° 2'55.92"N, 3° 4'3.02"W	Looking east and south-east, 1.9km east of Site
3	PRoW Footpath BER/1 north of Bersham Road Bersham Ironworks Museum	53° 2'12.34"N, 3° 2'1.60"W	Looking east, 200m west of Site
4	Berse Lane	53° 2'21.69"N, 3° 1'45.51"W	Looking north-east, in the Site
5	PRoW Byway BER/4 near property at Bryn-moel	53° 2'25.25"N, 3° 1'32.35"W	Looking west, in the Site
6	Intersection of PRoW Bridleway BER/3 and Footpath BER/4 on Site	53° 2'25.59"N, 3° 1'29.64"W	Looking north-east, in the Site
7	PRoW Byway BER/4 on Site	53° 2'16.32"N, 53° 2'16.32"N	Looking east, in the Site
8	Bersham Road and residential property on Bersham Road	53° 2'17.64"N, 3° 1'7.88"W	Looking north, 7m south of Site
9	Intersection of Bersham Road and Lon Homestead	53° 2'22.59"N, 3° 0'51.23"W	Looking west, 10m south-west of Site
10	Ruthin Road to north of Site	53° 2'36.96"N, 3° 1'2.64"W	Looking south and south-west, 15m north of Site
11	PRoW Footpath BER/4 in north-eastern section of Site	53° 2'32.21"N, 3° 1'15.66"W	Looking north-west, in the Site
12	PRoW Footpath ESC/5 along River Clywedog	53° 2'8.38"N, 3° 1'22.54"W	Looking north, 150m south of Site
13	Berse Lane looking into small parcel in western section of Site	53° 2'24.36"N, 3° 1'47.55"W	Looking west, in the Site

Baseline Views

7.4.97 The following paragraphs describe existing views towards the Site, experienced by the visual receptors listed above, and with reference to relevant viewpoint photography shown at **Figures 7.1 to 7.33**.

Views from PRoW Footpath BER/4 (Viewpoint 6)

7.4.98 PRoW Footpath BER/4 runs south-west north-east through the northern section of the Site. Viewpoint 6 is taken from its southern section near where it adjoins PRoW Bridleway BER/3 and is looking north-east across the Site. From this point there are open views across the agricultural fields and vegetation in the Site to the east and north-east. These views are backgrounded by the urban area of Wrexham, with residential development rooflines, Ysgol Clywedog Secondary School and St Giles Church visible on the skyline. The full extent of the Site is not visible from this footpath due to tree belts forming field boundaries. The recreation ground and goal posts within Brickfield Rangers FC can be seen to the east when walking along the footpath.

Views from PRoW Byway BER/4 (Viewpoints 5 and 7)

7.4.99 PRoW Byway BER/4 runs in a north-easterly direction from Berse Lane to its intersection with PRoW Bridleway BER/3 and PRoW Footpath BER/4. Viewpoint 5 is taken from PRoW Byway BER/4 near property at Bryn-moel and is looking west across the Site. The property at Bryn-moel (not within the Site boundaries) can be seen in close views, and there are open views across the agricultural land in the western section of the Site. Views extend beyond the Site to the adjacent A483, and beyond to rising land which forms part of the Clwydian Range and Dee Valley National Landscape.

7.4.100 Viewpoint 7 is taken from PRoW Byway BER/4 within the Site and is looking east across the agricultural fields in the southern section of the Site. Views are open and there are filtered views towards the surrounding fields in the Site, partially screened by the field boundary vegetation including hedgerows and trees. Telegraph poles and wires cross the fields in close views. Properties on Bersham Road can be seen beyond the Site's southern boundary, surrounded by the woodland associated with the River Clywedog. In distant views, St Giles Church tower can be seen above the vegetation within and surrounding the Site.

Views from PRoW Bridleway BER/3 and Footpath WRE/21 (Viewpoint 11)

7.4.101 PRoW Footpath Bridleway BER/3 runs easterly from Berse Lane across the central section of the Site where it adjoins Footpath WRE/21 in the Site and runs north-easterly past Brickfield Rangers FC to Homestead Lane. The vegetation surrounding the bridleway and footpath forms a wooded corridor through the Site which foreshortens views (see Inset A). There are some views of the fields in the Site to the north and south through gaps in the vegetation and views will be more open in winter when deciduous vegetation is not in leaf.



Inset A: View along Footpath WRE/21

Views from PRoW Footpath BER/1 (Viewpoint 3)

7.4.102 PRoW Footpath BER/1 runs north and north-westerly from Bersham Road near the Bersham Ironworks Museum through grassland fields to the A525.

7.4.103 Viewpoint 3 is taken from PRoW Footpath BER/1 just north of Bersham Road and Bersham Ironworks Museum. There are close views towards the Site beyond the moving vehicles on the A483, but views are heavily filtered by the vegetation on either side of the A483 and limited to the western parcel of land which adjoins the A483. The rising topography of the land beyond this land parcel, and the woodland belt to its east provide further screening, limiting views of the other agricultural fields in the Site beyond.

7.4.104 From the northern end of Footpath PRoW BER/1, just south of the A525, there are views towards the layers of trees forming the boundary of the north-western section of the Site.

Views from PRoW Footpaths ESC/5 and Footpath BER/2 (Viewpoint 12)

7.4.105 PRoW Footpath ESC/5 and BER/2 runs west to east along the River Clywedog to the south of the Bersham Road. From these footpaths, there are oblique northward views towards the Site which are glimpsed and only available through gaps in the layers of intervening vegetation. Views of the Site will be more open during winter when deciduous vegetation is not in leaf.

PRoWs to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range (Viewpoint 1)

7.4.106 Some PRoWs to the west of the Site such as Footpath ESC/13 near The Wern (Viewpoint 1), Footpath ESC/17A on the Esclusham Mountain, and Footpath BER/11 on the eastern edge of Coedpoeth have very distant and glimpsed views looking eastwards and downwards towards the Site due to their position on higher ground.

7.4.107 Viewpoint 1 is taken from PRoW ESC/13 near to The Wern (in the Clwydian Range National Landscape) to the west of the Site. From this point the Site is on lower ground and distant glimpsed views are possible towards the agricultural land in the Site. Some intervening vegetation screens some of the view and views of the Site are seen in the immediate context of the surrounding urban area of Wrexham to the north and east. Ysgol Clywedog Secondary School can be seen just beyond the Site to the east.

Views from Ruthin Road (Viewpoint 10)

7.4.108 Users of Ruthin Road will have varying oblique views southwards towards the Site depending upon their location on the road. Viewpoint 10 is taken from the eastern section of the road and is looking south and south-west towards the Site. From this point there are open views across the north easternmost fields in the Site due to the low hedgerows and lack of trees along this section of the northern boundary. Views towards the southernmost and westernmost fields, and Lower Berse Farm, are not possible due to field boundary vegetation in the Site and its undulating topography. There are views towards the two telecoms masts in the Site. The Site is backgrounded by the Clywdian Range which rises to the west.

7.4.109 From the western end of the road views towards the Site are increasingly filtered by the trees that form part of the Site's northern boundary. Views are still available of the fields in the Site through gaps in the vegetation, and these will be more open in winter when deciduous trees are not in leaf.

Views from Croesnewydd Road

7.4.110 Southward views towards the Site are available from the southern section of Croesnewydd Road. Views extend across Ruthin Road towards the fields in the northern section of the Site through gaps in and above the hedgerow forming the northern boundary of the Site. Views are channelled towards the central part of the Site, with restricted views towards the easternmost and westernmost sections of the Site. Views towards the southern section of the Site are screened by vegetation along field boundaries and the wooded corridor of PRoW Footpath WRE/21 and Bridleway BER/3.

Views from Berse Lane (Viewpoints 4 and 13)

7.4.111 Viewpoint 4 is taken from Berse Lane and is looking north-eastwards across the Site. From this point there are clear views of agricultural fields and vegetation on the site boundary The full extent of the Site, predominantly agricultural land in the eastern section of the Site cannot be seen clearly from this location due to the landform and vegetation within the Site. In views to the north, the rooflines of the buildings at Lower Berse Farm can be seen beyond and above surrounding vegetation.

7.4.112 From other sections of the Berse Lane views to the east are well-screened by vegetation along the road's boundary. Views to the west to the smaller land parcel in the Site between Berse Lane and the A483 are well screened by a stone wall and woodland tree belt. Viewpoint 13 is taken from Berse Lane adjacent to a field gate which allows views across the western parcel of land. The wooded belt on the western edge of the Site screens views of moving vehicles on the A483 from this land parcel in summer, and there are glimpses to the Clywdian Range in the distance to the west above and beyond gaps in the trees.

Views from Bersham Road (Viewpoints 8 and 9)

7.4.113 Viewpoint 8 is taken from Bersham Road and is looking northwards towards the south-east corner of the Site. There are close views of the adjacent field in the Site and partial views of those beyond. However, views beyond are screened by the vegetation along each field boundary in the Site, restricting views across the full extent of the Site. To the north-east there are some views towards the residential development on The Homestead and Clywedog Secondary School.

7.4.114 Viewpoint 9 is taken from the intersection of Bersham Road and Lon Homestead and from here there are views across the south-eastern field within the Site which is bounded by hedgerows, post and wire fencing and trees. Views towards other fields within the Site are restricted by the trees lining the field to the north-west and by the undulating landform of this section of the Site. Beyond the Site, the Clwydian Range is visible in the distance.

7.4.115 Towards the western end of Bersham Road views northward across the Site become limited due to the vegetation and built form outside of the Site’s boundaries to the north of Bersham Road and east of Berse Lane, which forms part of the Bersham CA.

Views from Homestead Lane (Viewpoint 9)

7.4.116 Homestead Lane runs north to south beyond the eastern site boundary. Users of the northern section of the road will have some views into the Site from the Brickfield Rangers FC. Views of the Site are available beyond the boundary palisade fencing in which goal posts and recreation pitches and the wooded corridor of PRoW Bridleway BER/3 and Footpath WRE/21 can be seen in close view. Residential development on the eastern edge of Coedpoeth and the Clywdian

Range are visible in the far distance. There are limited views to the west across the Site from the central section of the road due to a short section of trees forming the eastern Site boundary.

7.4.117 Views become more open and are available across the south-eastern section of the Site from the southern end of the road where there is just hedgerow forming the boundary, such as at the junction with Bersham Road (Viewpoint 9), as described above.

Views from the A483

7.4.118 From the A483, road users will have oblique and filtered views to the east towards the Site. There will be some views of the grassland in the westernmost parcel of the Site which adjoins the A483, but these will be filtered by the tree lined western boundary of the Site. Views of the other sections of land within the Site are partially screened by a wooded belt to the west of Berse Lane and the rising topography of land to the east. Views towards the Site will be more open in winter when deciduous vegetation is not in leaf.

Views from roads to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clwydian Range (Viewpoint 2)

7.4.119 Viewpoint 2 is taken from Penygelly Road in Coedpoeth to the west of the Site. There are distant but clear views of the Site due to the Site's lower elevation and the ground plane of the Site, hedgerows and woodland are visible. The Site is seen in the immediate context of the surrounding urban area of Wrexham to the north and east.

7.4.120 There are some glimpsed views towards the Site from gaps in existing vegetation along minor roads in this area, but the Site forms a small part of the view and is seen in conjunction with the built up area of Wrexham.

Views from Residential Properties off Ruthin Road

7.4.121 Views towards the Site from residential properties off Ruthin Road, including properties along Pendinas, Croesnewydd Road, Bro Deg, Dol Isaf and Cae Mawr are generally well screened by existing vegetation along the northern side of Ruthin Road. The exception to this is the block of flats on the corner of Croesnewydd Road and Ruthin Road where there are clear views across the Site from second and third storey windows. Views from other properties will be slightly more open in winter months but will still be filtered and softened by existing vegetation and will be limited to upper storey rear windows.

Views from Residential Properties on Bersham Road

7.4.122 There are scattered residential properties along Bersham Road. From these properties there are likely to be clear views across the Site from both upper and lower storey windows, partially screened by existing garden vegetation and hedgerows along the southern site boundary.

Views from Residential Properties on The Homestead

7.4.123 Existing residential properties along The Homestead largely comprise detached bungalows. For the majority of residents of these properties views towards the Site are screened by existing close board fencing in back gardens with a hedgerow beyond.

Views from the Property at Bryn-moel

7.4.124 The dwelling house at Bryn-moel is of two storeys and is surrounded by trees to the east and south. To the north there are some open views from upper storey windows across the Site.

Views from Residential Properties to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range

7.4.125 Residents of properties to the west have will have varying views towards the Site depending on distance, angle of view and levels of intervening vegetation.

7.4.126 From some properties residents will have distant views towards the ground plane of the Site, which is filtered by the vegetation on the Site's boundaries and in its immediate surroundings. Other existing development is visible in the context of the Site, including Ysgol Clywedog.

Views from Brickfield Rangers FC

7.4.127 Brickfield Rangers FC is beyond the north-eastern corner of the Site. Users of the recreation pitches have views across the agricultural fields in the northern section of the Site, but views towards the southernmost and westernmost sections are screened by vegetation forming field boundaries in the Site and by the wooded corridor of PRoW Bridleway BER/3 and Footpath WRE/21. Views to the west across the Site are background by residential development on the eastern edge of Coedpoeth and the Clywdian Range in the far distance.

Views from Ysgol Clywedog Secondary School

7.4.128 Those attending Ysgol Clywedog Secondary School have varying views of the Site depending upon their location. Those at the entrance/exit and within the school’s car parks will experience similar views to those described for users of Brickfield Rangers FC above.

Other Views Considered

7.4.129 Views from Footpath BER/8 (south of Smithy Road and Higher Berse Road) to the north-west of the Site were considered but views are screened by layers of intervening vegetation including blocks of woodland and roadside vegetation along the A525.

7.4.130 Views from Erdigg Country Park (National Trust) to the south of the Site were considered but views towards the Site are heavily screened by intervening layers of vegetation, including large swathes of woodland within the country park.

7.4.131 Views from roads and PRoWs to the south of the Site including long distance footpath Wat's Dyke Way and Hafod Road were considered but views towards the Site were not possible due to screening by built form, landform and vegetation.

Sensitivity of Receptors

7.4.132 The sensitivity of visual receptors depends on the susceptibility of the visual receptor to changes in views as a result of the development and the value of the view (as set out in the method in **Appendix 7.1**).

Susceptibility to Change

7.4.133 Walkers and cyclists using the local PRoWs and other recreational routes are judged to be of high susceptibility to change as their attention is likely to be focussed on views of the landscape. Residents also have a high susceptibility to change as they are static receptors.

7.4.134 Road users within the study area have limited views over wider landscape and the routes are not promoted in any way for their scenic value. Road users are considered to have a low susceptibility to change.

7.4.135 Visitors to Brickfield Rangers FC have a low susceptibility due to change as these receptors are likely to engaged in outdoor sports with little focus on the wider landscape.

7.4.136 Visitors to Ysgol Clywedog Secondary School are likely to be focused on the activity at hand, rather than the wider landscape, and their susceptibility to change is low.

Value of the View

7.4.137 Most PRoWs considered are of local value.

7.4.138 Some views from minor roads to the west of the Site are in the Clwydian Range and Dee Valley National Landscape and these views are of national value.

7.4.139 All other views, including views from local roads, residential properties, and local businesses will be valued by residents and workers at a community level.

Receptor Sensitivity

7.4.140 In accordance with Method Table 8 at **Appendix 7.1**, the sensitivity of each identified visual receptor is set out in Table 7.4 below.

Table 7.4: Visual Receptor Sensitivity

Receptor	Viewpoint (s)	Value	Susceptibility	Sensitivity
Users of Footpath BER/4	6	Local	High	Medium
Users of Byway BER/4	5 and 7	Local	High	Medium
Users of Bridleway BER/3 and Footpath WRE/21	11	Local	High	Medium
Users of Footpath BER/1	3	Community	High	Medium
Users of Footpaths ESC/5 and BER/2 (along River Clywedog)	12	Local	High	Medium
Users of PRoWs to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range	1	Local	High	Medium
Users of Ruthin Road	10	Community	Low	Low
Users of Croesnewydd Road	-	Community	Low	Low
Users of Berse Lane	4 and 13	Community	Low	Low
Users of Bersham Road	8 and 9	Community	Low	Low
Users of Homestead Lane	9	Community	Low	Low
Users of A483	-	Community	Low	Low
Users of minor roads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range	2	National	Low	Medium
Residents of properties off Ruthin Road	-	Community	High	Medium
Residents of properties along Bersham Road	-	Community	High	Medium
Residents of properties along The Homestead	-	Community	High	Medium
Residents of property at Bryn-moel	-	Community	High	Medium
Residents of scattered residential properties and farmsteads to the west of the Site in the vicinity of Hafod Wenm, The Wern, Coedpoeth and the Clwydian Range	-	Community	High	Medium
Visitors to Brickfield Rangers FC	-	Community	Low	Low
Visitors to Ysgol Clywedog Secondary School	-	Community	Low	Low

7.5 Embedded Mitigation

7.5.1 This section describes those mitigation measures which have been ‘embedded’ into the development through an interactive process of assessment and redesign. In particular, this section reflects measures that have been incorporated into the parameters plans or other assessment parameters that will be automatically incorporated into any forthcoming planning permission by way of the approval of submitted plans or details. Embedded mitigation does not include any measures that must be secured through planning conditions/obligations, management plans or further survey.

Demolition and Construction

7.5.2 Throughout the design development process potential landscape and visual effects were reviewed as part of an iterative design process.

7.5.3 The Proposed Development has been carefully designed to minimise landscape and visual effects, create a positive transition between the Site and wider countryside and retain existing landscape features (where present). The proposed green infrastructure strategy will deliver long-term landscape, biodiversity, recreation and sustainability benefits through the introduction of new habitats, landscape enhancement and the creation of accessible natural green space, contributing to the wider green infrastructure network.

Operational Development

7.5.4 The Masterplan Framework sets out the level of strategic planting envisaged. It is proposed that broad compliance with this plan will be a condition of the planning permission. The key elements of the landscape masterplan have also been enshrined in the parameters plan, with which full compliance will be conditioned in the planning permission.

7.5.5 The approach to the Masterplan Framework provides a high quality landscape setting and strong green infrastructure framework to the proposed buildings. The landscape objectives of the Proposed Development are to:

- Establish green corridors through the Site (north-south and west-east), connecting the Site and surrounding residential areas to the wider countryside via a series of pedestrian and cycle routes;
- Provide vegetation within these green corridors to help support and strengthen the biodiversity of the Site, and provide landscape structure breaking up the built form; and
- Create a series of linked green spaces and green streets that permeate the built form, which will incorporate strategic tree planting. The green corridors will provide softening of the built form and enhance connectivity through the Proposed Development for both people and wildlife.

7.5.6 The influence of vegetation is noted in both landscape and visual effects as it provides the structure and framework for the new buildings and hard landscape. Subsequently the time that it takes for establishment will influence the period over which short to medium-term adverse effects will be experienced and the development is successfully integrated into the landscape.

7.5.7 The implementation of planting will be phased in conjunction with the substantial completion of each area. All new planting will be implemented in accordance with the detailed landscape drawings, specification and implementation programme and monitored by an appropriate qualified landscape professional.

7.5.8 The planting specification will establish the level and quality of topsoil and cultivation; use of mulch (to retain soil moisture and reduce competition from weeds); plant numbers, stock sizes

and quality; measures for management such as watering and weeding to aid establishment; and plant replacement (where required).

7.6 Potential Effects

7.6.1 This section sets out the potential effects of the development on the basis of the assessment parameters plans and assumes the inclusion of embedded mitigation as set out in the preceding section.

Demolition and Construction

7.6.2 The impacts and resulting effects during construction will arise from the following:

- Site clearance works including the removal of a small area of existing vegetation to accommodate access;
- The presence of temporary buildings, access and haul roads, construction compounds, areas of hard standing and associated lighting;
- Site signage, traffic control and fencing and hoarding;
- Earthworks within development areas, excavation for foundations and attenuation basins;
- Construction activities including the progressive construction of the access;
- Temporary localised material stockpiles and earthworks; and
- Construction traffic and working machinery including cranes.

7.6.3 Construction working methods will adopt best practices wherever practicable.

7.6.4 Whilst construction is likely to be phased across the Site, for the purposes of this assessment, it is assumed that works would all be undertaken simultaneously as this represents the worst-case scenario.

7.6.5 The likely significant environmental effects resulting from construction are described below. The majority are anticipated to be temporary and short-term in their duration. The description of construction work considers the worst-case scenario i.e. the whole site and buildings under construction.

Potential Impacts on Landscape during Construction

7.6.6 Construction would result in alterations to the landscape, some of which would be temporary (i.e. the introduction of plant and machinery and associated activities), while some would be permanent (removal of vegetation) and also apparent during the operation (i.e. the emergence of new built form).

7.6.7 During construction the following activities would give rise to effects on landscape character:

- Establishing a construction compound, site offices and laydown areas for materials and components;
- Temporary construction fencing;
- Vegetation removal, soil stripping, earthworks and material storage;
- Earthworks including ground levelling across proposed warehouse footprints, through cut and fill;
- Movement of construction vehicles and plant;
- Construction of the new access road, residential dwellings, local centre, hardstanding and car parking areas;
- Temporary security and task lighting; and
- Implementation of soft and hard landscape proposals.

7.6.8 The ‘Arboricultural Impact Assessment', prepared by Shields Arboricultural Consultancy, and submitted with the outline planning application, indicates the potential impact of the Proposed Development on on-site trees.

7.6.9 The assessment of construction effects focusses upon those effects that occur only during the construction stage of the Proposed Development. The construction activities mentioned above would be temporary, and construction of the Proposed Development would incur in the short-term.

7.6.10 Standard mitigation measures set out in a Construction Environmental Management Plan (CEMP) would be implemented during construction, minimising adverse effects on landscape character and on visual amenity.

The Site and surrounding landscape

7.6.11 During construction direct adverse effects to landscape components will result from changes in land cover and vegetation and alterations to the existing topography, for example through excavation for foundations, roads and services. The landscape character of the Site and its more immediate context will change substantially during the construction period.

7.6.12 Throughout the Site there will be a temporary disturbance of the existing ground levels arising from the removal and storage of topsoil and excavation for roads, foundations, services and drainage.

7.6.13 The development of the Site will result in a change in land use from agricultural land to a construction Site with a progressive extent of built development.

7.6.14 Existing vegetation on the boundaries of the Site will be retained where possible. All vegetation to be retained will be protected in accordance with BS5837:2012.

7.6.15 During construction the overall character of the Site will permanently change from agricultural fields to a construction Site. Uncharacteristic components such as machinery, compounds and lighting will be introduced alongside characteristic features or elements. There will be a noticeable and localised temporary moderate adverse significance of effect on the Site and its immediate surroundings for the short-term.

Landscape Character

7.6.16 Construction activity would introduce some localised disturbance to NLCA 13: Deeside and Wrexham but would not result in the alteration or removal of any landscape elements or features of particular importance to the character of the NLCA. Construction activity would influence landscape character within a very small part of the NLCA and would have a very limited influence on wider landscape character. Given these factors the magnitude of impact on NLCA 13 would be low negative in a limited geographical area adjacent to the Proposed Development and negligible for the NCLA as a whole. During construction, the effect on NLCA 13 overall is judged to be of minor adverse significance within a limited geographical area and temporary negligible on landscape character of the NCLA as a whole.

7.6.17 The introduction of plant and machinery, material stockpiles, welfare facilities, and construction traffic to facilitate the construction of the development would result in a direct impact to LCA 7d: West Wrexham Ridges and Valleys. The magnitude of impact on the LCA 7d: West Wrexham Ridges and Valleys would be temporary moderate negative, and the significance of effect moderate adverse for the short-term.

7.6.18 LCA 9a: Clywedog Valley Plas Power and Bersham is to the immediate south of the Site. From the LCA there is some intervisibility with the Site and during construction there would be some disturbance to the perceptual and aesthetic qualities of the landscape. Construction activity would have a low negative magnitude of impact on the part of the LCA in closest proximity with reducing influence in the wider LCA. Overall this would represent a temporary minor adverse effect on the character of the LCA as a whole.

7.6.19 LCA 10: Wrexham Town is characterised by post-war housing. Whilst the introduction of construction activity will result in views towards construction activity from a very small part of this character area, which will result in some localised disturbance, it will not affect its key characteristics. The magnitude of effect will be negligible with an overall negligible effect.

7.6.20 As previously described, intervisibility with LCA 13a: Welsh Maelor is limited by intervening vegetation, including woodland within Erdigg Country Park. Construction activity is unlikely to be perceived from this LCA and the magnitude of effect will be negligible with an overall negligible significance of effect.

<u>Potential Impacts on Views and Visual Amenity during Construction</u>

7.6.21 The following paragraphs assess the magnitude of the predicted effect, and the overall effect on each view assessed, which would result from the construction and operation of the Proposed Development.

7.6.22 During construction visual impacts will arise from activities including site parking; the storage of materials; operational plant; and the construction of buildings, structures, and landscape. The effects of construction works generally will be short term and temporary in nature. All construction works will be carried out in accordance with good practice to avoid, reduce or limit the extent of negative visual effects as far as possible.

7.6.23 The greatest levels of change during construction will be experienced by those receptors immediately adjoining the Proposed Development. This is due to the proximity to the Site and the extent of construction works that will be visible to receptors.

Users of Public Rights of Way

7.6.24 Users of Footpath BER/4 (Viewpoint 6), Byway BER/4 (Viewpoints 5 and 7), Bridleway BER/3 and Footpath WRE/21 (Viewpoint 11) within the Site will experience one of the greatest levels of visual effect during construction. PRoW users would experience open and near views of construction of residential dwellings. From Bridleway BER/3 and Footpath WRE/21 views will be partially screened by existing tree and hedgerow planting to be retained. Overall during construction, a large proportion of the view from these PRoWs would be affected in the short-term. The magnitude of effect during construction would be moderate negative with a temporary moderate adverse significance of effect.

7.6.25 From Footpath BER/1 (Viewpoint 3) to the west of the A483, construction activity within the western parcel of land will be clearly visible through gaps in existing vegetation. During construction a large proportion of the view from the PRoW would be affected in the short-term. The magnitude of effect during construction would be moderate negative with a temporary moderate adverse significance of effect.

7.6.26 From Footpaths ESC/5 and BER/2 along the River Clywedog (Viewpoint 12) there will be some glimpsed views towards construction activity in winter months which will occupy a small proportion of the view in the short-term. The low magnitude of effect on views and medium sensitivity of PRoW users would result in a temporary minor adverse significance of effect.

7.6.27 From PRoWs to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range (Viewpoint 1), construction activity would be visible at a distance, partially screened by existing vegetation along field boundaries. During construction, a small proportion of the view from the footpath would be affected in the short-term. The low magnitude of effect on views and high sensitivity of PRoW users would result in a temporary minor adverse significance of effect.

Road Users

7.6.28 In some locations along Ruthin Road (Viewpoint 10), Berse Lane (Viewpoints 4 and 13) and Bersham Road (Viewpoints 8 and 9), road users would have near and open views looking towards the construction of up to 3 storey homes, the primary school and the local centre. Overall, the construction of the Proposed Development would affect a high proportion of the view in the short-term and the magnitude of effect on views would be moderate negative with a temporary moderate adverse significance of effect.

7.6.29 Users of Croesnewydd Road will have channelled views towards construction activity at the junction with Ruthin Road through existing boundary vegetation. Overall, the construction of the Proposed Development would affect a moderate proportion of the view in the short-term. The

magnitude of effect during construction will be up to moderate negative, with an overall temporary minor adverse significance of effect.

7.6.30 Views towards the Site from Homestead Lane (Viewpoint 9) are generally well screened by the existing roadside hedgerow. The Site occupies rising land and there are likely to be some views of construction activity in the eastern part of the Site above and beyond the hedgerows to be retained. During construction, up to a large proportion of the view would be affected in the short-term. The magnitude of effect would be up to moderate negative with a temporary moderate adverse effect.

7.6.31 Users of the A483 are travelling at speed and will have fleeting oblique views towards construction activities through gaps in existing vegetation, especially in winter. The magnitude of effect during construction would be up to moderate negative with an overall temporary minor adverse significance of effect.

7.6.32 Users of minor roads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range (Viewpoint 2) will have glimpsed views towards construction activity through layers of intervening vegetation along field boundaries. Construction activity will be viewed at a distance and will be seen in conjunction with the existing built up edge of Wrexham. There will be a temporary low negative magnitude of effect and minor adverse significance of effect during construction as intervening vegetation will restrict most views towards the Site.

Residential Properties

7.6.33 Dependent upon their location, residents of properties off Ruthin Road will have either open and direct views towards the construction activity in the Site or filtered views which are well-screened by hedgerow and street trees along Ruthin Road. Views will be available from front, side and rear windows of properties. Overall, the construction of the Proposed Development would affect up to a large proportion of the view in the short-term and the magnitude of effect on views would be temporary moderate negative with a moderate adverse significance of effect.

7.6.34 Views towards the construction activity in the Site from properties along Bersham Road will vary depending on their location on the road. From the Farmhouse facing the Site on Bersham Road, there will be open and direct views available of the construction activity over the wire and post fencing and hedgerow lining the Site's southern boundary. There is a proposed 8m wide landscape buffer with hedgerow and tree planting embedded in the Masterplan Framework to set the residential development back from these properties (Drawing Ref: PS9730.003). From properties to the western end of Bersham Road, views towards the construction activity become increasingly screened due to intervening vegetation and built form. Overall, the construction of the Proposed Development would affect up to a large proportion of the view in the short-term and the magnitude of effect on views would be temporary moderate negative with a moderate adverse significance of effect.

7.6.35 Residents of properties along The Homestead that back onto Homestead Lane will have limited views of construction activity as these will be well-screened by the close board fencing in back gardens with the hedgerow lining the roadside of Homestead Lane beyond. There will be a

temporary low negative magnitude of effect and minor adverse significance of effect during construction as intervening vegetation will restrict most views towards the Site.

7.6.36 Residents of property at Bryn-moel will have close views of the construction activity in the Site. Views would be most open from upper storeys of the property to the north where up to a large proportion of the view would be affected for the short-term. Views towards construction activities to the south and east will be heavily filtered by vegetation surrounding the property. The magnitude of effect on views would be temporary moderate negative with a moderate adverse significance of effect.

7.6.37 Residents of scattered residential properties and farmsteads to the west of the Site in the vicinity of Hafod Wenm, The Wern, Coedpoeth and the Clwydian Range will have glimpsed views towards construction activity through layers of intervening vegetation along field boundaries. Construction activity will be viewed at a distance and will be seen in conjunction with the existing built up edge of Wrexham. There will be a temporary low negative magnitude of effect and minor adverse significance of effect during construction as intervening vegetation will restrict most views towards the Site.

Other Receptors

7.6.38 Visitors to Brickfield Rangers FC will have close views towards construction activity beyond intervening vegetation, especially in the northern section of the Site. A large proportion of the view would be affected short-term. The magnitude of effect would be temporary moderate negative with a moderate adverse significance of effect.

7.6.39 Visitors to Ysgol Clywedog will have views towards construction activity from upper storey windows and car parking areas. A small proportion of the view would be affected for the short-term. The magnitude of effect would be temporary low negative with a minor adverse significance of effect.

Operational Development

7.6.40 On completion, it is assumed that all construction activities would have ceased, and the Proposed Development would be fully operational and landscape design proposals implemented.

7.6.41 The operation phase is assessed on completion, when the Proposed Development including embedded landscape proposals, would have been implemented; for the short and medium-term (between year 0 and year 15 after completion); and for the long-term from year 15 onwards.

<u>Potential Impacts on Landscape during Operation</u>

7.6.42 The Operation Phase is assessed at year 1 when the Proposed Development including planting has been implemented, but before any planted mitigation can take effect. Residual effects have been assessed at year 15 when new planting has had time to mature.

The Site and surrounding landscape

7.6.43 There would be a permanent change in land use across the Site to a high quality development including residential dwellings, local centre, primary school, open space, and strategic landscape proposals.

7.6.44 The design ensures the trees and hedgerows to the edges of the Site are retained where possible to aid screening from adjacent footpaths and roads. Retained boundary vegetation would provide a mature landscape setting to the new development. The existing boundary vegetation would be complemented by significant new tree, hedgerow and native shrub planting. Initially this new landscape framework will be immature and have a limited visual effect.

7.6.45 Beyond the Site boundary the Proposed Development would not result in the physical alteration or removal of landscape features and elements important to the baseline. The effects would be on aesthetic and perceptual aspects of landscape character.

7.6.46 The magnitude of effect and significance of effect on the character of the Site would be moderate adverse at year 1. At year 15, the significance of effect on landscape character would reduce to minor adverse as the Proposed Development and landscape proposals are established within the Site and its immediate surroundings.

Landscape Character

7.6.47 The Proposed Development is very small in relation to NLCA 13: Deeside and Wrexham and would influence a very small area of it. It would be of a similar character to residential development in its surroundings to the north and east and would not affect any valued characteristic or feature that is rare or highly distinctive in the NLCA. At year 1 post-completion, proposed planting will have little effect and the significance of effect will remain localised minor adverse, but negligible overall. As proposed planting matures the magnitude of effect and significance effect of the Proposed Development on NLCA 13 would be negligible.

7.6.48 The Site would permanently change from greenfield land to a development with a new local centre and primary school. The design, scale, layout and landscape of the Proposed Development respects the character of the surrounding landscape. Vegetation to the site boundaries, within residential areas and open space areas would incorporate locally appropriate native species, with a mix of native and ornamental species to complement and integrate the built form. The effect on the character of LCA 7d: West Wrexham Ridges and Valleys initially would be moderate adverse, decreasing to minor adverse over time as vegetation matures and the proposals integrate into the surrounding landscape.

7.6.49 From the LCA 9a: Clywedog Valley Plas Power and Bersham to the immediate south of the Proposed Development there is some intervisibility with the development. Post-completion there would be some influence of the development. After 15 years, proposed planting along the southern edge of the development will help to integrate the development more into the wider landscape and reduce its influence on LCA 9a. The development would have a low negative magnitude of impact on the part of the LCA in closest proximity with reducing influence in the

wider LCA. Overall this would represent a temporary minor adverse effect on the character of the LCA as a whole.

7.6.50 The Proposed Development would have a negligible magnitude of effect on LCA 10: Wrexham Town and LCA 13a: Welsh Maelor and would not affect any of the key characteristics of these LCAs.

7.6.51 The Site is a minor part of the Special Landscape Area to the west of Wrexham and the change resulting from the proposed development will be localised. The magnitude of effect at year 1 post-completion will be low negative with an overall minor adverse effect.

Potential Impacts on Views and Visual Amenity during operation

7.6.52 Following the completion of the Proposed Development the greatest levels of effects will still be experienced by those receptors in close proximity to Site. Such effects have been mitigated by the design of the Proposed Development in conjunction with planting; although incorporating a range of stock sizes it will take time for new vegetation to become established.

Users of Public Rights of Way

7.6.53 Users of Footpath BER/4 (Viewpoint 6) and Byway BER/4 (Viewpoints 5 and 7) within the Site will experience one of the greatest levels of visual effect post-completion of the Proposed Development. PRoW users would experience open and near views of residential dwellings. The retention of existing vegetation and proposed planting throughout the development would provide some filtering. Overall, a large proportion of the view from these PRoWs would be affected and there would be a great scale of change from the present situation in the medium and long-term. The magnitude of effect during construction would be up to a high negative with a major adverse significance of effect at Year 1 and Year 15.

7.6.54 From Bridleway BER/3 and Footpath WRE/21 (Viewpoint 11) views will be partially screened by existing tree and hedgerow planting to be retained. There will be close views of residential dwellings to the north and south in Development Parcels H, G, E, C, I, F, J, D, B, and A through gaps in the vegetation. There will be some views towards the school Site to the south-east. Views will be more open in winter when deciduous vegetation is not in leaf. There will be a partial alteration to the existing view, but vegetation screening will minimise the scale of change from the present situation. The magnitude of effect and significance of effect will be moderate adverse at Year 1 and Year 15.

7.6.55 From Footpath BER/1 (Viewpoint 3) to the west of the A483, there will be partial views towards the upper and lower storeys and rooflines of residential dwellings within the western parcel of land beyond gaps in the existing and proposed vegetation and proposed acoustic barrier, within the western parcel of land will be clearly visible through gaps in existing vegetation. In the medium-term, a moderate proportion of the view from the PRoW would be affected in and the magnitude of effect at Year 1 would be moderate negative with a moderate adverse significance of effect. After 15 years once the proposed additional planting along the western edge of the

development has matured, the magnitude of effect will reduce to low negative, and the significance of effect will reduce to minor adverse.

7.6.56 From Footpaths ESC/5 and BER/2 along the River Clywedog (Viewpoint 12) there will be some glimpsed views towards the residential dwellings in winter months, which will occupy a very small proportion of the view in the medium and long term. There would be a negligible magnitude of effect and significance of effect at Year 1 at Year 15.

7.6.57 From PRoWs to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range (Viewpoint 1) views of the Proposed Development including the many residential dwellings throughout would be visible at a distance, partially screened by existing vegetation along field boundaries. Any views of the residential dwellings and other built development in the Site would be seen backgrounded by the surrounding urban area of Wrexham beyond to the north and east. Proposed additional planting to the western edge and throughout the development will further filter views. In the medium and long-term, up to a small proportion of the view from the footpath would be affected. There would be up to a low negative magnitude of effect on views and up to a minor adverse significance of effect at both Year 1 and Year 15.

Road Users

7.6.58 In some locations along Ruthin Road (Viewpoint 10), road users would have near and open views looking towards the Proposed Development, including Development Parcels D, G, A and the local centre. Existing vegetation and proposed planting along the road will provide some screening towards the development. Some views towards the development will be backgrounded by other existing built development along Ruthin Road. Up to a large proportion of the view would be affected, and this will result in up to a moderate negative magnitude of effect and moderate adverse significance of effect at Year 1 and Year 15.

7.6.59 Users of Croesnewydd Road at the junction with Wrexham Road will have channelled views towards the new access road into the Site from Ruthin Road and the residential dwellings in Development Parcels D and A through and above existing and proposed additional boundary vegetation. Views towards the residential dwellings in close view will be backgrounded by the rooflines of other residential dwellings in development parcels beyond. Overall, the Proposed Development would affect a moderate proportion of the view in the short-term. The magnitude of effect at Year 1 will be up to moderate negative, with an overall minor adverse significance of effect. After 15 years once the proposed additional planting along the northern edge of the development has matured, the magnitude of effect will decrease to low negative, and the significance of effect will remain at minor adverse.

7.6.60 From Berse Lane (Viewpoints 4 and 13), there will be partial views towards Development Parcels N, J, F,I, and H and the local centre. Up to a large proportion of the view would be affected, and this will result in a moderate negative magnitude of effect and moderate adverse significance of effect at Year 1 and Year 15. Whilst proposed planting will help to soften and

filter views of the Proposed Development it will still occupy a large proportion of the view in the long-term and will result in a notable change when compared to the baseline situation.

7.6.61 From Bersham Road (Viewpoints 8 and 9), road users would have near and open views looking towards the residential dwellings in Development Parcels M, L and K beyond the existing hedgerow and proposed additional planting along the southern edge. At the eastern end of Bersham Road there will be some partial views towards residential development in Parcel O. Overall, the Proposed Development would affect up to a large proportion of the view and the magnitude of effect on views would be moderate negative with a moderate adverse significance of effect at Year 1 and Year 15.

7.6.62 Views towards the Proposed Development from Homestead Lane (Viewpoint 9) are generally well screened by the existing roadside hedgerow and the development is mostly set back from the road. The development occupies rising land and there are likely to be some views of the proposed primary school site. There would be views towards new residential dwellings which would be close and a large proportion of the view. The magnitude would be moderate negative and significance of effect moderate adverse at Year 1 and Year 15.

7.6.63 Users of the A483 are travelling at speed and will have fleeting oblique views towards the Proposed Development through gaps in existing and proposed vegetation, especially in winter. Partial views would be available towards the residential dwellings in Development Parcels F, I, H and N and up to a moderate proportion of the view would be affected. The magnitude of effect at Year 1 would be up to moderate negative with an overall minor adverse significance of effect. The magnitude of effect would decrease to low negative at Year 15 due to high degree of filtering from proposed planting, but the significance of effect will remain at minor adverse.

7.6.64 Users of minor roads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range (Viewpoint 2) will have glimpsed views towards the residential dwellings and other built form of the Proposed Development through layers of intervening vegetation along field boundaries. The Proposed Development will be viewed at a distance and will be seen in conjunction with the existing built up edge of Wrexham. Proposed additional planting to the western edge and throughout the development will further filter views. The Proposed Development would affect up to a small proportion of the view in the medium and long-term. There will be a low negative magnitude of effect and minor adverse significance of effect at Year 1 and Year 15 as intervening vegetation will restrict most views towards the development.

Residential Properties

7.6.65 Dependent upon their location, residents of properties off Ruthin Road will have either open and direct views towards the residential dwellings in Development Parcel D and beyond or filtered views which are well-screened by hedgerow and street trees along Ruthin Road. Views will be available from front, side and rear windows of properties. Views will be most open from the 3 storey block of flats on the junction of Ruthin Road and Croesnewydd Road. Overall, the Proposed Development would affect up to a large proportion of the view and the magnitude of

effect on views would be moderate negative with a moderate adverse significance of effect at Year 1. After 15 years once the proposed additional planting has matured, the magnitude of effect would decrease to low negative, and the significance of effect reduce to minor adverse for a majority of these receptors.

7.6.66 Residents of the Farmhouse on Berhsam Road will have open and direct views of the residential dwellings in Development Parcels M and K. Views will extend beyond the existing and proposed hedgerow and trees along the southern edge of the development and affect a large proportion of the view. From properties to the western end of Bersham Road there will be filtered views towards residential dwellings in Development Parcels J and K beyond the area of strategic open space. Views would extend across the proposed POS areas and would be screened by existing vegetation, proposed vegetation in the POS and existing built form along the road. The Proposed Development would affect up to a large proportion of the view and the magnitude of effect on views would be up to moderate negative with up to a moderate adverse significance of effect at Year 1 and Year 15.

7.6.67 Residents of properties along The Homestead that back onto Homestead Lane will have some glimpsed close views of the proposed school site from rear and side windows. There would be views towards new residential dwellings which would be close and a large proportion of the view. Views will be well-screened by the close board fencing in back gardens with the retained hedgerow lining the roadside of Homestead Lane and proposed planting beyond. The magnitude would be low negative and significance of effect minor adverse at Year 1. After 15 years, the proposed additional planting surrounding the residential dwellings will mature and provide further screening of the development. At Year 15 the magnitude of effect will remain low negative with a minor adverse significance of effect.

7.6.68 Residents of property at Bryn-moel will have close views of the residential dwellings in Development Parcel J to the west and north-west and Development Parcel K to the east. Views towards the development to the east, north and west will be filtered by vegetation surrounding the property. The magnitude of effect on views would be moderate negative with a moderate adverse significance of effect at Year 1 and Year 15.

7.6.69 Residents of scattered residential properties and farmsteads to the west of the Site in the vicinity of Hafod Wenm, The Wern, Coedpoeth and the Clwydian Range will have glimpsed views towards the Proposed Development, namely the residential dwellings through layers of intervening vegetation along field boundaries. The Proposed Development will be viewed at a distance and will be seen in conjunction with the existing built up edge of Wrexham. Proposed additional planting to the western edge and throughout the development will further filter views. The Proposed Development would affect up to a small proportion of the view in the medium and long-term. There will be a low negative magnitude of effect and minor adverse significance of effect at Year 1 and Year 15 as intervening vegetation will restrict most views towards the development.

Other Receptors

7.6.70 Visitors to Brickfield Rangers FC will have close views towards the Proposed Development beyond intervening vegetation, especially of residential dwellings in Development Parcel A. Visitors would have views to the south towards the school site. There would be some views towards new residential dwellings in the south-eastern parcel of the development, but the wooded corridor of PRoW Bridleway BER/3 and Footpath WRE/21 will provide some screening of this. The magnitude would be moderate negative and significance of effect moderate adverse at Year 1 and Year 15.

7.6.71 Visitors to Ysgol Clywedog will have views towards the residential dwellings of the Proposed Development from upper storey windows and car parking areas. Views towards the Proposed Development would be partially screened by existing and proposed vegetation. There would be some views towards new residential dwellings in the south-eastern parcel of the development. The magnitude would be low negative and significance of effect minor adverse at Year 1 and Year 15.

7.7 Mitigation and Monitoring

7.7.1 This section describes the measures which are proposed to mitigate any significant environmental effects. It is anticipated that the delivery of these measures will be secured by way of appropriate planning conditions or obligations.

Demolition and Construction

7.7.2 In advance of construction a Construction and Environmental Management Plan (CEMP) will be prepared detailing phasing and how the works will be managed.

7.7.3 The Construction and Environmental Management Plan will include an outline of the Development, the sequencing of construction works and the management controls required for construction activities and environmental effects. The Construction Management Plan will include:

- The location and arrangement of site access, compounds (including accommodation and cabins) and parking;
- The use of hoardings and fencing (including temporary fencing);
- The storage of construction materials and waste;
- The handling and storage of topsoil;
- Measures to protect ditches and watercourses;

- Measures for the protection of existing vegetation and landscape areas (in accordance with BS5837:2012[1]);
- Permitted working hours and use of lighting, including a detailed lighting specification;
- The implementation of planting (and where necessary proposed protection on the substantial completion of each phase); and
- Responsibilities and monitoring/reporting measures including supervision by appropriately qualified personnel.

7.7.4 Protection of existing vegetation through the period of construction and monitoring (during construction and at appropriate intervals post completion where required) will be undertaken in accordance with BS5387:2012. The details for monitoring will be established in the Arboricultural Method Statement.

7.7.5 Details of external lighting will comply with British Standards and Codes of Practice. While lighting is already present in adjoining areas, particular consideration should be given to the location of lighting, light source and the type of luminaires to ensure that the additional effects of light pollution and sky glow are kept to a minimum.

Operational Development

7.7.6 All areas in the public realm will be retained and managed in accordance with the standards and annual maintenance regime set out in a Landscape and Ecological Management Plan (LEMP) to be agreed with the council by a Reserved Matters application. This will ensure that they are retained in a sustainable and well-maintained condition in perpetuity and ensure that is appropriately managed to secure biodiversity, landscape and recreational enhancements.

7.8 Residual Effects

7.8.1 This section summarises the significance of the anticipated residual environmental effects, which are those that remain after all proposed mitigation measures are implemented.

Construction Phase

7.8.2 Standard mitigation measures set out in a CEMP would be implemented during construction, minimising adverse effects on landscape character and on visual amenity.

7.8.3 The residual effects of the demolition and construction stage of the Proposed Development on both the landscape and visual receptors would remain as previously described. No monitoring measures are required.

[1] BS5837:2012 Trees in Relation to Design, Demolition and Construction Recommendations (BSi, April 2012)

Operational Phase

7.8.4 In the long-term, planting proposed as part of the landscape strategy would continue to soften the Proposed Development and would enhance the appearance of the Proposed Development at ground-level and at the street scale.

7.8.5 The adverse effect of the Proposed Development on views would reduce in the long-term, as the Proposed Development would become established in the view, and within its surrounding landscape.

7.8.6 Residual effects have been considered in Section 7.7 above.

Table 7.5: Summary of Residual Effects

Receptor	Significance	Mitigation	Residual Effect
Construction and Demolition			
The Site and its immediate surroundings	Moderate adverse	Protection of all retained trees and hedgerows in accordance with BS5837:2012. The works will be subject to a CEMP which will outline working hours, lighting levels and methods of enclosure.	Moderate adverse
NLCA 13: Deeside and Wrexham	Negligible	N/A	Negligible
LCA 7d: West Wrexham Ridges and Valleys	Moderate adverse	Hoarding and other forms of fencing will protect site vegetation and partially screen the works. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
LCA 9a: Clywedog Valley Plas Power and Bersham	Minor adverse	Hoarding and other forms of fencing will protect site vegetation and partially screen the works. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
LCA 10: Wrexham Town	Negligible	N/A	Negligible
LCA 13a: Welsh Maelor	Negligible	N/A	Negligible
Users of PRoW Footpath BER/4	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Byway BER/4	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse

Users of Bridleway BER/3 and Footpath WRE/21	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Footpath BER/1	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Footpaths ESC/5 and BER/2 (along River Clywedog)	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Users of PRoWs to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range	Minor adverse	N/A	Minor adverse
Users of Ruthin Road	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Users of Croesnewydd Road	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Users of Berse Lane	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Bersham Road	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Homestead Lane	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of A483	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Users of minor roads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range	Minor adverse	N/A	Minor adverse
Residents of properties off Ruthin Road	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Residents of properties along Bersham Road	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Residents of properties along The Homestead	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse

Residents of property at Bryn-moel	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Residents of scattered residential properties and farmsteads to the west of the Site in the vicinity of Hafod Wenm, The Wern, Coedpoeth and the Clwydian Range	Minor adverse	N/A	Minor adverse
Visitors to Brickfield Rangers FC	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Visitors to Ysgol Clywedog Secondary School	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Completed Development			
The Site and its immediate surroundings	Moderate adverse	Retain and enhance existing levels of planting and use native species where appropriate as part of a comprehensive landscape scheme. Appropriate monitoring of vegetation and replacement of trees and shrubs for a minimum of five years.	Minor adverse
NLCA 13: Deeside and Wrexham	Negligible	N/A	Negligible
LCA 7d: West Wrexham Ridges and Valleys	Moderate adverse	Retain and enhance existing levels of planting and use native species where appropriate as part of a comprehensive landscape scheme. Appropriate monitoring of vegetation and replacement of trees and shrubs for a minimum of five years.	Minor adverse
LCA 9a: Clywedog Valley Plas Power and Bersham	Minor adverse	Retain and enhance existing levels of planting and use native species where appropriate as part of a comprehensive landscape scheme. Appropriate monitoring of vegetation and replacement of trees and shrubs for a minimum of five years.	Minor adverse
LCA 10: Wrexham Town	Negligible	N/A	Negligible
LCA 13a: Welsh Maelor	Negligible	N/A	Negligible
Users of PRoW Footpath BER/4	Major adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Major adverse

Users of Byway BER/4	Major adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Major adverse
Users of Bridleway BER/3 and Footpath WRE/21	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Users of Footpath BER/1	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Users of Footpaths ESC/5 and BER/2 (along River Clywedog)	Negligible	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Negligible
Users of PRoWs to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range	Minor adverse	N/A	Minor adverse
Users of Ruthin Road	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Users of Croesnewydd Road	Minor adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse

Users of Berse Lane	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Users of Bersham Road	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion. POS along the southern site boundary to Bersham Road.	Moderate adverse
Users of Homestead Lane	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Users of A483	Minor adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Users of minor roads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range	Minor adverse	N/A	Minor adverse
Residents of properties off Ruthin Road	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Residents of properties along Bersham Road	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion or as advanced planting.	Moderate adverse

Residents of properties along The Homestead	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Residents of property at Bryn-moel	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting.	Moderate adverse
Residents of scattered residential properties and farmsteads to the west of the Site in the vicinity of Hafod Wenm, The Wern, Coedpoeth and the Clwydian Range	Minor adverse	N/A	Minor adverse
Visitors to Brickfield Rangers FC	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Visitors to Ysgol Clywedog Secondary School	Minor adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse

7.9 Summary

7.9.1 This chapter assesses the landscape and visual impact of the Proposed Development of land south of Ruthin Road, Wrexham. In particular, it considers the potential effects of the completed scheme on landscape character and visual amenity from the surrounding properties, roads, footpath network and public open spaces. This includes an assessment during the life cycle of the project from construction to post construction and completion.

7.9.2 The LVIA has been undertaken in accordance with the method set out in 'Guidelines for Landscape and Visual Assessment, Third Edition' (GLIVIA3) (2013), produced by the Landscape Institute (LI), and the Institute of Environmental Management and Assessment (IEMA).

Baseline Conditions

7.9.3 The Application Site comprises agricultural land. Landscape features within the site boundaries include mature and established hedgerows, and some woodland tree belts. The Application Site

lies on the western urban edge of Wrexham and will inevitably see a permanent change in land use.

7.9.4 At the district level the Site is in LCA 7d: West Wrexham Valleys and Ridges. This area is characterised by lowland, valleys, hills and scarp with wooded valleys.

7.9.5 The Site is visually well contained by existing vegetation along all site boundaries and existing development to the north and east. There are some middle and long-distance views towards the Site from the west, where the Site is seen in conjunction with the existing edge of Wrexham.

7.9.6 The primary views towards the Site are from PRoW which run through the Site boundaries and the local road network, including the minor lanes to the east and south of the Site, Ruthin Road to the north and the A483 to the west.

Likely Significant Effects

7.9.7 During the construction and operational phases, the Development will have a restricted landscape and visual effect, with the most significant effects occurring close to the Site.

7.9.8 The Proposed Development will see a permanent change of land use from farmland to residential. Construction will inevitably result in a permanent negative effect.

7.9.9 During construction there will be some inevitable adverse effects to the character of the local landscape as a result of introducing temporary site hoarding and plant machinery, although during the operational phase it is expected there will be beneficial effects resulting from substantial mitigation planting measures.

7.9.10 Once the Proposed Development is operational there will be an introduction of a high-quality residential development. The Proposed Development will incorporate a high level of planting in the form of back gardens, formal open spaces and along streets together with a substantial landscape buffer along the southern boundary to avoid coalescence between the Site and Bersham.

7.9.11 The Proposed Development will result in some clear and permanent visual changes along the immediate northern, eastern, southern and western edges of the Application Site. A small percentage of immediately adjoining residents will lose an outwardly open view; and be permanently affected by the Proposed Development.

7.9.12 The existing hedgerow along Ruthin Road to the north provides a good level of visual screening for car users, and the Proposed Development is set-back from the road edge by public open space and new planting, minimising the severity of effect on road users and nearby residents.

7.9.13 A number of PRoW run around the Application Site. The visual amenity of pedestrians will be temporarily affected whilst construction takes place. The Proposed Development has considered pedestrian permeability and the wider connectivity of the Site with a Green Infrastructure Plan accommodating these existing PRoWs.

Mitigation and Enhancement

7.9.14 The Proposed Development has been carefully designed to minimise landscape and visual effects, create a positive western settlement edge to Wrexham and retain existing landscape features. The Framework Masterplan sets out the level of strategic planting envisaged and embedded mitigation.

7.9.15 Additional mitigation measures can be successfully addressed and monitored by the local planning authority prior to the commencement of the development via Reserved Matters conditions of the planning consent. This will include:

- An agreement of the detailed design;
- Preparation of a Construction and Environmental Management Plan (CEMP) outlining the sequencing of construction works and the management controls required for construction activities and implementation; and
- Preparation of a Landscape and Ecological Maintenance Plan (LEMP) to ensure the establishment, management and annual maintenance regime required for all areas of the public Realm.

Conclusion

7.9.16 The assessment has identified that the Proposed Development would have a restricted landscape and visual impact, with the most significant impacts occurring in close proximity to the Site.

7.9.17 As part of the Masterplan Framework, it is proposed that existing boundary vegetation will be retained wherever possible and enhanced by new native planting and a substantial landscape buffer to the southern boundary.

7.9.18 The Proposed Development carefully considers the relationship between Wrexham and Bersham and retains an area of Strategic open space; ensuring that the sense of visual separation is retained and that the settlements retain their individual sense of character.

7.9.19 The Proposed Development will have some long-term significant adverse effects on the visual amenity of PRoW users within the site boundaries, from adjacent roads and from some residential properties. There are no long-term significant adverse effects on landscape receptors.

8 Ecology

8.1 Introduction

8.1.1 This chapter assesses the effects of the proposed development on ecology, arboriculture and nature conservation. In particular, it considers the potential effects of the proposed development on the ecological features present within the site. Full details of the planning application and what they include can be found at Chapter 4 of the EIA.

8.1.2 This chapter has been written by The Environment Partnership (TEP). Within the chapter the 'site' refers to land that falls within the red line boundary at **Figure 3.1**.

8.1.3 The chapter includes the following:

- A summary of legislation and planning policy relevant to biodiversity;
- Descriptions of methods used to establish the ecological baseline conditions currently existing at the site and within the surrounding locality;
- Assessment of the nature conservation/biodiversity interest present;
- Identification of the potential effects of the proposed development on ecology, arboriculture and nature conservation;
- Evaluation of the potential direct and indirect impacts of the proposed development arising from construction and occupation;
- Mitigation measures required to prevent, reduce, or offset the impacts and the residual impacts of the proposed development; and
- Assessment of cumulative effects from other surrounding developments.

8.1.4 This assessment is based upon the information provided in the Masterplan at **Figure 4.1** and the parameters plan at **Figure 4.2**.

8.1.5 TEP is an Institute of Environmental Management and Assessment (IEMA) registered Environmental Impact Assessor with a Quality Mark for commitment to excellence. TEP have extensive experience in managing the EIA process, regularly working in multi-disciplinary teams of ecologists, engineers, designers, surveyors and planners. TEP's priority is to identify all of the potential environmental effects from a proposed development and provide innovative and practical measures to reduce identified impacts. A summary of TEP staff skills and experience in the preparation of this chapter is provided in **Table 8.1**.

Table 8.1: Summary of TEP skills and experience in the preparation of this chapter

Name	Qualifications/ Accreditations Relevant to Technical Area	Years Technical Experience (in Technical Area)	Number of EIA's Delivered to Date
Lead Author			
Lindsey Roberts (LR)	BSc Hons, ACIEEM	8	1
Technical Reviewer			
Anne Pritchard (AP)	BSc Hons, MSc, CEnv, MCIEEM	17	15

8.2 Planning Policy Context

8.2.1 This section identifies the relevant legislation, planning policy and guidance that will be taken into account in the assessment of ecological features and the impacts of the proposed development.

Legislation

8.2.2 The principal international legislation relating to ecology and development are summarised as follows:

- The Convention on Wetlands of International Importance especially as Waterfowl Habitat ('Ramsar Convention' [1] or 'Wetlands Convention') - provides the only international mechanism for protecting sites of global importance.
- The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention[2]) - imposes legal obligations on contracting parties, protecting over 500 wild plant species and more than 1,000 wild animal species.
- The Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention[3] or CMS) - provides strict protection for endangered migratory species. The UK has currently ratified four legally binding Agreements under the convention relating to bats (EUROBATS), African-Eurasian migratory birds (AEWA), small cetaceans in the Baltic, Irish and North Seas (ASCOBANS) and albatrosses and petrels (ACAP) in addition to five Memorandum of Understanding (MoU) and is non-party range state to a further Agreement and a further MoU.
- The Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO World Heritage Convention) - seeks to protect both cultural and natural heritage.

1 Convention on Wetlands of International Importance especially as Waterfowl Habitat, Ramsar, 2.2.1971 https://www.ramsar.org/

2 Convention on the Conservation of European Wildlife and Natural Habitats. Bern, 1979 https://www.coe.int/

3 Convention on the Conservation of Migratory Species of Wild Animals, Bonn, June 1979 https://www.cms.int/

- The Convention on Biological Diversity (Biodiversity Convention[4] or CBD) - provides a legal framework for biodiversity conservation. Within the UK, delivery of the CBD and the Strategic Plan for Biodiversity 2011-2020 [5] is guided by the UK Post-2010 Biodiversity Framework[6].

8.2.3 The legal obligations of the multiple Conventions to which the UK is a Contracting Party are enacted through a suite of national environmental legislation. The most relevant are summarised as follows:

- The Conservation of Habitats and Species Regulations 2017[7] (2017 Regulations) - transposed the land and marine aspects of the Habitats Directive (Council Directive 92/43/EEC) and certain elements of the Wild Birds Directive (Directive 2009/147/EC) (known as the Nature Directives) into domestic law, affording protection to certain habitats and species.
- The Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019[8] (2019 Regulations) - amends the 2017 Regulations to make them operable following the withdrawal of the United Kingdom from the European Union (EU). Most of the changes involve transferral of functions from European Commission to the appropriate authorities in Wales, affording protection to certain habitats and species. It also amends Section 27 of the Wildlife and Countryside Act 1981 to maintain existing protections and enforcement for species of wild birds.
- National Site Network - under the 2019 Regulations, Special Areas of Conservation (SAC) and Special Protection Areas (SPA) in the UK no longer form part of the EU's 'Natura 2000' ecological network, but instead (along with new SACs and SPAs designated under the 2019 Regulations) form the new National Site Network (NSN). Proposals which may significantly affect a site belonging to the NSN require (by Regulations 63 and 64 of the 2017 Regulations, as amended by Regulations 24 and 25 of the 2019 Regulations, respectively) competent authorities to undertake an Appropriate Assessment of the implications of proposals in view of that site's conservation objectives. This process is commonly referred to as a 'Habitats Regulations Assessment' (HRA).

4 Convention on Biological Diversity, Rio de Janeiro, June 1992https://www.cbd.int/

5 In October 2010, at the 10th Conference of the Parties to the CBD in Nagoya, Japan, the Parties adopted a new 'Strategic Plan for Biodiversity 2011–2020' along with its 20 'Aichi targets'. https://www.cbd.int/sp/

6 The framework is overseen by the Environment Departments of the four UK governments working through the Four Countries' Biodiversity Group. It demonstrates how the UK, through each of the four countries, contributes to achieving the 'Aichi targets', and identifies the activities required to complement the individual country biodiversity strategies https://jncc.gov.uk/our-work/uk-post-2010-biodiversity-framework/

7 Conservation of Habitats and Species Regulations 2017 (SI 2017/1012) https://www.legislation.gov.uk/uksi/2017/1012/

8 Conservation of Habitats and Species Regulations 2019 (SI 2019/579) https://www.legislation.gov.uk/uksi/2019/579/

- The Wildlife and Countryside Act 1981 (as amended)[9] (WCA) - a major legal instrument for wildlife protection in the UK. In respect of habitats and flora, the WCA protects important habitats and/or species as Sites of Special Scientific Interest (SSSI). The designation of UK Ramsar sites[1] has usually been underpinned through prior notification of these areas as SSSI and accordingly they receive statutory protection under the WCA. The obligations of the Bern Convention[2] (the protection of wild plant and animal species and their natural habitats) are transposed into law for Wales by the WCA. The legal requirement for the protection of migratory species listed by the Bonn Convention[3] is also provided by the WCA.
- The Countryside and Rights of Way Act 2000 (Part III)[10] (CROW) deals specifically with wildlife protection and nature conservation. It requires that Government Departments have regard for the conservation of biodiversity, in accordance with the CBD. In addition, it requires that Government Departments publish a list of living organisms and habitat types that are considered to be of principal importance in conserving biodiversity. The CROW also amends the WCA, expanding the terms of offences to include reckless activity.
- The Environment (Wales) Act 2016[11] - Section 6 (S6) places a duty on public authorities to 'seek to maintain and enhance biodiversity' so far as it is consistent with the proper exercise of those functions. In so doing, public authorities must also seek to 'promote the resilience of ecosystems'. Section 7[12] (S7) requires The Welsh Ministers to publish, review and revise lists of living organisms and types of habitats in Wales, which they consider are of key significance to sustain and improve biodiversity in relation to Wales. This is known as the S7 list. The S7 list includes priority habitats and priority species drawn from earlier lists of United Kingdom Biodiversity Action Plan Priority Species and Habitats.
- The Well-being of Future Generations (WFG) Act 2015[13] - sets out goals at Part 2 (4) that include 'A Resilient Wales'. This goal describes 'A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change'. The WFG Act 2015 and the Environment (Wales) Act 2016 in combination set out objectives, principles and framework for the sustainable management of natural resources (SMNR).

9 Wildlife and Countryside Act 1981 c. 69 https://www.legislation.gov.uk/ukpga/1981/69/

10 Countryside and Rights of Way Act 2000 c. 37 https://www.legislation.gov.uk/ukpga/2000/37/

11 Environment (Wales) Act 2016 c.3 https://www.legislation.gov.uk/anaw/2016/3/section/6/enacted

12 Environment (Wales) Act 2016 c.3 https://www.legislation.gov.uk/anaw/2016/3/section/7/enacted

13 Well-being of Future Generations (Wales) Act 2015: Guidance on law to improve social, economic, environmental and cultural well-being (2015) Welsh Government.

First published: 23 June 2015 Last updated: 15 June 2021https://gov.wales/well-being-future-generations-act-essentials-html

- Hedgerow Regulations 1997 - important hedgerows are protected from removal by the Hedgerows Regulations[14] (as amended). Regulation 3 defines the hedgerows to which the Regulations apply. Regulation 4 sets out the criteria for identifying 'Important' hedgerows include ecological, landscape or historical/cultural reasons. Under the Hedgerow Regulations it is against the law to remove or destroy certain hedgerows without permission from the local planning authority. Works to 'important hedgerows' are exempt under the Hedgerow Regulations if planning consent is granted which allows their removal.
- Protection of Badgers Act 1992 – badgers *Meles meles* and their setts receive statutory protection under the Protection of Badgers Act 1992 (PBA)[15]. This makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as 'any structure or place, which displays signs indicating current use by a badger'.

Planning Policy Wales

8.2.4 Planning Policy Wales (Edition 12, February 2024)[16] delivers land use planning policy for Wales and provides a framework for the effective preparation of local planning authorities' development plans. This is supplemented by 21 topic based Technical Advice Notes (TANs). Technical Advice Note 5 - Nature Conservation and Planning is a key TAN in relation to nature conservation and biodiversity. TAN 5 states that the town and country planning system in Wales should:

- Work to achieve nature conservation objectives through a partnership between local planning authorities, Natural Resources Wales (NRW), the Environment Agency Wales, voluntary organisations, developers, landowners and other key stakeholders;
- Integrate nature conservation into all planning decisions looking for development to deliver social, economic and environmental objectives together over time;
- Ensure that the UK's international and national obligations for site, species and habitat protection are fully met in all planning decisions;
- Look for development to provide a net benefit for biodiversity conservation with no significant loss of habitats or populations of species, locally or nationally;

14 The Hedgerow Regulations 1997 (SI 1997/1167) https://www.legislation.gov.uk/uksi/1997/1160/

15 Protection of Badgers Act 1992 c. 51 https://www.legislation.gov.uk/ukpga/1992/51/

16 National Planning Policy and Planning Policy and Guidance: Planning Policy Wales (2024) Welsh Government Planning Policy Wales - Edition 12 (gov.wales)

- Help to ensure that development does not damage, or restrict access to, or the study of, geological sites and features or impede the evolution of natural processes and systems especially on rivers and the coast;
- Forge and strengthen links between the town and country planning system and biodiversity action planning particularly through policies in local development plans and the preparation of supplementary planning guidance that adds value to Local Biodiversity Action Plans (LBAPs) by highlighting the ways in which the planning system can help to deliver the objectives of LBAPs in practical ways; and
- Plan to accommodate and reduce the effects of climate change by encouraging development that will reduce damaging emissions and energy consumption and that help habitats and species to respond to climate change.

Local Planning Guidance Note No. 17: Trees and Development

8.2.5 Wrexham County Borough Council Local Planning Guidance Notes (LPGN)[17] relating to biodiversity and nature conservation include LPGN 17 Trees and Development. The purpose of LPGN 17[18] is to amplify Policy EC4 of the Wrexham UDP regarding the protection of trees. Development proposals should provide for the conservation and management of hedgerows, trees, orchards, woodland, wildlife and other natural landscape and water features, and include new planting in order to enhance the character of the landscape and townscape. Development which results in the loss or significant damage to valuable trees, important hedgerows or ancient woodland sites will not be permitted.

8.2.6 Development proposed near to existing trees, woodlands or hedgerows must also be in accordance with the design and protection principles set out in LPGN 17 and British Standard 5837: 2012 'Trees in relation to design, demolition and construction'.

Local Planning Guidance Note No. 32: Biodiversity and Development

8.2.7 Wrexham County Borough Council LPGN 32[19] relates to biodiversity and nature conservation and identifies the need to resist development proposals that may irreversibly damage important habitats or species, by enhancing biodiversity through incorporating mitigation and enhancements and by securing long-term favourable management of sites. LPGN 32 notes that whilst protecting priority species is important, if biodiversity is to be genuinely enhanced, the conservation of all wildlife and habitats needs to be at the centre of development and planning decision making.

17 Local Planning Guidance Notes Wrexham County Borough Council https://www.wrexham.gov.uk/service/development-plans-and-other-planning-policy/local-planning-guidance-notes

18 Local Planning Guidance Note 17 Wrexham County Borough Council https://www.wrexham.gov.uk/sites/default/files/2020-05/lpg-17e.pdf

19 Local Planning Guidance Note 32 Wrexham County Borough Council https://www.wrexham.gov.uk/sites/default/files/2020-05/lpg-32e.pdf

Wrexham Local Development Plan 2013 - 2028

8.2.8 Wrexham County Borough Council adopted their Local Development Plan (LDP)[20] in December 2023, which sets out the Borough's planning policies up to 2028. The LDP sets out the long-term land use and development strategy, focused on achieving sustainable development.

8.2.9 The LDP contains several policies relating to natural environment strategy including:

- Strategic Policy SP14 Natural Environment - development will only be permitted where it seeks to protect, conserve and enhance the natural environment.
- Strategic Policy SP18 Climate Change - development proposals will need to mitigate against the effects of climate change and adapt to its impacts, demonstrating that they have taken ecological resilience into account .
- Strategic Policy SP19 Green Infrastructure - development will be required to maintain the extent, quality and connectivity of multi-functional green infrastructure on or near a site, and, where appropriate to enhance it by: creating new interconnected areas of green infrastructure between the proposed site and the existing network, filling gaps in the existing network to improve connectivity, protecting the features most valuable for both nature and people, and in instances where loss of green infrastructure is unavoidable, provide mitigation and compensation for the lost assets on a site-specific basis.

8.2.10 The LDP also contains several topic, criteria and area based policies relating to the natural environment including:

- Policy NE1 International and Nationally Designated Nature Conservation Sites - development likely to significantly affect any protected site of international importance, either alone or in combination with other plans or projects, will be subject to a Habitat Regulations Assessment (HRA). Development will only be permitted where it is possible to ascertain no adverse effect on the species or integrity of the habitat or site or where there are Imperative Reasons of Overriding Public Interest and compensatory measures are secured. Permission for development likely to impact the special features of a Nationally Designated Site or protected species or habitat advice will only be granted in exceptional circumstances where appropriate compensation can be provided. Development likely to affect any protected species will only be permitted when there is no satisfactory alternative and if there is no detrimental impact to the maintenance of the population concerned at a favourable conservation status in its natural range. The proposals must adequately demonstrate that they are for the purposes of preserving public health or safety or reasons of overriding public

20 Draft Wrexham Local Development Plan 2013 - 2028 (LDP) Wrexham County Borough Council https://wrexham-consult.objective.co.uk/portal/ldp/dldp/local_development_plan

interest.Policy NE2 Locally Designated Sites of Nature Conservation and Geological Importance - development which adversely affects the nature conservation and/or geological importance of locally designated sites, habitats and species will only be permitted in exceptional circumstances where it can be demonstrated that there is no satisfactory alternative location for the development which avoids nature conservation impacts, and compensation measures are designed to ensure that there is no reduction in the overall nature or geological conservation value of the site.

- Policy NE3 Trees, Woodlands and Hedgerows - development will only be permitted where it does not cause unacceptable harm to trees, woodlands and hedgerows of significant public amenity, natural or cultural heritage value or those that provide important ecosystem services. Development affecting all existing and new proposed woodlands should: i. Support proposals which assist in the respectful and appropriate use and protection of woodlands and boundary edges; ii. Promote sustainable management to deliver multiple benefits; and iii. Support the relevant aims and objectives of the Wrexham Tree & Woodland Strategy 2016-2026 and all subsequent amendments. Where adverse effects cannot justifiably be avoided and sustainable integration is not possible then adequate mitigation will be required. In such cases development should include proposals for the planting of new trees, woodlands, and hedgerows within the site, ensuring connectivity between proposed and existing green infrastructure.

Natural Resources Wales Area Statements

8.2.11 Natural Resources Wales (NRW) have developed seven Area Statements covering different areas of Wales. These statements are seen as a collaborative response to the Natural Resources Policy[21], published by the Welsh Government in 2017. The Area Statement for North East Wales[22] includes the following sections that relate to biodiversity and nature conservation:

- Climate emergency - ensuring the natural environment is valued, enjoyed, protected and enhanced, with increased resilience to climate change;
- Develop and improve urban/rural green infrastructure - targeting green infrastructure to allow for; climate change adaptation, reversing the decline in biodiversity, reducing air pollution levels, enhancing air quality, reducing noise pollution, developing resilient ecological networks, improving the quality and quantity of water, improving the management of existing woodlands and more widespread use of trees, safeguarding and increasing carbon stores in soils and biomass and reducing the risk of land and coastal flooding;

21 Natural Resources Policy (2017) Welsh Government https://gov.wales/sites/default/files/publications/2019-06/natural-resources-policy.pdf

22 North East Wales Areas Statement Natural Resources Wales https://naturalresources.wales/about-us/area-statements/north-east-wales-area-statement/?lang=en

- Increasing woodlands - increasing woodland cover for social, environmental and economic benefits and designing woodland planting and maintenance to allow for adaptation to climate change.
- Promoting the resilience of ecosystems in maintaining and enhancing biodiversity - to reduce land use pressure and support wildlife, actions are to be taken to; reverse the decline in biodiversity, develop resilient ecological networks, improve the quality and quantity of water, improve the management of existing woodlands and ensure more widespread use of trees, improve biosecurity against non-native species and ensure adaptation to climate change.

Local Biodiversity Action Plans (LBAP)

8.2.12 Additional guidance on habitats and species is provided by the Wrexham Local Biodiversity Action Plan (LBAP)[23]. LBAPs are designed to conserve and enhance local biodiversity by setting targets and co-ordinating actions for biodiversity conservation. The following habitats are identified within LBAPs by Wrexham County Borough Council:

- Derelict and industrial land;
- Garden;
- Linear aquatic habitats (rivers, streams, canals);
- Ponds;
- Upland moorland;
- Woodland;
- Lowland raised bog;
- Lowland wood-pasture and parkland; and
- Wet woodland.

8.2.13 The following species are identified within LBAPs by Wrexham County Borough Council:

- Great crested newt *Triturus cristatus*;
- Barn owl *Tyto alba*;
- Song thrush *Turdus philomelos*;
- Badger *Meles meles*;
- Otter *Lutra lutra*;
- Lesser horseshoe bat *Rhinolophus hipposideros*; and
- Black poplar *Populus nigra*.

23 Wrexham Biodiversity Action Plan (2002) Joint Nature Conservation Committee
https://webarchive.nationalarchives.gov.uk/20110303154000/http://www.ukbap.org.uk/lbap.aspx?id=499#6

Other Relevant Guidance

8.2.14 The Birds of Conservation Concern[24] (BoCC) report splits UK birds into three categories of conservation importance; red, amber and green. Red (BoCCRd) is the highest conservation priority, and includes species that are globally threatened, or have experienced historical UK population decline, a severe decline in UK breeding population, or a severe contraction of UK breeding range. Amber (BoCCAm) is the next most critical group, followed by green.

8.3 Approach

Assessment Methodology

8.3.1 The ecological impact assessment has been undertaken with due consideration for the Chartered Institute of Ecology and Environmental Management (CIEEM) Guidelines for Ecological Impact Assessment (EcIA) (CIEEM 2017a[25], 2018[26]). The guidelines provide a robust framework for EcIA, which is then informed by the interpretation of contextual information and professional judgement.

8.3.2 In summary, the following procedure was undertaken during this EcIA:

- Establish a robust and accurate ecological baseline for the site;
- Identify and evaluate the nature conservation/biodiversity interest present;
- Identify any potential effects arising from the proposed development (construction and operational stages);
- Establish the character and significance of those identified effects;
- Identify mitigation measures to address the significant effects;
- Assess any residual effects and the need for any compensation; and,
- Assess cumulative effects from other surrounding developments.

Study Area

8.3.3 Baseline ecology surveys were undertaken to establish the existing ecological features on the site and within the surrounding locality or 'study area'. The study area reflects the differing 'Zone of Influence' (ZoI) anticipated as a result of the proposed development on ecological features identified, such as habitats or protected faunal species.

8.3.4 To identify the ZoI on ecological features, potential direct and indirect impacts that may occur during the lifespan of the proposed development were considered, including; disturbance

24 Royal Society for the Protection of Birds, (2018), Birds of Conservation Concern 4: the population status of birds in the United Kingdom, Channel Islands and the Isle of Man. RSPB.

25 CIEEM (2017a) Guidelines for Ecological Report Writing, 2nd Edition. Chartered Institute of Ecology and Environmental Management

26 CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine version 1.2. Chartered Institute of Ecology and Environmental Management, Winchester

associated with artificial lighting, new resident recreational activities and any indirect hydrological impacts. Consideration was also given to conservation objectives of designated sites. The study area for each ecological feature was determined accordingly and is set out in the following baseline ecology survey methodologies.

Ecology Desk Study

8.3.5 A search of existing information relating to protected species, habitats of conservation priority and designated sites was undertaken. Sources included Natural Resources Wales (NRW) for statutory designated wildlife sites of international importance within 10 km of the site, statutory designated wildlife sites of national importance within 5 km and statutory designated wildlife sites of local importance within 2 km. LANDMAP the Welsh Landscape Baseline was used to search for notable habitats within and adjacent to the site in a 2 km ZoI. Cofnod, the Local Environmental Records Centre for North Wales, was used to review protected species records and non-statutory designated wildlife sites of local importance within 2 km of the site. Relevant local planning policies were also identified to inform the study. The full methodology and further details of the Ecology Desk Study is included within the technical report at **Appendix 8.1**.

Limitations

8.3.6 No limitations were encountered during the Ecology Desk Study.

Extended Phase 1 Habitat Survey

8.3.7 An extended Phase 1 habitat survey was completed by TEP Consultant Ecologist Clare Gower (BSc (Hons), ACIEEM), certified to Level 4 under the Field Identification Skills Certification (FISC)[27]. The survey was completed from 12th-14th April 2021. The survey was carried out in accordance with the Phase 1 habitat assessment methods (JNCC, 2010[28]) and Guidelines for Preliminary Ecological Appraisal (CIEEM, 2017b[29]). The method records the habitat types present, within the survey area, based on the JNCC descriptions. Plant species were identified in accordance with the New Flora of the British Isles (Stace, 2019[30]) and recorded as target notes using the DAFOR[31] scale, where relevant.

8.3.8 The survey was expanded to include off-site habitats adjacent to the site in order to provide context. Adjacent habitats were viewed from accessible locations within the site boundary. Target notes detailing the findings of the extended Phase 1 habitat survey are included within

27 A national skills certification scheme operated by Botanical Society of Britain and Ireland. FISC 4 is the competency level recommended for Biodiversity Net Gain (BNG) field assessments

28 JNCC (2010) Handbook for Phase 1 Habitat Survey – a technique for environmental audit

29 Chartered Institute of Ecology and Environmental Management (2nd edn), (2017), Guidelines for Preliminary Ecological Appraisal. CIEEM.

30 Clive Stace (2019) New Flora of the British Isles

31 DAFOR = Dominant, Abundant, Frequent, Occasional and Rare

the technical report at **Appendix 8.2**. Habitats are displayed with the site boundary on **Figure 8.1**.

Limitations

8.3.9 The extended Phase 1 habitat survey was undertaken during the recommended seasonal window (April to October) and therefore no seasonal constraints were encountered. No limitations were encountered during the survey.

Hedgerow Regulations Assessment

8.3.10 A Hedgerow Regulations Assessment was undertaken by TEP Consultant Ecologist Clare Gower (BSc (Hons), ACIEEM, FISC Level 4) from 12th-14th April 2021. Native hedgerows on site were subject to a detailed sampling survey in accordance with the Department for Environment, Food and Rural Affairs (DEFRA) Hedgerow Survey Handbook[32] and criteria set out in the Hedgerow Regulations (Hedgerow Regulations, 1997[33]). Hedgerows were assessed in terms of wildlife and landscape criteria for determining 'Important' hedgerows. This entailed recording the number of woody species (as listed on Schedule 3 of the Hedgerow Regulations 1997) within 30 m sample sections as well as any features within 2 m associated with the hedge. These features include the presence of any bank or wall, ditch, standard trees and ground flora species (as listed on Schedule 2 of the Hedgerow Regulations 1997). Also, the number of connections with adjacent hedgerows was recorded. Hedgerow target notes were made on standard data recording forms and included a description of the hedge and detailed plant species list. Further details of the Hedgerow Regulations Assessment are included within the technical report at **Appendix 8.3**.

Limitations

8.3.11 The hedgerow regulations assessment was undertaken during the recommended seasonal window (April to June) and therefore no seasonal constraints were encountered. No limitations were encountered during the survey.

Arboricultural Survey

8.3.12 A tree survey and associated Arboricultural Impact Assessment (AIA) of trees on and immediately adjacent to the site was carried out by Shields Arboricultural Consultancy in July 2021. The survey was undertaken by means of inspection from ground level in accordance with British Standard (BS) 5837:2012 ‘Trees in relation to design, demolition and construction –

32 Department for Environment, Food and Rural Affairs (DEFRA) (2007). Hedgerow Survey Handbook: A standard procedure for local surveys in the UK. DEFRA, London.

33 The Hedgerow Regulations 1997 (SI 1997/1160).

Recommendations'[34]. The Standard provides a categorisation method to *'identify the quality and value (in a non-fiscal sense) of the existing tree stock, to allow informed decisions to be made concerning which trees should be removed or retained in the event of development occurring'*. The method places trees and groups of trees into one of four quality categories and provides guidance on the integration and protection of trees during construction.

8.3.13 Local authorities reserve the right to create Tree Preservation Orders (TPO) to protect the amenity value conferred to a location by a tree or group of trees. Where a TPO is in force, lopping, topping, felling, uprooting or wilful damage caused to a tree is prohibited and such actions may be prosecuted and incur an unlimited fine. Works to TPO protected trees must only be undertaken with the written consent of the local authority. The full methodology and further details of the arboricultural survey are included within the technical report at **Appendix 8.4**.

Limitations

8.3.14 No checks have been undertaken to establish the status of trees within or adjacent to the site in regard to TPOs or Conservation Areas.

Badger Survey

8.3.15 A badger *Meles meles* survey of the site, and surrounding 30 m buffer where accessible, was undertaken on 15th June 2021 by TEP Consultant Ecologist Damian Young (BSc (Hons)) and updated by TEP Principal Ecologist Christopher King (BSc (Hons), ACIEEM, Natural England Badger Class Licence (CL35) holder) on 25th and 26th January 2022. The surveys were undertaken in line with the standard approach detailed in Surveying Badgers (Harris, Cresswell and Jefferies 1988)[35] and used during the National Badger Survey (Harris, Cresswell and Jefferies 1990)[36].

8.3.16 The surveys involved assessing potentially suitable habitat and looking for evidence of badger activity such as setts, badger trails/pathways, snuffle holes (or foraging pits), latrines and badger hairs. Any badger setts and associated entrance holes were recorded and assigned a category of badger sett type. The full methodology and further details of the badger survey are included within the technical report at **Appendix 8.5**.

Limitations

8.3.17 Badgers are active all year round, so a survey can be carried out at any time of year. However, depending upon the level of vegetation cover, this species is often best surveyed over the winter months when the vegetation has died back. The initial badger survey was undertaken during

34 British Standards Institution (2012). BS 5837:2012 Trees in relation to design, demolition and construction – Recommendations. Milton Keynes: BSI.

35 Harris S., Cresswell O. & Jefferies D., 1989. Surveying Badgers. Occasional Publication of the Mammal Society No.9; Mammal Society, London.

36 Cresswell, P., Harris, S. and Jefferies, D.J., 1990, The history, distribution status and habitat requirements of the badger in Britain. Nature Conservancy Council, Peterborough.

the summer months when vegetation was high and there was potential for additional sett entrance holes to be present which had been obscured by tall ruderal vegetation and subsequently not found. The updated badger surveys were therefore undertaken during winter to account for this limitation and to ensure badger activity was monitored throughout the summer and winter seasons.

8.3.18 Badger survey information is accurate at the time of survey; however, badgers are a mobile species and may dig new setts or entrance holes, abandon old setts, and change the status of existing setts (e.g., extend an annexe sett to create a main sett) at any time. Furthermore, classification of setts is based on the best available evidence at the time of survey. There is also a degree of overlap in these classifications and therefore clear distinctions are not always possible.

8.3.19 Sheep were present within two fields in the west of the site at the time of surveys. It is likely that their presence within these fields would have destroyed any evidence of badger (pathways, latrines etc.). This limitation was overcome by surveying field boundaries for signs of external activity and badger access into the fields.

Bat Roost Surveys

Structures

8.3.20 Lower Berse Farm is situated in the north-west corner of the site and is composed of several barns, storage sheds and outbuildings in addition to some Grade II* listed farmhouse buildings. Other development adjacent to the site includes a residential dwelling and a communications aerial installation to the centre of the site, though these are excluded from the site boundary. None of the structures within or adjacent to the site have been assessed as to their bat roost habitat suitability, as at the time of survey these areas were not identified as being impacted by the proposed development. A Preliminary Roost Assessment (PRA) of structures within the site including internal and external inspection will be undertaken prior to determination to further assess bat roost habitat resources within the site.

Trees

8.3.21 Trees within or immediately adjacent to the site were assessed in line with the Bat Conservation Trust (BCT) 2016 Good Practice Guidelines[37] for their potential to support roosting bats. The survey was undertaken by TEP Senior Ecologist Lindsey Roberts (Accredited Agent under John Crowder's Natural Resources Wales Survey Licence: S089169/1) from 18th-20th May 2021.

8.3.22 The Ground Level Tree Assessment (GLTA) involved the surveyor searching from the ground for any Potential Roost Features (PRFs) that may be used by bats, using binoculars. The trees were then categorised in accordance with the criteria set out in the BCT 2016 Guidelines.

37 Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.

8.3.23 Thirteen trees were subject to nocturnal surveys, within the proposed detailed application area as at May 2021, including dusk emergence and dawn re-entry surveys in accordance with their moderate or high bat roost habitat categorisation during the peak bat active season (May to August inclusive). Trees with moderate bat roost habitat suitability were subject to two nocturnal surveys, whilst trees with high bat roost habitat suitability were subject to three nocturnal surveys. The full methodologies and further details of the bat roost surveys of trees are included within the technical report at **Appendix 8.6**.

Limitations

8.3.24 Optimal conditions for identifying tree PRFs are when trees are not in leaf. According to the BCT 2016 Guidelines, the recommended survey window for GLTA is between December and March (inclusive). As the GLTA was carried out in May, this is considered a sub-optimal season for survey. Poor light and dense foliage (including ivy cover) can cause PRFs to be missed from ground level vantage points. Periods of rain were also experienced during the GLTA. Rain can reduce apparent suitability of PRFs as staining from bat roosts can be less obvious and damp bark colouration can affect visibility.

8.3.25 These limitations were overcome during the GLTA, as where PRFs were obscured by the angle of view, elevation or vegetation or were less evident due to damp and discolouration of bark but were likely to be present due to the age, size and apparent health of the tree, a precautionary approach was taken, and trees were categorised as having moderate or high bat roost habitat suitability. This assessment has been undertaken based on the 'worst case scenario' following review of the results of the GLTA and bat activity surveys within the site and is considered to be sufficient to allow a robust assessment of the proposed development.

8.3.26 Windy conditions were recorded at the beginning of the third nocturnal emergence/ re-entry survey of tree T178, with fresh breezes (5 - Beaufort Scale) >18 mph noted at the start of the survey. Whilst wind conditions were not optimum, they remained <18 mph for the majority of the survey and bat activity continued to be recorded. The wind conditions during this survey were therefore not a significant constraint. No other limitations were encountered during the nocturnal surveys.

Bat Activity Surveys

8.3.27 Desk based scoping and review of historic data for the site from bat activity surveys undertaken by TEP during the peak bat active season (May to August inclusive) in 2014, allowed for habitats within the site to be categorised as to their suitability to support foraging and commuting bats. The site was categorised as having moderate habitat suitability for commuting and foraging bats, as it has a variety of woodland, scrub, grassland and arable habitats providing edge habitat and clearings. Hedgerows, treelines and ditches within the site also provide linear features for bat commuting between habitats. However, the dominant habitats within the site are arable fields with indirect connectivity to rural habitats in the wider landscape due to the bounding

A483, A525 (Ruthin Road), B5099 (Bersham Road) and surrounding residential development associated with Wrexham to the north, east and south.

8.3.28 Due to the moderate habitat suitability of the site for commuting and foraging bats, bat activity surveys undertaken in 2021 included activity transect survey visits each month through the bat active season (April to October inclusive) in accordance with the BCT 2016 Guidelines. Two pre-determined transect routes were designed to cover all features likely to be of value to foraging and commuting bats and were surveyed to sample bat activity across the bat active season.

8.3.29 Each activity transect route was walked at a slow steady pace, by two surveyors with full spectrum (Elekon Batlogger M) detectors and supporting Batbox Duet heterodynes. Bat passes were recorded, together with the maximum number of bats observed, the species identified, and any other contextual data such as flight direction, social calling or feeding buzzes.

8.3.30 To accompany the activity transect surveys, static monitoring surveys were undertaken. Four Anabat Express frequency division detectors were placed close to features of valuable foraging/commuting habitat within and adjacent to the site and were set to record for a minimum of five consecutive nights during favourable weather conditions to monitor bat activity. Static monitoring detectors were deployed monthly in cohesion with activity transect surveys from April to October 2021.

8.3.31 Recorded data was analysed following completion of the activity transect surveys and static monitoring periods using Kaleidoscope Pro software.

8.3.32 The full methodologies and further details of the bat activity surveys are included within the technical report at **Appendix 8.6**.

Limitations

8.3.33 Bats vary their calls dependent on the habitats they fly in and on their activity (commuting, foraging, social interaction, etc.). It is not always possible to identify bat calls to species level owing to the overlap of call parameters between some species and/or poor-quality recordings (e.g., brief and distant passes). In these cases, it is accepted that species are identified to genus level or group level (e.g., *Myotis, Myotis/Plecotus*). Where call parameters are inconclusive the species has been noted as ‘unknown’, ensuring the dataset is interpreted accurately and transparently.

8.3.34 Some limitations with regard to sub-optimal weather conditions including; temperatures below 10°C, rain showers and high levels of moon illuminance were encountered during the activity transect surveys and static monitoring surveys. Given the overall level of survey effort, the recording of continued bat activity with the majority of temperatures remaining above 6°C and the fact the site is screened by woodland, hedgerows and treelines providing some shelter from rain, these variables were not considered to be significant constraints to interpreting the baseline data.

8.3.35 The Elekon Batlogger M failed to record activity within the north transect route during the October 2021 activity transect survey; however, observational manual data continued to be

recorded by surveyors using the supporting heterodyne. This limitation has been accounted for in the interpretation of the baseline data, in combination with review of the overall level of survey effort, with activity transect surveys having been undertaken monthly in correlation with static monitoring surveys and the recording of data manually during the October 2021 survey of the north transect route.

8.3.36 Bat activity occasionally failed to record during static monitoring surveys due to detector malfunction or excessive power drain. The static remote detector at Location B failed to record bat activity during the April 2021 monitoring period and the static remote detector at Location C failed to record activity during the October 2021 monitoring period. The static remote detector at Location A failed to record five nights of bat activity during the August 2021 monitoring period. The static remote detector at Location B failed to record five nights of bat activity during the May, August and October 2021 monitoring periods. The static remote detector at Location C failed to record five nights of bat activity during the June 2021 monitoring period. The static remote detector at Location D only recorded three nights of bat activity during the May 2021 monitoring period. In some circumstances no errors were recorded, and it is assumed that limited data reflected the absence of bat activity rather than detector malfunction.

8.3.37 Across all static monitoring periods an average of at least five nights of activity were recorded at each location. Overall limitations to length of static detector monitoring periods did not impair confidence in the interpretation of the baseline data, as detectors recorded at the various static detector locations across the bat active period and did not consistently fail in the same locations. Reduced or failed monitoring also did not occur at all static detector locations during a single static monitoring period. The level of survey effort with static monitoring surveys undertaken monthly at four locations, in combination with activity transect surveys allowed for interpretation of the baseline data and these limitations were taken into consideration when reflecting on habitat use within the site by bats in the locality.

Breeding Bird Survey

8.3.38 A Breeding Bird Survey (BBS) was carried out at the site, using methods based on the standard breeding bird survey and common bird census methods developed by the British Trust for Ornithology (BTO) (Gilbert *et al.* 1998)[38].

8.3.39 Three survey visits were carried out in the morning period, starting at least half an hour after dawn. Survey visits were carried out on 19th April, 19th May and 17th June 2021, approximately four weeks apart, by TEP Principal Ornithologist Mike Walker (BSc (Hons), MSc, PhD, MCIEEM), TEP Principal Ecologist John Crowder (BSc (Hons), MSc, MCIEEM) and ornithologist Richard Castell (BSc (Hons), MCIEEM). Bird species and activity patterns were recorded and mapped using standard BTO symbology. The three survey visits were undertaken using pre-determined transect routes to cover the entire site. Bird species observed within

38 Gilbert, G., Gibbons, D.W. & Evans, J., (1998), Bird Monitoring Methods. RSPB.

100 m surrounding the site boundary were also recorded during the survey, as a proportion of these bird's foraging or nesting habitat was likely to be within the site.

8.3.40 The full methodology and further details for the BBS are included within the technical report at **Appendix 8.7**.

Limitations

8.3.41 The BBS was undertaken during the recommended seasonal window (April to June) and therefore no seasonal restrictions were encountered. No limitations were encountered during the surveys.

Great Crested Newt (GCN) Surveys

8.3.42 Nine ponds were identified within 500 m of the site during a review of aerial and Ordnance Survey (OS) imagery. Pond locations are displayed with the site boundary on **Figure 8.2**. Two ponds were identified within the site. Ponds which were found to hold water, had connectivity to the site and had permitted access, were subject to Habitat Suitability Index (HSI)[39] Assessment and environmental DNA sampling.

8.3.43 HSI is a standard measure of calculating the suitability of a pond to support breeding great crested newt (GCN), based on an assessment of ten characteristics (indices), including size, shading, depth, and vegetation profile[40]. The HSI assessment generates a number between 0 - 1 for each of the indices which are combined to provide an overall assessment of a pond's suitability to support GCN on a categorical scale.

8.3.44 Environmental DNA (eDNA) sampling to determine the presence or absence of GCN was undertaken on a single pond (P1). eDNA sampling was undertaken by licensed GCN surveyor Angie McEwan (NRW GCN Survey Licence Ref: 2015-16877-CLS-CLS) on 15th April 2021 in accordance with the DEFRA 2014 Guidance[41].

8.3.45 In line with NRW guidance and the GCN Mitigation Guidelines[42] a combination of three traditional survey techniques were also used to assess GCN presence or absence within P1 including; bottle trapping, torch surveys and egg searches. Surveys were led by TEP Principal Ecologist John Crowder (NRW GCN Survey Licence Ref: 2015-19338-CLS-CLS) and assisted by ecologist David Houghton. Surveys were undertaken between mid-March and mid-June with at least two visits in the core period of mid-April to mid-May. To ensure effective detection rates torch and bottle surveys were undertaken when night-time air temperatures were >5ºC and when rain and wind conditions did not affect visibility (only relevant to torch surveys).

39 ARG UK (2010). Advice Note 5: Great Crested Newt Habitat Suitability Index. Amphibian and Reptile Groups of the UK

40 Oldham, R. S., Keeble, J., Swan, M. J. S. & Jeffcote, M. (2000) Evaluating the Suitability of Habitat for the Great Crested Newt (Triturus cristatus). The Herpetological Journal 10(4): 143 – 155

41 Biggs et al. (2014). Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

42 English Nature (2001). Great Crested Newt Mitigation Guidelines. English Nature, Peterborough

8.3.46 The full methodologies and further details for the GCN surveys are included within the technical report at **Appendix 8.8**.

Limitations

8.3.47 Access was not permitted to Pond P3 during surveys. Pond P3 is isolated from other ponds in the area, all being more than 500 m away, in addition to having barriers to amphibian dispersal in the wider landscape due to the bounding A483 to the west, the A525 (Ruthin Road) north of the site, the River Clywedog to the south and surrounding residential development associated with Wrexham to the north, east and south. Survey of ponds within the site was therefore sufficient to establish if a population of GCN was present within the locality.

Importance of Ecological Features

8.3.48 CIEEM EcIA guidance confirms that detailed assessment of ecological features that are widespread, un-threatened and resilient to proposed development impacts is not necessary. It is therefore necessary to determine which ecological features are sufficiently important (and potentially affected by the proposed development). Decisions on relative importance consider quality, extent, rarity (including local rarity) and threats or declines of a feature. Relevant statutory and non-statutory designations, legislation and policies are taken account of, although not all populations of legally protected species show the same rarity or distribution, so contextual information is presented where relevant (for example, while GCN are afforded statutory protection at a European level, a small population situated within an optimal geographic location is unlikely to be of ecological value at a European level). Importance could also relate to the supportive function of the ecological feature (i.e., providing a buffer, connections or opportunities for expansion or climate change resilience of a neighbouring feature).

8.3.49 The importance of an ecological feature is identified within a defined geographical context and the scales relevant to the proposed development and its ecological features are presented in **Table 8.2**. These criteria provide a framework for the assessment but specific site conditions, together with information on the local and wider context, may result in different criteria being applied.

Table 8.2: Geographic context of important ecological features

Geographic Context	Criteria
International and European	Designated or proposed/candidate Special Areas for Conservation (SAC), Special Protection Areas (SPA) and Ramsar Sites and their qualifying features, some of which may depend on land outside the designation boundaries. Candidate or proposed designations are treated as of equal value to fully designated sites. Land that is set aside as compensation for adverse effects of development on European Sites should also be regarded as of European value. Species populations or habitat areas (such as those listed in Annex I, II or IV of the Habitats Directive (Council Directive 92/43/EEC) or Annex I of the Birds Directive (Directive 2009/147/EC) of international importance due to relative size, rarity or quality of the feature.
National	Designated or proposed Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Marine Nature Reserves (MNR) and their qualifying features, some of which may depend on land outside the designation boundaries. A viable area of ancient woodland. Species populations or habitat areas (including legally protected or Environment (Wales) Act 2016 Section 7 (S7) species or habitats) of national importance due to relative size, rarity or quality of the feature.
County	Designated or proposed Local Wildlife Sites (LWS) and their qualifying features where they occur within the designation boundaries. 'Important' hedgerows (as described under the Hedgerows Regulations 1997) where these occur as an extensive network. Species populations or habitat areas (including legally protected or S7) or Nationally Scarce species or habitats of district or county importance due to relative size, rarity or quality of the feature. Sites should comfortably exceed LWS criteria if these exist, but not meet SSSI selection criteria.
Local	Local Nature Reserves (LNR) (unless also designated at a higher level) and other nature conservation designations (under local planning policies). Green infrastructure designations where these contribute to local landscape connectivity and/or buffer other ecological features valued at least this geographic scale. Species populations or habitat areas (including legally protected or S7 species or habitats) of local importance due to relative size or quality. Features that appreciably enrich the local ecological resource, although these may themselves be common and widespread, such as long-established hedgerows, woodlands and ponds.
Immediate Zone of Influence (IZoI)	Species populations or habitat areas of value within the immediate ZoI, usually identified within or immediate to the site (including legally protected species or habitats).
Negligible	Habitats of little or no ecological value or function e.g., densely urbanised environments, amenity grassland, hardstanding etc.

Characterisation of Impact

8.3.50 It is good practice to describe potential impacts on ecological features without and with mitigation. The proposed development may result in multiple potential impacts on an important ecological feature. The CIEEM approach requires that only those that are likely to occur and

have significant impacts need be assessed, although a precautionary approach to scoping potential impacts is recommended. The following characteristics are used to describe impacts:

- Positive or negative;
- Extent;
- Magnitude;
- Duration;
- Frequency;
- Timing; and
- Reversibility.

8.3.51 The assessment only needs to describe the characteristics relevant to understanding the ecological effect of the impacts as a result of the proposed development and to determine the significance of the impacts.

Likelihood of Effect

8.3.52 The following four-point scale has been used to express the degree of confidence in the prediction of impact significance, for residual impacts this scale will also indicate the reliability of mitigation proposals.

- Certain/near certain;
- Probable;
- Possible; and
- Extremely unlikely.

Significance of Effects

8.3.53 Once an impact has been described it is necessary to determine if the effect is ‘significant’. In the context of CIEEM EcIA guidance a 'significant' effect is one that either 'supports or undermines biodiversity conservation objectives for important ecological features’. This can include impacts on the structure and function of sites and habitats or the conservation status of habitats and species (i.e., the extent, distribution or abundance). The decision on significance is made irrespective of the geographical scale of importance of the feature; if an effect is found not to be significant at the level at which the feature has been valued, it may be significant at a more local level.

8.3.54 A significant negative effect is not necessarily one that would make the proposed development unacceptable. A significant effect is simply an effect that is sufficiently important to require assessment and reporting to establish the environmental consequences of permitting proposals.

Climate Change

8.3.55 European Commission (EC) Guidance[43] requires that EcIA considers the effects of schemes on climate change and on biodiversity. The EC Guidance indicates that impacts that are only likely to be experienced in the next 20 years should be based on current weather patterns or near-future projections if available and relevant. Beyond 20 years, identified potential impacts (associated with operation of the proposed development) may need to consider the projected climate. This has been taken into account in the assessment of operational effects.

Assumptions and Limitations

8.3.56 Where relevant, key assumptions and/or limitations have been included within assessment methodologies and are further detailed within **Appendices 8.1-8.8**. No limitations prevented or reduced the effective interpretation of the baseline ecological data.

8.4 Baseline Conditions

8.4.1 This section identifies the current ecological conditions of the site and the study area. The assessment is made on the best available data, based on the information that has been gathered from stakeholders, other data sources and the surveys undertaken between 2021-2022. All surveys were completed within appropriate seasons over appropriate periods in accordance with industry standards for the specific survey. Nevertheless, the surveys will only identify habitats present at the site at the time of surveys. Additionally, the species investigated are mobile and will move into and out of areas over time, a precautionary approach has therefore been taken in the prediction of impacts. Where there is any doubt, except where specifically noted, a species is assumed present, and an impact is given the higher level of significance. Details of the baseline conditions for ecological features are provided below.

Designated Sites

Internationally Designated Sites

8.4.2 The technical report for the Ecology Desk Study is included in **Appendix 8.1**.

8.4.3 There are four internationally statutory designated wildlife sites within 10 km of the site; Johnstown Newt Sites SAC, Clwyd/Berwyn and South Clwyd Mountains SAC, Midland Meres and Mosses Phase 2 Ramsar and River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC.

8.4.4 Johnstown Newt Sites SAC is located 1.90 km south of the site and is primarily designated due to it supporting one of the largest known GCN populations in Great Britain and this species being listed under; Annex II of the Nature Directives, Bern Convention, 2017 and 2019

43 European Commission, (2013), The EU Strategy on Adaptation to Climate Change: Strengthening Europe's resilience to the impacts of climate change. European Commission.

Regulations and Schedule 5 of the WCA. Good populations of other widespread amphibian species are also present including, common frog *Rana temporaria*, common toad *Bufo bufo*, and smooth newt *Lissotriton vulgaris*. Given the designation of Johnstown Newt Sites SAC is associated with the presence of GCN and habitats within the site are not likely to support associated amphibian populations being >1.5 km to the north of the SAC, the proposed development is highly unlikely to affect habitats and species associated with the SAC designation. Bonc Yr Hafod Nature Reserve and Stryt Las Park Country Park form part of the SAC and the proposed development may increase public recreational pressure on these areas. However, the SAC does include formal footpaths and is under management by the Woodland Trust and Wrexham County Borough Council ranger service, allowing for maintenance of habitats supporting GCN and green space for recreation will also be provided within the proposed development. Public recreational pressure associated with the proposed development is therefore highly unlikely to affect the integrity of this internationally designated site. Johnstown Newt Sites SAC has been scoped out of further assessment.

8.4.5 Clwyd/Berwyn and South Clwyd Mountains SAC lies within 3.70 km west of the site and is primarily designated for its European dry heath and blanket bog habitats due to these habitats being listed under Annex I of the Nature Directives and the 2017 and 2019 Regulations. There is potential for an increase in public recreational pressure on the SAC. However, the SAC does include formal footpaths and tracks to direct public access and prevent deterioration of habitats due to footfall pressure. The large size of the SAC will also allow dispersal of residents associated with the proposed development whilst seeking recreation, and public pressure impacts will therefore be less concentrated. Local green space will also be provided within the proposed development for recreation within the site. Public recreational pressure associated with the proposed development is therefore highly unlikely to affect the integrity of this internationally designated site. Clwyd/Berwyn and South Clwyd Mountains SAC has been scoped out of further assessment.

8.4.6 Midland Meres and Mosses Phase 2 Ramsar is located 5.54 km north-east of the site is designated for its good examples of natural or near-natural wetland habitats from open water to raised bog and the supports a number of rare plant and invertebrate species. The designation of Midland Meres and Mosses Phase 2 Ramsar is associated with the presence of wetland and bog habitats that are not present within the site and the site is not likely to support associated flora. The SAC is also >5.0 km from the site and does not allow public access. The proposed development is therefore highly unlikely to affect the integrity of the internationally designated Midland Meres and Mosses Phase 2 Ramsar site and it has been scoped out of further assessment.

8.4.7 River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC lies 7.16 km south-east of the site at its nearest point and continues to the north. The SAC is primarily designated for its watercourses of plain to montane levels with *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation (habitats listed under Annex I of the Nature Directives and the 2017 and 2019 Regulations) and for supporting Atlantic salmon *Salmo salar* and floating water-plantain *Luronium natans* (species

listed under; Annex II of the Nature Directives and the 2017 and 2019 Regulations). The designation of River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC is due to the presence of riparian habitats and associated flora and fauna. The SAC is >7.0 km from the site and therefore impacts associated with increased public recreational pressure are not anticipated, particularly with the provision of local green space within the proposed development for recreation within the site. Public pressure associated with the proposed development is therefore highly unlikely to affect the integrity of the River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC and the SAC has been scoped out of further assessment in this regard. Habitats within the site do not directly connect to the SAC and do not support associated designated flora and fauna species.

Nationally Designated Sites

8.4.8 There are five nationally statutory designated wildlife sites within 5 km of the site; Gatewen Marsh SSSI, Stryt Las A'r Hafod SSSI, Sontley Marsh SSSI, Coedwig Ffosil/Brymbo Fossil Forest SSSI and Ruabon/Llantysilio Mountains and Minera SSSI. Coedwig Ffosil/Brymbo Fossil Forest SSSI is designated for its geological interest, not habitats or associated flora and fauna that may be supported by the site. Coedwig Ffosil/Brymbo Fossil Forest SSSI consequently lies outside the scope of EcIA and has been scoped out of further assessment.

8.4.9 Whilst transient species associated with these SSSIs may use the site as part of their wider habitat network, predominantly arable habitat present is unlikely to provide optimal supporting habitat for these species.

8.4.10 Gatewen Marsh SSSI is located 1.07 km north of the site and is one of only three significant examples of the southern mesotrophic mires wetland type. Moss Valley Country Park connects to and includes the Gatewen Marsh SSSI. Other than a small pond, wetland habitats are not present within the site and therefore the site is not likely to support rarer flora and fauna associated with the designated habitats within the SSSI. The proposed development may increase public recreational pressure on the SSSI however, the SSSI has formal footpaths and is under management by Wrexham County Borough Council ranger service allowing for maintenance and protection of habitats. Green space for local recreation will also be provided within the proposed development. Public recreational pressure associated with the proposed development is therefore highly unlikely to affect the integrity of this nationally designated site. No indirect effects on the SSSI such as noise or dust pollution are anticipated as a result of the proposed development, as Gatewen Marsh SSSI is located >1.0 km from the site. Gatewen Marsh SSSI therefore has been scoped out of further assessment.

8.4.11 Stryt Las A'r Hafod SSSI is located 1.90 km south of the site and is designated for supporting amphibian populations including GCN, forming part of the Johnstown Newt Sites SAC. Given the designation of the SSSI is associated with the presence of GCN and habitats within the site are not likely to support associated amphibian populations being >1.5 km to the north of the site, the proposed development is highly unlikely to affect the integrity of the SSSI. The proposed development may increase public recreational pressure on Stryt Las A'r Hafod SSSI.

However, the SSSI does include formal footpaths and is under management by the Woodland Trust and Wrexham County Borough Council ranger service, allowing for maintenance of habitats supporting GCN. Green space for recreation will be provided within the proposed development. Public recreational pressure associated with the proposed development is therefore highly unlikely to affect the integrity of Stryt Las A'r Hafod SSSI. No indirect effects on the SSSI such as noise or dust pollution are anticipated as a result of the proposed development, as Stryt Las A'r Hafod SSSI is located >1.5 km from the site. Stryt Las A'r Hafod SSSI has been scoped out of further assessment.

8.4.12 Sontley Marsh SSSI is situated 2.27 km south-east of the site and is designated for supporting extensive areas of alder *Alnus glutinosa* carr woodland, tall fen vegetation and herb-rich damp grassland habitats. The site does not support similar habitats to the SSSI and does not have direct connectivity being >2.0 km from the SSSI. The site is therefore not likely to support rarer flora and fauna associated with the designated habitats within the SSSI. The proposed development may increase public recreational pressure on Sontley Marsh SSSI. However, the SSSI includes formal footpaths and is under management by Wrexham County Borough Council ranger service, allowing for maintenance of habitats. Green space for recreation will be provided within the proposed development. Public recreational pressure associated with the proposed development is therefore highly unlikely to affect the integrity of Sontley Marsh SSSI. No indirect effects on the SSSI such as noise or dust pollution are anticipated as a result of the proposed development, as Sontley Marsh SSSI is located >2.0 km from the site. Sontley Marsh SSSI has therefore been scoped out of further assessment.

8.4.13 Ruabon/Llantysilio Mountains and Minera SSSI lies 3.70 km west of the site and is designated for its heather moor, limestone and neutral grassland habitats and associated species including, various upland breeding birds, bats and rare and uncommon plants. The SSSI forms part of the Clwyd/Berwyn and South Clwyd Mountains SAC. There is potential for an increase in public recreational pressure on the SSSI. However, the SSSI does include formal footpaths and tracks to direct public access and prevent deterioration of habitats due to footfall pressure. As the SSSI is located within the larger surrounding SAC, dispersal of residents associated with the proposed development whilst seeking recreation is anticipated. Public pressure impacts will therefore be less concentrated within the SSSI. Local green space will also be provided within the proposed development for recreation within the site. Public recreational pressure associated with the proposed development is therefore highly unlikely to affect the integrity of the SSSI. Ruabon/Llantysilio Mountains and Minera SSSI has been scoped out of further assessment.

Locally Designated Sites

8.4.14 There are no statutory locally designated wildlife sites within 2 km of the site. However, there are ten non-statutory locally designated wildlife sites within 2 km of the site.

8.4.15 Erddig Estate LWS, Big Wood LWS and Berse Drelincourt LWS all lie within 0.50 km of the site and are designated for their woodland, grassland, marsh and riparian habitats and associated flora and fauna. New Broughton Meadow LWS, Nant Mill Grasslands LWS, Higher Berse Marsh

LWS, Crematorium LWS, Legacy Substation LWS, Moss Valley LWS and Afon Gwenfro LWS all lie >1.0 km from the site and are designated for their ranging grassland, marsh, wetland, woodland, pond and scrub habitats.

8.4.16 There is potential for an increase in public pressure on the LWSs as a result of the proposed development that may affect the condition of the LWS habitats. However, the LWSs include formal footpaths and tracks to direct public access and prevent deterioration of habitats due to footfall pressure. Green space will also be incorporated within the proposed development for recreation within the site. Public recreational pressure associated with the proposed development is therefore unlikely to affect the integrity of the LWSs. No indirect effects on the LWSs such as noise or dust pollution are anticipated as a result of the proposed development, as the LWSs are >0.35 km from the site and do not have direct connectivity to the site, being separated by surrounding road infrastructure and residential development. The ten non-statutory locally designated wildlife sites have therefore been scoped out of further assessment.

Habitats and Flora

8.4.17 There is a narrow belt of woodland identified as ancient woodland within the south-west corner of the site located within a field bounding the A483. Ancient woodland habitat is a S7 priority habitat identified within the Environment (Wales) Act 2016. Other notable habitats recorded within 0.50 km of the site included mosaic habitat and residential green space. Residential green space is identified as an LBAP habitat. The priority habitats noted within influencing distance of the site are frequent throughout the surrounding landscape and are not directly connected to the site or within 0.10 km. The ancient woodland habitat recorded within the site will be taken forward in this assessment as part of the habitat features within the site.

8.4.18 The full extended Phase 1 habitat survey is presented in **Appendix 8.2** and detailed on the Phase 1 Habitat Survey Map (**Figure 8.1**). The habitats within the proposed development are summarised below.

- Improved grassland;
- Semi-improved neutral grassland;
- Amenity grassland;
- Arable farmland;
- Tall ruderal vegetation;
- Hedgerows;
- Dense/continuous and scattered scrub;
- Semi-natural broad-leaved woodland;
- Scattered broad-leaved trees;
- Standing water;
- Flowing wet ditch;
- Bare ground; and

- Structures and hardstanding.

8.4.19 In line with CIEEM EcIA guidance detailed assessment of ecological features that are 'widespread, unthreatened and resilient to project impacts' is not necessary. Some of the habitats within the site fall into this category. Habitat descriptions are condensed in the following paragraphs where similar ecological features are described. While some habitats provide shelter and/or foraging for faunal species, to reduce repetition any impacts on fauna as a result of habitat loss, degradation or fragmentation within the proposed development are described in the relevant faunal section.

Improved Grassland, Arable and Field Margins

8.4.20 There are several fields in the centre and west of the site of improved grassland heavily dominated by perennial rye grass *Lolium perenne.* These fields are generally used as either grazing or to grow fodder for livestock. The majority of the larger fields along the north, east and south of the site are arable, which at the time of the survey contained young, unidentifiable crops. The improved grassland and arable habitats dominant within the site offer limited ecological diversity and are a widespread and unthreatened habitat. Arable and improved grassland habitat is therefore scoped out of further assessment as an important ecological feature.

8.4.21 Field margins include tall ruderal vegetation throughout the site and patches of tall herb are also occasionally present within the fields. These areas commonly comprise a mix of nettles *Urtica dioica*, great willowherb *Epilobium hirsutum*, cow parsley *Anthriscus sylvestris*, hogweed *Heracleum sphondylium* and creeping thistle *Cirsium arvense.* Dense/continuous scrub and scattered scrub habitat are also located around field margins in the centre and south of the site. Areas of dense/continuous scrub and scattered scrub habitat are generally composed of hawthorn *Crataegus monogyna*, bramble *Rubus fruticosus* agg. and willow *Salix* sp..

8.4.22 The field margin habitats are common and widespread and do not qualify as arable field margin habitat of principal importance under S7, as they are not managed specifically to provide benefits for wildlife and are generally no more than 2.0 m wide. Therefore, they will be scoped out of further assessment as an important ecological feature.

Semi-improved Neutral Grassland

8.4.23 There are fields of semi-improved neutral grassland within the north-west of the site surrounding Lower Berse Farm and in the centre surrounding the residential Bryn-Moel property. Semi-improved neutral grassland within the site is of varying quality and species abundance ranging from species-poor grassland to relatively species rich grassland. Most of these fields are grazed, some more intensively and frequently than others, and are generally still dominated by perennial ryegrass.

8.4.24 Semi-improved neutral grassland is a relatively common and widespread habitat. However, the higher species diversity they possess, when compared to the improved grassland habitats within the site confers a greater level of importance and therefore these grasslands are assessed as an important ecological feature within the IZoI of the site.

Hedgerows

8.4.25 The network of hedges across the site provide one of the habitats of main ecological value with 67 hedgerows being recorded and surveyed. Hedgerows within the site included; native species-rich intact hedgerows, species-poor intact hedgerows, native species-rich defunct hedgerows, species-poor defunct hedgerows, native species-rich hedgerows and trees and species-poor hedgerows and trees. Generally, the hedgerows surveyed were found to have a good mix of species. Hawthorn, elder *Sambucus nigra*, holly *Ilex aquifolium*, hazel *Corylus avellana*, blackthorn *Prunus spinosa* and dog rose *Rosa canina* were the most frequently recorded woody species. Frequently recorded ground flora species included native bluebell *Hyacinthoides non-scripta*, cleavers *Galium aparine*, nettle *Urtica dioica*, ivy *Hedera helix*, dog's mercury *Mercurialis perennis* and lord's and ladies' *Arum* maculatum. There were also a number of hedgerows with mature (in some cases, with veteran characteristics) standard trees, in particular English oak *Quercus robur*, many of these adjacent to the old green lane and Public Right of Way (PROW) that bisects the site from west to east.

8.4.26 The old green lane and PROW have raised hedgerows on banks on both sides with several mature trees throughout. This is an old throughway with several ancient woodland indicator species and some different shrubs and scrub species not occurring in the rest of the site such as gooseberry *Ribes uva-crispa* and hairy broom *Cytisus striatus*.

8.4.27 A total of 41 hedgerows were assessed to be 'Important' under the Hedgerow Regulations in terms of the wildlife and landscape criteria. Eleven of these were assessed to be 'Important' due only to the presence of the protected plant species (Schedule 8, WCA) native bluebell within the ground flora at the base of the hedges. All the other hedges were designated as 'Important' due to the average number of Schedule 3 (Hedgerow Regulations) woody species present within the sampled sections of the hedges in conjunction with the number of features associated with the hedges, as well as containing native bluebell.

8.4.28 All native hedgerows are 'habitats of principal importance' under S7 and given the number of 'Important' (Hedgerow Regulations) hedgerows identified within the site, hedgerows are assessed as an important ecological feature at County level.

Semi-natural Broad-leaved Woodland

8.4.29 There is a long, narrow area of broad-leaved woodland stretching along the eastern and southern boundaries of an elongated field in the south-west corner of the site, to the west of Berse Lane. The woodland was identified as ancient woodland S7 priority habitat within the Ecology Desk Study. It has abundant sycamore *Acer pseudoplatanus*, with frequent ash

Fraxinus excelsior and a mixed age range of trees with varied ground flora, which includes several ancient woodland indicator species such as; enchanter's nightshade *Circaea lutetiana*, primrose *Primula vulgaris*, scaly male-fern *Dryopteris affinis* ssp. *Borreri,* dog's mercury *Mercurialis perennis,* lords-and-ladies and bluebell. The woodland was also noted as supporting a variety of fungi species including King Alfred's cakes *Daldinia concentrica*, and several species of waxcaps *Hygrocybes* sp. and bracket fungi *Polypore* sp..

8.4.30 In the south-west of the site, there is also a long thin strip of semi-natural broad-leaved woodland along a field edge with a public footpath running through it. This woodland has abundant sycamore, hazel and hawthorn. The tree survey and associated AIA recorded this linear block of woodland (W4) in the south-west of the site, adjacent to Bersham Road and Berse Lane, as one of the most significant arboricultural features on site, being restored ancient woodland.

8.4.31 There is also a smaller block of semi-natural broad-leaved woodland with associated willow scrub in the north-west of the site containing small, flooded areas created by flowing water being dammed within the woodland and then culverted to re-join the ditch/brook. The tree survey and associated AIA also recorded the linear group of trees running along the watercourse in the north-west of the site as one of the most significant arboricultural features on site. The full results for the arboricultural tree survey are included within the technical report at **Appendix 8.4**.

8.4.32 Ancient woodland and semi-natural broad-leaved woodland are 'habitats of principal importance' under S7 and though the woodland areas will be largely retained within the site, semi-natural broad-leaved woodland habitats are assessed as an important ecological feature at County level.

Scattered Broad-leaved Trees

8.4.33 There are numerous mature broad-leaved trees within the site, mostly associated with the field boundaries and hedgerows. The tree survey and associated AIA recorded 86 individual trees, 50 groups of trees, 43 hedgerows and two areas of woodland. Based on an objective assessment made in accordance with BS 5837:2012 there are 46 Category A, 60 Category B, 68 Category C and seven Category U trees and groups on or within influencing distance of the site. Tree cover at the site is typical of an agricultural landscape, with both individual and groups of trees situated around the boundaries of the site and along hedgerows and watercourses. In addition to the woodland areas, other significant arboricultural features on the site are, the linear group of trees and shrubs running east to west through the site along the old green lane, a second linear group running along the watercourse in the north-west of the site and a number of individual large, mature specimen trees situated in hedgerows. The groups of trees that provide screening of the site from existing adjacent residential properties along the south boundary around Bersham Hall and the highway, are also of value.

8.4.34 The species and age distribution of the existing tree resource is limited with around 90% of the tree stock made up of four species; ash, oak, sycamore and hawthorn and 80% of the trees being either mature or over mature with less than 3% semi-mature. Trees with ash die-back and

Dutch elm disease are present within the site. At the time of the survey the majority of the trees were either in very early stages or did not show any significant symptoms.

8.4.35 A search of the Woodland Trust Ancient Tree Inventory[44] and the Lle Geoportal Database for Wales[45] indicate that there are no veteran trees recorded on site. The tree survey and associated AIA identified trees T24, T28 and T172 as having veteran characteristics. The full results for the arboricultural tree survey are included within the technical report at **Appendix 8.4**.

8.4.36 Trees are assessed as an important ecological feature at the Local level due to their quality and maturity within the site.

Standing Water and Flowing Water

8.4.37 There is a small man-made pond of very low water quality in the centre of a field near to the Lower Berse Farm buildings, with no submergent vegetation and regularly used by waterfowl. It is understood this is linked to the farm buildings as an outfall pond for cattle slurry. A partially filled ditch runs north from the pond through the field with some species associated with wet grassland such as soft rush *Juncus effusus*. A dry ephemeral pool is located in the east of the site within an arable field.

8.4.38 A ditch/brook emerging from a concrete culvert under Berse Lane, flows eastwards along field boundaries through the site before turning towards the north in the centre of the site. This watercourse has hedgerows on either one or two sides along most of its length through the site.

8.4.39 A small ditch/brook runs west to east through a partially collapsed culvert through a field and emerges from the culvert running through the woodland in the south-west of the site before being culverted under Berse Lane in a south-easterly direction, possibly towards the River Clywedog to the south of the site.

8.4.40 Watercourses are identified as LBAP habitats for Wrexham County however, the ditches/brooks within the site are of poor quality with limited associated bankside habitat and form more of a drainage feature within the site rather than valuable habitat. The two ditches/brooks within the site are therefore assessed as an important ecological feature at the Local level.

Other Habitats

8.4.41 There is a small area of amenity grassland within the gardens surrounding the Lower Berse Farmhouse in the north-west corner of the site. There are a few limited areas of bare ground scattered around the site, mostly associated with footpaths and tracks, gateways and access points into fields, and some small patches within fields where vegetation has not grown.

8.4.42 Areas of hardstanding occur around Lower Berse Farm yard, access road and buildings in the north-west of the site and along an access road and area immediately surrounding the small

44 Woodland Trust Ancient Tree Inventory https://ati.woodlandtrust.org.uk/

45 Lle Geoportal Database for Wales http://lle.gov.wales/catalogue

substation in the centre of the site. These habitats are of very limited intrinsic ecological value and therefore are scoped out of further assessment as important ecological features.

8.4.43 Buildings within the site are associated with Lower Berse Farm in the north-west and include a range of large, corrugated metal storage and livestock barns in addition to a Grade II* listed brick-built farm building and farmhouse. Structures and buildings within the site are considered with regard to notable and protected species in the relevant sections below.

Notable Plant Species

8.4.44 Native bluebells were recorded along multiple hedgerows, within woodlands and along the old green lane traversing the site. This species is listed under Schedule 8 of the WCA. Native bluebell is therefore assessed as an important ecological feature within the IZoI of the site.

Invasive Non-native Plant Species

8.4.45 A stand of rhododendron *Rhododendron ponticum*, an invasive non-native species listed on Schedule 9 of the WCA, was recorded within the semi-natural broad-leaved woodland located to the west of B5098 (Berse Lane). A small amount of variegated yellow archangel *Lamiastrum galeobdolon* subsp. *argentatum* was also noted along the old green lane and is an invasive non-native species listed on Schedule 9 of the WCA. These species are not of ecological conservation concern but there is a statutory duty to avoid the introduction or spread of species listed on Schedule 9 of the WCA.

Protected and Notable Fauna

Bats

8.4.53 The Ecology Desk Study (**Appendix 8.1**) returned numerous records for at least eight species of bats from within 2 km of the site including; common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, brown long-eared *Plecotus auritus*, Daubenton's bat *Myotis daubentonii*, Brandt's bat *Myotis brandti*/whiskered bat *Myotis mystacinus,* Natterer's bat *Myotis nattereri*, whiskered bat *Myotis mystacinus*, noctule *Nyctalus noctula* and lesser horseshoe *Rhinolophus hipposideros*.

8.4.54 Full details of the bat surveys are presented in **Appendix 8.6**.

Roosting – Trees

8.4.55 The majority of trees identified as having bat roost habitat suitability during the GLTA were located along field boundaries within hedgerows and along the old green lane. Of the 80 trees identified during the GLTA as having bat roost habitat suitability:

- 14 trees were categorised as having high bat roost habitat suitability;
- 35 trees were categorised as having moderate bat roost habitat suitability; and
- 31 trees were categorised as having low bat roost habitat suitability.

8.4.56 Species recorded within the site during nocturnal surveys included; common pipistrelle, soprano pipistrelle, brown long-eared, *Myotis* species, noctule and lesser horseshoe.

8.4.57 A single day roost of soprano pipistrelle bats was recorded in T172 during nocturnal surveys. No other bat roosts were recorded during nocturnal surveys.

8.4.58 Roosting bats are assessed as an important ecological feature at a Local level due the presence of numerous trees with bat roost habitat present within the site, the evidence of a variety of species within the site and the immediate locality and due to the presence of a confirmed day roost of a common species.

Foraging and Commuting

8.4.59 Species recorded within the site during activity transect surveys and static monitoring surveys included; common pipistrelle, soprano pipistrelle, brown long-eared, noctule, *Myotis* species, and lesser horseshoe.

8.4.60 Bat activity was generally distributed along higher quality linear habitat features within the site including the bands of semi-natural broad-leaved woodland in the west of the site, along mature hedgerows and trees, along the ditches traversing the site and particularly along the central old green lane. Less foraging and commuting activity was recorded within the open arable and grassland habitats, which are less likely to support a variety of invertebrate prey. Linear features provided by hedgerows and ditches around the site were frequently used by commuting bats, in particular the old green lane and the linear group of trees running along the watercourse in the north-west of the site.

8.4.61 Based on analysis of the survey data, the site is of Local importance for commuting and foraging common pipistrelle, soprano pipistrelle, brown long-eared, noctule, *Myotis* species and lesser horseshoe.

8.4.62 Foraging and commuting bats are assessed as an important ecological feature at a Local level due the use of numerous linear hedgerow and ditch features, mature trees and woodland edge habitat by a variety of bat species within the site and the immediate locality.

Breeding Birds

8.4.63 The Ecology Desk Study (**Appendix 8.1**) returned historical records of 55 notable bird species that have been recorded within 2 km of the site. Of the 13 species identified under Schedule 1 of the WCA and recorded within 2 km of the site, quail *Coturnix coturnix*, barn owl *Tyto alba* and hobby *Falco subbuteo* are the most likely species to breed in habitat within the site or the 100 m buffer. The data search confirmed that no statutory or non-statutory designated wildlife sites within 2 km of the site are designated for breeding birds.

8.4.64 Full details of the breeding bird survey are presented in **Appendix 8.7**.

8.4.65 A total of 37 bird species were recorded within the site boundary and 100 m survey buffer during the 2021 BBS. The 37 bird species recorded within the site boundary and 100 m survey buffer represent a moderate species diversity with many of the species recorded being commonplace and widespread. No significant breeding bird concentrations (i.e., 1% or more of the national breeding population) were recorded during the BBS.

8.4.66 Thirty-six of these species were recorded at least once within the site itself. Two bird species were confirmed as nesting within the site, namely blue tit *Cyanistes caeruleus* and notable species dunnock *Prunella modularis*. Twenty bird species were assessed as probable breeding species within the site and 100 m survey buffer.

8.4.67 The total number of confirmed probable and possible breeding bird species recorded within a site also indicates its significance. The confirmed, probable and possible breeding bird species recorded within the site and 100 m survey buffer indicated the site is of local significance for breeding birds.

8.4.68 Breeding birds are therefore assessed as an important ecological feature at the Local level.

Amphibians

8.4.69 The Ecology Desk Study (**Appendix 8.1**) returned 23 records for GCN within 2 km of the site, the closest being 290 m north-east. Twenty-five records for other common amphibians including common frog, common toad, palmate newt *Lissotriton helveticus* and smooth newt were also returned within 2 km of the site, the closest record was 400 m south of the site.

8.4.70 Full details of the amphibian surveys are presented in **Appendix 8.8**.

8.4.71 Of the nine ponds identified within 500 m of the site, six ponds were identified as having barriers to amphibian dispersal to the site, due to the surrounding road infrastructure and residential development. Based on previous survey information from 2015, two ponds were identified within the site (P1 and P2) and a third pond (P3) was identified within a field to the south of the site.

8.4.72 During the HSI assessment survey Pond 1 (P1) was noted as having a Poor HSI score. Pond P2 was deemed to be absent during the Phase 1 habitat survey and was therefore scoped out of further survey. Access to Pond P3 was not permitted. Only P1 was therefore included in the traditional presence/absence surveys.

8.4.73 The eDNA sampling survey returned indeterminate results for GCN likely due to the slurry draining into the pond and so traditional presence/absence surveys were carried out. Traditional presence/absence surveys recorded no GCN nor other common amphibians. GCN are considered absent from the site.

8.4.74 Whilst it was not possible to survey P3, the pond is located to the south of Bersham Road with surrounding terrestrial habitat suitable for amphibians. It is therefore unlikely that if GCN were present within the locality, they would range into the arable fields to the north of Bersham Road when breeding habitat is present within P3 and higher quality woodland, scrub and grassland habitat is present along the riparian corridor to the south of P3. However, P3 is also isolated from ponds in the wider area, all being more than 500 m away, with the exception of P1 and it is unlikely that a single pond would support a viable GCN population. Survey of P1 within the site was therefore sufficient to establish if a population of GCN was present within the locality as this would likely be the same population associated with P3.

8.4.75 Whilst GCN are considered absent from the site, the site provides a range of suitable terrestrial habitats for amphibians where hedgerows, scrub, woodland and grassland habitats are present. Overall amphibians are assessed as an important ecological feature within the IZoI of the site due to their possible presence in the locality.

Otter

8.4.76 The Ecology Desk Study (**Appendix 8.1**) returned 16 records for otter *Lutra lutra*, with the closest being 150 m south-west of the site. The two ditches/brooks within the site were not identified as providing suitable foraging or ranging habitat for otter due to being regularly culverted under fields and main roads. The surrounding road infrastructure and residential development between the site and main watercourses in the wider landscape would prevent use of the site by otter for commuting or shelter. Arable land dominates within the site and the

field margins and small woodland habitats with public footpaths would likely be subject to too much disturbance from farming activities and recreational users for otters to construct holts.

8.4.77 Otters are scoped out of this assessment as an important ecological feature due to the lack of evidence of this species within the site and the barriers to otter dispersal provided by main roads and surrounding residential development.

Water Vole

8.4.78 The Ecology Desk Study (**Appendix 8.1**) returned no records of water vole *Arvicola amphibius* within 2 km of the site.

8.4.79 The aquatic habitats provided by the two ditches/brooks within the site offer poor suitability for water vole. The two ditches/brooks are heavily culverted and lack connectivity to surrounding watercourses with more suitability. The ditches/brooks are also heavily shaded by adjacent hedgerows, mature trees and dense tall ruderal vegetation reducing suitability for water vole foraging.

8.4.80 Due to the absence of water vole records within the surrounding landscape and as the two ditches/brooks within the site provide unsuitable and poor-quality habitat with regard to water vole, water vole are scoped out of this assessment and not taken forward as an important ecological feature.

Invertebrates

8.4.81 The Ecology Desk Study (**Appendix 8.1**) returned several records of terrestrial invertebrates (S7) within 2 km of the site, in addition to records for white letter hairstreak *Satyrium w-album* (WCA5, S7). However, given the majority of the site is intensively farmed, likely subject to pesticide use and having only limited field margin habitat diversity, the site is likely to support widespread and common invertebrate species but not a significantly diverse assemblage. Invertebrates are therefore scoped out of this assessment and not taken forward as an important ecological feature.

Reptiles

8.4.82 The Ecology Desk Study (**Appendix 8.1**) returned a single record of adder *Vipera berus,* five records of grass snake *Natrix natrix* and two records of common lizard *Zootoca vivipara* within 1.0 km of the site. No records of reptiles were returned within the site.

8.4.83 The site has some habitats with suitability for reptiles, in particular grass snake. The numerous hedgerows and areas of woodland, scrub, grassland and tall ruderal vegetation provide suitable refuge, commuting and foraging habitat for reptiles. However, habitats within the majority of the site are mainly arable with poor floristic diversity and homogenous vegetative structure unsuitable for reptile basking, refuge and foraging. Connectivity to reptile populations in the wider landscape is also limited to the north, east and west due to the surrounding road infrastructure and residential development. Habitats south of Berhsam Road and associated

with River Clywedog may provide connectivity for reptiles to disperse into the site if present in the wider locality.

8.4.84 Reptiles are not brought forward for assessment as an important ecological feature due to the lack of evidence of this species within the site, the sub-optimal habitats within the site and the restrictions to dispersal of reptiles from surrounding populations into the site due to surrounding road infrastructure and development. However, it is recognised that reptiles are afforded some protection and therefore appropriate precautionary mitigation has been outlined later in this chapter.

Other Fauna

8.4.85 The Ecology Desk Study (**Appendix 8.1**) returned records of west European hedgehog *Erinaceus europaeus* (S7), polecat *Mustela putorius* (S7) and brown hare *Lepus europaeus* (S7), within 2 km of the site.

8.4.86 The site has habitats which have suitability for hedgehog foraging, refuge and commuting, including hedgerows, woodland, scrub, grassland and tall ruderal vegetation. Hedgehogs may disperse into the site, though the surrounding road infrastructure restricts dispersal and poses a risk for injury or death. Overall hedgehogs are assessed as an important ecological feature within the IZoI of the site due to their possible presence in the locality.

8.4.87 Polecats generally prefer wetlands, riparian corridors and farmland with hedgerows and small woods. However, intensive management of arable fields may reduce prey abundance within the site for polecat. Polecat records within the site locality and sub-optimal habitats existing within the site suggest regular use of the site by polecat is unlikely. However, polecats may disperse into the site, though as for hedgehogs the surrounding road infrastructure restricts dispersal and poses a risk for injury or death. Overall polecats are assessed as an important ecological feature within the IZoI of the site due to their possible presence in the locality.

8.4.88 The site has habitats which have suitability for brown hare foraging and creation of forms, including areas of hedgerow, woodland, scrub, grassland and tall ruderal vegetation. The site provides open farmland, grassland habitats, woodland edges and the general mosaic of arable fields, grasses and hedgerows preferred by brown hare however, the surrounding road infrastructure is likely to restrict dispersal into and from the site into the wider countryside. Brown hare have a preference for larger expanses of open arable mosaic habitat. As the site is isolated by barriers to brown hare movement and no brown hare were observed during surveys this species is scoped out of further assessment as an important ecological feature.

Evaluation of Ecological Features Summary

8.4.89 **Table 8.3** provides a summary of the designated sites, habitats and fauna that have been identified as important ecological features associated with the site, which have the potential to be impacted by the proposed development.

8.4.90 CIEEM guidance requires ecological features of importance at International and European, National, County and Local levels to be taken forward for assessment.

8.4.91 Ecological features of importance within the IZoI of the site are not required to be taken forward for assessment; however appropriate mitigation measures have been included later in this chapter.

Table 8.3: Summary of important ecological features within the site or within influencing distance

Ecological Feature	Planning/ Legal Status	Ecological Value	Inclusion of Ecological Feature for Further Assessment
Designated Sites			
Johnstown Newt Sites SAC	Habitats Directive, 2017 Regulations	International	Scoped out
Clwyd/Berwyn and South Clwyd Mountains SAC	Habitats Directive, 2017 Regulations	International	Scoped out
Midland Meres and Mosses Phase 2 Ramsar	Ramsar Convention, 2017 Regulations	International	Scoped out
River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC	Habitats Directive, 2017 Regulations	International	Scoped out
Gatewen Marsh SSSI	Wildlife and Countryside Act 1981 (as amended)	National	Scoped out
Stryt Las A'r Hafod SSSI	Wildlife and Countryside Act 1981 (as amended)	National	Scoped out
Sontley Marsh SSSI	Wildlife and Countryside Act 1981 (as amended)	National	Scoped out
Coedwig Ffosil/Brymbo Fossil Forest SSSI	Wildlife and Countryside Act 1981 (as amended)	National	Scoped out
Ruabon/Llantysilio Mountains and Minera SSSI	Wildlife and Countryside Act 1981 (as amended)	National	Scoped out
10 Non-statutory Local Wildlife Sites	The Town and Country Planning Act 1990	County	Scoped out
Habitats and Flora			
Improved Grassland and Arable and Field Margins	N/A	N/A	Scoped out
Semi-improved Neutral Grassland	**N/A**	**IZoI**	**Scoped in**
Hedgerows	**Hedgerow Regulations 1997, S7 Environment (Wales) Act 2016**	**County**	**Scoped in**
Semi-natural Broad-leaved Woodland	**S7 Environment (Wales) Act 2016, LBAP**	**County**	**Scoped in**
Scattered Broad-leaved Trees	**N/A**	**Local**	**Scoped in**
Standing Water and Flowing Wet Ditch	**N/A**	**Local**	**Scoped in**
Other Habitats	N/A	N/A	Scoped out
Native Bluebell	**Wildlife and Countryside Act 1981 (as amended)**	**IZoI**	**Scoped in**
Invasive Non-native Plant Species	Wildlife and Countryside Act 1981 (as amended)	**IZoI**	N/A
Protected and Notable Fauna			

Ecological Feature	Planning/ Legal Status	Ecological Value	Inclusion of Ecological Feature for Further Assessment
Badger	**Protection of Badgers Act 1981**	**Local**	**Scoped in**
Roosting Bats	**2017 Regulations, Wildlife and Countryside Act 1981 (as amended), S7 Environment (Wales) Act 2016 (certain species only), LBAP**	**Local**	**Scoped in**
Foraging and Commuting Bats	**S7 Environment (Wales) Act 2016 (certain species only), Lesser Horseshoe LBAP**	**Local**	**Scoped in**
Breeding Birds	**Wildlife and Countryside Act 1981 (as amended), S7 Environment (Wales) Act 2016 (certain species only), BoCC (certain species), LBAP (certain species)**	**Local**	**Scoped in**
Amphibians	**2017 Regulations, Wildlife and Countryside Act 1981 (as amended), S7 Environment (Wales) Act 2016 (certain species only), LBAP (certain species)**	**IZoI**	**Scoped in**
Otter	2017 Regulations, Wildlife and Countryside Act 1981 (as amended), LBAP	N/A	Scoped out
Water Vole	Wildlife and Countryside Act 1981 (as amended), S7 Environment (Wales) Act 2016 (certain species only)	N/A	Scoped out
Invertebrates	S7 Environment (Wales) Act 2016 (certain species only)	N/A	Scoped out
Reptiles	Wildlife and Countryside Act 1981 (as amended), S7 Environment (Wales) Act 2016 (certain species only)	N/A	Scoped out
Hedgehog	**S7 Environment (Wales) Act 2016 (certain species only)**	**IZoI**	**Scoped in**
Polecat	**S7 Environment (Wales) Act 2016 (certain species only)**	**IZoI**	**Scoped in**
Brown Hare	S7 Environment (Wales) Act 2016 (certain species only)	N/A	Scoped out

8.5 Embedded Mitigation

8.5.1 This section describes those mitigation measures which have been 'embedded' into the development through an interactive process of assessment and redesign. In particular, this section reflects measures that have been incorporated into the parameters plans or other assessment parameters that will be automatically incorporated into any forthcoming planning permission by way of the approval of submitted plans.

8.5.2 Standard pollution prevention controls and maintenance of run off rates will be committed to as part of the drainage strategy for the site and are further detailed in chapter 11. The drainage strategy will include a surface water drainage management strategy for construction and operation of the proposed development. The surface water drainage management strategy will include the early provisioning of temporary and permanent Sustainable Drainage System (SuDS) infrastructure during the construction of each phase of the proposed development. SuDS will include attenuation ponds and swales within the site to slow the transportation of surfaces water and to store surface water in high intensity rainfall events. SuDS will also improve runoff water quality by reducing contaminants through settlement or biological breakdown of pollutants, improving the water quality of the watercourses in the vicinity of the site. Where feasible, infiltration techniques will also be used in the form of individual property soakaways and permeable paving. Foul drainage will be discharged to the public sewer, which connects to the Welsh Water Five Fords WWTW.

8.5.3 Green infrastructure (GI) principals have been integrated into the design strategy, with consideration to the retention, protection and enhancement of existing landscape features, in particular hedgerows, trees and the old green lane. The old green lane will form a strategic green corridor from the east to the west of the site.

8.5.4 The proposed development will also look to incorporate strategic public open spaces (POS) in the centre and south-west of the site, with smaller areas in the north and west to provide a break in the built form and offer habitat for local wildlife and visual amenity. Strategic greenways including footpaths and cycleways will also be incorporated around proposed development parcels in the north and south of the site. Where possible, loss of semi-improved neutral grassland habitat will be offset through incorporation of diverse grassland habitat within areas of strategic POS.

8.5.5 A green buffer providing at least 15 m stand off from the belt of ancient woodland/semi-natural broad-leaved woodland in the south-west will provided in the area of POS to ensure the quality of the habitat is retained.

8.5.6 Hedgerow loss will be minimised as far as possible, with the design retaining the majority of existing mature hedgerows along field boundaries and in particular along the old green lane. Where hedgerows are retained, native bluebell will be protected by a landscape buffer implemented along the hedgerow.

8.5.7 Tree loss will be minimised as far as possible, with the design retaining the majority of existing mature trees along field boundaries and in particular along the old green lane. Where trees are

retained, they will be protected by a buffer at least adhering to the required root protection area. Where trees require removal, replacement planting will be incorporated within the site to offset any tree loss.

8.5.8 Standing water habitat provided by Pond P1 will be retained and enhanced within the proposed community centre area to provide improved aquatic habitat for wildlife within the locality.

8.5.9 Of the 80 trees identified with bat roost suitability, the majority will be retained within the site design and will therefore maintain bat roosting opportunities in the future. Provision of the strategic old green lane corridor across the site, the linear woodland in the north of the site along the watercourse and their connecting hedgerow and treelines, will provide connectivity for foraging and commuting bats between the open landscape to the west and across the site. Hedgerows and trees bounding fields will be retained and enhanced to maintain the foraging and commuting resource for bats along these features and maintain connectivity to the wider landscape. Retention of the hedgerows will maintain existing foraging habitat used by bats within the locality.

8.5.10 Retention of trees and hedgerows, provision of the strategic old green lane corridor across the site and areas or POS will also maintain and enhance nesting and foraging habitat for garden birds within the site locality.

8.5.11 Retention of field boundary habitats, creation of strategic greenways, buffer areas along the strategic old green lane corridor across the site and areas or POS will provide inter-habitat connectivity for a range of other species (including amphibians, invertebrates and terrestrial mammals).

8.6 Potential Effects

8.6.1 This section sets out the potential effects of the proposed development on ecological features on the basis of the assessment parameters plans and assumes the inclusion of embedded mitigation as set out in the preceding section but in the absence of any additional mitigation measures.

8.6.2 Based on the results of the Ecology Desk Study and field surveys, described in **Section 8.4**, the distribution, function and value of ecological features present vary across the site. Different ecological features could be affected by different components of the proposed development in different ways, during and post-construction. The following sections identify those activities with greatest potential to give rise to biophysical changes to valued ecological features (pathways of effects). Where pathways of effects are identified, the potential impact is subject to further assessment, using impact characterisation methods in accordance with CIEEM guidelines, to determine whether a significant ecological effect may result prior to mitigation. If no pathways of effects are identified, no further assessment is made.

Demolition and Construction

8.6.3 The key construction activities which are likely to be required and have potential to affect the ecological features associated with the site, include those activities listed in **Table 8.4**.

Table 8.4: Potential construction activities resulting in potential change in ecological features

Development and Construction Effect	Potential Ecological Change
Vegetation and other site clearance activities (e.g., installation of temporary compounds/offices	• Temporary/permanent habitat loss. • Loss of species (killing and injury). • Disturbance of species (physical). • Disturbance of species (loss of or disruption to animal territories, severance, fragmentation or isolation). • Disturbance of species (loss of foraging or shelter resources). • Introduction/spread of invasive non-native or other undesirable species.
Topsoil stripping, bulk earthworks, soil storage and creation of new levels	• Temporary/permanent habitat loss. • Habitat degradation / disturbance (accidental damage, compaction). • Loss of species (killing and injury). • Disturbance of species (physical). • Disturbance of species (loss of or disruption to territories, severance, fragmentation or isolation). • Disturbance of species (loss of foraging or shelter resources). • Disturbance of species (noise and vibration). • Introduction/spread of invasive non-native or other undesirable species.
Movement and operation of plant and machinery (including piling, if required) and construction traffic	• Disturbance of species (noise and vibration). • Introduction/spread of invasive non-native or other undesirable species.
Accidental spillages of fuels or chemicals	• Habitat degradation (pollution). • Possible loss of species (killing and injury).
Construction of buildings, roads, greenways and footpaths	• Permanent/temporary habitat loss. • Habitat degradation (accidental damage, compaction). • Loss of species (killing and injury). • Disturbance of species (physical). • Disturbance of species (loss of foraging or shelter resources). • Introduction/spread of invasive non-native or other undesirable species.
Landscaping and planting	• Habitat creation. • Habitat loss (permanent modification). • Habitat degradation (accidental damage, compaction). • Species gain (net gains foraging and shelter habitats as a consequence of net gains in scrub, hedgerow and permanent grasslands). • Species gain (strengthened ecological network as a consequence of improved habitat connectivity and diversity of habitats). • Introduction/spread of invasive non-native or other undesirable species.

8.6.4 The potential for these construction activities to result in changes within the important ecological features which have been identified, are discussed in further detail in the following sections.

Habitats and Flora

Semi-improved Neutral Grassland

8.6.5 Embedded mitigation has enabled the retention of areas of grassland within areas of strategic POS as part of the proposed development. However, there will some loss of semi-improved neutral grassland within the site where development zones are proposed in the north-west of the site. The losses of this habitat will lead to a **negative significant effect** on this feature at the level of the **IZoI**.

8.6.6 There is the potential for direct damage to the retained areas of semi-improved grassland within the centre of the site from encroachment by construction machinery and indirect effects resulting from demolition and construction works such as airborne dust, noise and ground water contamination. Direct and Indirect effects as a result of the construction phase would have a **negative significant effect** on this feature at the level of the **IZoI**.

Hedgerows

8.6.7 Embedded mitigation ensured the majority of the hedgerows within the site will be retained as part of the proposed development. However, some lengths of hedgerow will be lost within the site where the proposed spine road and other access roads are required across the site. The losses of this habitat will lead to a **negative significant effect** on this feature at the **IZoI**.

8.6.8 There is the potential for direct damage to the hedgerows from encroachment by construction machinery and indirect effects resulting from demolition and construction works such as airborne dust, noise and ground water contamination. Direct and Indirect effects as a result of the construction phase would have a **negative significant effect** on this feature at the **IZoI**.

Semi-natural Broad-leaved Woodland

8.6.9 No direct loss to the ancient woodland will occur as a result of any earthworks in the south-west corner of the site. However, there is the potential for direct damage to the ancient woodland from encroachment by construction machinery along its western and northern boundary and indirect effects resulting from demolition and construction works such as airborne dust, noise and ground water contamination. The embedded 15 m buffer along the western and northern boundary of the woodland will prevent direct effects at this location. However, indirect effects could still occur from the west, it is likely that there will be a **negative significant effect** on this feature at the level of the **IZoI**.

8.6.10 There is the potential for direct damage to retained semi-natural broad-leaved woodland from encroachment by construction machinery and indirect effects resulting from demolition and construction works such as airborne dust, noise and ground water contamination on retained parts of the site. Therefore, it is likely that there will be a **negative significant effect** on this feature at the level of the **IZoI**.

Scattered Broad-leaved Trees

8.6.11 Embedded mitigation ensured broad-leaved trees within the site will be retained as part of the proposed development where feasible. However, there is the potential for direct damage to retained broad-leaved trees from encroachment by construction machinery and indirect effects resulting from demolition and construction works such as airborne dust, noise and ground water contamination. Therefore, it is likely that there will be a **negative significant effect** on this feature at the level of the **IZoI**.

8.6.12 Some loss of high and moderate value trees will be unavoidable within the site. Overall tree loss as a result of the proposed development is currently unknown. A number of trees will be lost within the site where the proposed spine road and other access roads are required, and proposed development zone footprints cannot accommodate root protection areas and buffers. However, taking a precautionary approach, given the currently unknown tree loss, for the purposes of the EcIA the amount of tree planting proposed compared to the loss of trees has been assumed to lead to a **negative significant effect** on this feature at the level of the **IZoI**.

Standing Water and Flowing Brooks

8.6.13 Embedded mitigation will ensure standing water habitat provided by Pond P1 is retained and enhanced within the proposed community centre area to provide improved aquatic habitat for wildlife within the locality. Once Pond P1 has been enhanced this will lead to a **positive significant effect** on this feature within the **IZoI**.

8.6.14 Indirect effects may be possible on Pond P1 and the two ditches/brooks within the site, resulting from accidental encroachment and construction pollution events during the construction phase of the proposed development and would lead to a **negative significant effect** on this feature within the **IZoI**.

8.6.15 The central ditch/brook within the site will be culverted in three places to facilitate creation of access roads within the proposed development. There will therefore be a permanent loss of minor sections of this habitat leading to a **negative significant effect** on this feature within the **IZoI**.

Native Bluebell

8.6.16 Native bluebells within semi-natural broad-leaved woodland and along hedgerows throughout the site will be retained where woodland blocks and hedgerows are retained within embedded mitigation.

8.6.17 Native bluebells present in the central strip of semi-natural broad-leaved woodland and along some sections of hedgerows will be lost as a result of the development proposals, in the absence of mitigation. This will lead to a **negative significant effect** on this feature in the **IZoI**.

Protected and Notable Fauna

Roosting Bats

8.6.21 Of the 80 trees with bat roost habitat suitability, some loss of trees with bat roost habitat suitability may be unavoidable within the site. Overall tree loss as a result of the proposed development is currently unknown. A number of trees will be lost within the site where the proposed spine road and other access roads are required, and proposed development zone footprints cannot accommodate root protection areas and buffers. Trees T138, T139, T140 and T178 may also be fragmented from surrounding habitats due to the encroachment of development zones. Given the currently unknown loss of trees with bat roost habitat suitability, for the purposes of the EcIA a precautionary approach has been taken. It is assumed that some trees with bat roost habitat suitability will be lost as a result of site clearance and earthworks within the development zones. Loss of suitable tree roost habitat within the site may impact the Favourable Conservation Status (FCS) of bat species within the locality where alternative tree roost habitat is unavailable and if roosts of high conservation status where to be impacted. A loss of suitable roosting habitat for bats within the site will lead to a **negative significant effect** on this feature at the **Local level**.

8.6.22 A single day roost of soprano pipistrelle bat species has been identified within the site. However, bats are also transitionary in their use of roost habitat and there is the potential for bats to roost within other trees within the site in the intervening period between survey and construction. Where bat roosts or trees with bat roost habitat suitability are present within the site there is potential for killing or injury to bats should they be roosting within trees when they are felled during site clearance or if they require pruning works. Where bat roosts or trees with bat roost habitat suitability are present within the site there is also potential for damage or destruction of bat roosts. This has the potential to lead to a **negative significant effect** on this feature at the **Local level**.

8.6.23 There is also the potential for direct damage and disturbance of trees with bat roost suitability which are retained around the site as a result of encroachment by construction machinery. This has the potential to lead to a **negative significant effect** on this feature at the **Local level.**

Foraging and Commuting Bats

8.6.24 Loss of habitats of moderate value for supporting commuting and foraging bats including a small area of semi-natural broad-leaved woodland, sections of hedgerow, mature trees, scrub and grassland, which all provide edge habitat will occur as a result of site clearance. This will lead to a reduction in the availability of foraging areas and features along which bats commute between roost sites and foraging areas. It is possible that this will lead to a **negative significant effect** at the **Local level**. If connectivity between foraging and commuting habitat within the wider landscape is eroded by the proposed development and where availability of foraging and commuting habitat within the wider landscape is reduced over time, the FCS of bat species within the locality may be impacted. However, similar habitats are present within the wider landscape and as the proposed development is at the edge of existing sub-urban development, it is therefore likely to contribute to ecological networks used by bats within the wider landscape rather than being an integral site for bat species foraging and commuting.

8.6.25 There is the potential that bats using retained habitat for foraging and commuting will be affected by construction lighting, if required for night time working. It is only possible that this will occur, since the majority of night time working would take place during the bat hibernation period in the winter. It is unlikely that this would lead to significant disruption to foraging and commuting bats and therefore potential effects with respect to construction lighting will be **not significant**.

Breeding Birds

8.6.26 Site clearance will lead to the loss of a range of habitats which provide nesting opportunities for up to 37 species. Site clearance will lead to the loss of confirmed blue tit (1 pair) and dunnock (1 pair) breeding and probable breeding opportunities for 20 species. Site clearance for construction will lead to the loss of nesting opportunities for up to 37 species. It is likely that this will lead to a **negative significant effect** at the **Local level**.

8.6.27 During site clearance activities, if undertaken during the bird breeding season, there is a risk of killing and injury to nesting birds and their young. This is certain during the breeding season and would lead to a **negative significant effect** at the **Local level**.

8.6.28 During construction activities, there is the potential for disturbance and displacement of birds from retained habitats as a result of noise and the movement of construction machinery and operatives. However, the majority of species recorded across the site are likely to become habituated to construction activities and while there may be some displacement, it is unlikely that this will lead to a significant effect on their breeding success. This effect is therefore considered to be **not significant**.

Amphibians

8.6.29 Some grassland, scrub and hedgerow habitats used by foraging and commuting amphibians will be lost during construction of the proposed development. However, embedded mitigation ensures many woodland and hedgerow habitats within the site will be retained within the proposed development and areas of POS will provide grassland habitat around the site, in particular to the south. However, given the limited records of amphibians within the surrounding locality, the limited availability of aquatic breeding habitat within the site and the locality and the absence of amphibians recorded during field survey and the habitats that will be retained or created, this effect is considered to be **not significant**.

8.6.30 Given the presence of suitable terrestrial habitat to support amphibian refuge, foraging and commuting, in particular areas of scrub, woodland, grassland, tall ruderal vegetation and hedgerows, there will be potential to cause killing or injury of amphibians should they be present within the site during vegetation clearance and groundworks. This has the potential to lead to a **negative significant effect** on this feature within the **IZoI**.

Hedgehog

8.6.31 Some grassland, scrub and hedgerow habitats used by foraging and commuting hedgehog will be lost during construction of the proposed development. However, embedded mitigation ensures many woodland and hedgerow habitats will be retained within the proposed development and areas of POS will provide grassland habitat around the site, in particular to the south. There will be a temporary reduction in the availability of terrestrial habitat for hedgehog within the site, prior to the establishment of new habitats within the landscape design however, this effect is considered to be **not significant**.

8.6.32 Given the presence of suitable habitat to support hedgehog refuge, foraging and commuting, in particular areas of scrub, woodland, grassland, tall ruderal vegetation and hedgerows, there will be potential to cause killing or injury of hedgehogs should they be present within the site during vegetation clearance and groundworks. This has the potential to lead to a **negative significant effect** on this feature within the **IZoI**.

Polecat

8.6.33 Some grassland, scrub and hedgerow habitats used by foraging and commuting hedgehog will be lost during construction of the proposed development. However, embedded mitigation ensures many woodland and hedgerow habitats will be retained within the proposed development and areas of POS will provide grassland habitat around the site, in particular to the south. There will be a temporary reduction in the availability of terrestrial habitat for hedgehog within the site, prior to the establishment of new habitats within the landscape design however, this effect is considered to be **not significant**.

8.6.34 Given the presence of suitable habitat to support polecat refuge, foraging and commuting, in particular areas of scrub, woodland, grassland, tall ruderal vegetation and hedgerows, there will be potential to cause killing or injury of polecats should they be present within the site during vegetation clearance and groundworks. This has the potential to lead to a **negative significant effect** on this feature within the **IZoI**.

Table 8.5: Summary of construction effects

Important Ecological Feature	Potential Effect(s) Prior to Mitigation	Significance CIEEM
Semi-improved Neutral Grassland	Assumed overall net loss of this habitat, with embedded creation in masterplan framework.	Negative significant effect at IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at IZoI.
Hedgerows	Assumed overall net loss of this habitat, with embedded creation in masterplan framework.	Negative significant effect at the Local level.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at the Local level.
Semi-natural Broad-leaved Woodland	Potential degradation through construction pollution events on ancient semi-natural broad-leaved woodland	Negative significant effect at IZoI.
	Potential degradation through accidental encroachment and construction pollution events of non-ancient semi-natural broad-leaved woodland	Negative significant effect at IZoI.
Scattered Broad-leaved Trees	Assumed loss of trees, with embedded replacement tree planting in masterplan framework.	Negative significant effect at IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at IZoI.
Standing Water and Flowing Brooks	Embedded enhancement of pond P1 in masterplan framework.	Positive significant effect within the IZoI.
	Overall loss of minor sections of the central watercourse where culverted for access.	Negative significant effect within the IZoI.
	Potential degradation through accidental encroachment and construction pollution events of standing and flowing water.	Negative significant effect within the IZoI.
Native Bluebell	Loss of native bluebells due to site clearance.	Negative significant effect at IZoI.

Important Ecological Feature	Potential Effect(s) Prior to Mitigation	Significance CIEEM
Badger	Damage/ destruction of three badger setts including one main sett through accidental encroachment.	Negative significant effect at the Local level.
	Reduction in the availability of foraging and commuting habitat within the site and restriction to dispersal from setts to the wider landscape.	Negative significant effect at the Local level.
	Potential to cause killing or injury of badgers should they get trapped within groundworks or range around the site during clearance, earthworks or construction.	Negative significant effect at the Local level.
Roosting Bats	Assumed loss of some trees with bat roost habitat suitability.	Negative significant effect at the Local level.
	Potential for killing/ injury of roosting bats and/or damage/destruction of bat roosts during removal or pruning of trees with bat roost habitat suitability and of confirmed day roost at T172 (if removal is required).	Negative significant effect at the Local level.
	Potential for direct damage and disturbance of retained trees with bat roost suitability from construction activities.	Negative significant effect at the Local level.
Foraging and Commuting Bats	Loss of habitats of moderate value for supporting commuting and foraging bats.	Negative significant effect at the Local level.
	Potential effects of construction lighting on commuting and foraging bats.	Not significant.
Breeding Birds	Site clearance will lead to the loss of a range of habitats which provide nesting opportunities for up to 37 species.	Negative significant effect at the Local level.
	Potential for killing and injury to nesting birds and their young.	Negative significant effect at the Local level.
	Potential for disturbance and displacement of birds from retained habitats.	Not significant.
Amphibians	Potential loss of foraging and commuting habitats for amphibians, which is mitigated by habitat creation within embedded design.	Not significant.
	Site clearance may result in the killing or injury of common amphibians.	Negative significant effect within the IZoI.
Hedgehog	Potential loss of foraging and commuting habitats for hedgehog, which is mitigated by habitat creation within embedded design.	Not significant.

Important Ecological Feature	Potential Effect(s) Prior to Mitigation	Significance CIEEM
	Site clearance will lead to the loss of a range habitats which possibly provide refuge, foraging and commuting habitat for hedgehogs and may result in their killing or injury.	Negative significant effect within the IZoI.
Polecat	Potential loss of foraging and commuting habitats for polecat, which is mitigated by habitat creation within embedded design.	Not significant.
	Site clearance will lead to the loss of a range habitats which possibly provide refuge, foraging and commuting habitat for polecats and may result in their killing or injury.	Negative significant effect within the IZoI.

Operational Development

8.6.35 This section addresses the key activities which will have a potential effect on the ecological features of the site and the surrounding locality during operation of the site, including occupation and use of the residential, public open space and supporting infrastructure. The actions of future users would include vehicle and pedestrian traffic movements, sports and leisure activities and an increase in the presence of domestic pets. Direct habitat losses have been addressed within the Demolition and Construction section above.

8.6.36 Potential effects likely to arise during the operational phase will include but may not be limited to those listed in **Table 8.6** below.

Table 8.6: Potential operational activities resulting in potential change to ecological features

Operational Effect	Potential Ecological Change
Artificial lighting (e.g., streetlights, lighting of footpaths and buildings)	• Light pollution. • Disruption to species (behavioural changes, changes in species abundance and dispersion patterns, reduction in foraging times of nocturnal species). • Increased predation effects (mortality) in nocturnal species. • Barrier effects for light sensitive species.
Increased public access and recreation pressures	• Habitat degradation (soil compaction or erosion by trampling, nutrification by dog-fouling, accidental damage, direct interference, littering or tipping). • Disturbance of species (behavioural changes, reduction in foraging, interruption to dispersal or breeding). • Mortality of species (disturbance of critical life stages e.g., hibernating bats, direct interference, ingestion of or entrapment in litter objects). • Introduction or spread of invasive or undesirable species.
Traffic movements (work force, visitors to country park)	• Noise and light pollution. • Mortality of species. • Disturbance of species.

8.6.37 The potential for these operational activities to result in changes within the important ecological features which have been identified, are discussed in further detail in the following sections.

Habitats and Flora

Semi-improved Neutral Grassland

8.6.38 There is the potential for the newly created and retained/enhanced grasslands within the site to be lost through a lack of ongoing management and as a result of recreational use by new residents walking through these areas. Indirect effects would include dog fouling, trampling and physical disturbance/erosion of habitats. This will result in a **negative significant effect** on this feature at the **IZoI**.

Hedgerows

8.6.39 There is the potential for the newly created and retained/enhanced hedgerows and associated ancient woodland indicator ground flora, to be lost or degraded within the site through a lack of ongoing management and as a result of recreational use by new residents walking around these areas. Indirect effects would include dog fouling, trampling and physical disturbance/ fragmentation of hedgerow habitats. This will result in a **negative significant effect** on this feature at the **Local level**.

Semi-natural Broad-leaved Woodland

8.6.40 There is the potential for the retained ancient woodland and semi-natural broad-leaved woodland within the south-west corner and centre of the site to be lost or degraded through a lack of management and as a result of new residents walking through this area. Indirect effects would include dog fouling, trampling and physical disturbance/erosion of habitats. This will result in a **negative significant effect** on this feature at the **Local level**.

Scattered Broad-leaved Trees

8.6.41 There is the potential for the newly created and retained trees within the site to be lost or degraded through poor management and as a result of new residents undertaking pruning. Direct effects would include death of newly planted standard trees and physical damage where pruning of retained trees is undertaken by unqualified individuals. This will result in a **negative significant effect** on this feature within the **IZoI**.

Standing Water and Flowing Brooks

8.6.42 There is the potential for Pond P1 to be degraded through poor management and as a result of new residents introducing ornamental aquatic plants or fish. There is also the potential for the two ditches/brooks within the site to be degraded through poor management. This would inhibit the suitability of the pond and ditches/brooks to support native wildlife within the locality. This would result in a **negative significant effect** on these features within the **IZoI**.

Native Bluebell

8.6.43 Increased human pressure within the site has the potential to increase footfall/trampling and nitrification through dog fouling within retained woodland habitats and along hedgerows (including the strategic old green lane corridor), which support native bluebell and other ancient woodland indicator species. These impacts could disturb and potentially reduce the existing native bluebell population and other associated woodland ground flora and therefore represents a **negative significant effect** on this feature at the **IZoI**.

Protected and Notable Fauna

Badger

8.6.44 Provision of road infrastructure within the site will fragment badger foraging habitat and commuting routes should they range within development zones. The increased traffic using the surrounding landscape and the roads within the proposed development may increase the risk of collision between badger and vehicles. A **negative significant effect** at the **Local level** may occur in relation to collision risk and killing and injury of badger.

8.6.45 Indirect impacts on badger during the operational phase of the proposed development may include lighting disturbance of dispersal corridors within the site. A **negative significant effect** at **Local level** may occur in relation to lighting disturbance and badger upon completion of the proposed development.

Roosting Bats

8.6.46 Some of the trees with bat roost habitat suitability retained within the proposed development are in relatively close proximity to the boundary of the development zones. There is the potential that the use of these trees as roost sites could be affected by inappropriate lighting of the surrounding areas, should light spill fall on the roosts or their access routes. This would also be the case for installed roost boxes around the site. It is possible that this will lead to a **negative significant effect** at the **Local level** on roosting bats.

8.6.47 Buildings and trees incorporated into the proposed development may over time develop roosting habitat suitable for use by bats, which would provide habitat enhancements for roosting bats where previously arable habitat dominated. Provision of roost habitat within the site would support the FCS of bat species within the locality where additional habitat is provided. Therefore, the proposed development may have a **positive significant effect** at the **Local level** in relation to roosting bats.

Foraging and Commuting Bats

8.6.48 Access roads within the proposed development will intersect the old green lane corridor in two locations and the two mature hedgerows connecting this feature to semi-natural broad-leaved woodland along the ditch/brook in the north of the site. These hedgerow and treeline features provide connectivity across and beyond the site to adjacent habitats for foraging and commuting bats, particularly for species that fly less in the open e.g., brown long-eared and lesser horseshoe. Given the limited activity recorded by brown long-eared and lesser horseshoe during bat surveys it is likely that local populations have low reliance on habitats within the site and their FCS would unlikely be impacted as a result of the proposed development, with their geographic distribution and range being maintained. However, poor management of trees and hedgerows where roads intersect features used by commuting and foraging bat species could result in the erosion of bat commuting corridors within the site and the surrounding locality. It is

possible that this would lead to a **negative significant effect** at the **Local level** on foraging and commuting bats.

8.6.49 There is the potential that bats using the site for foraging and commuting could be disturbed or excluded by inappropriate street lighting and where light spill occurs onto suitable habitats such as woodland edge habitat, areas of tree planting or retained hedgerows and mature trees, particularly around development zones. It is possible that this will lead to a **negative significant effect** at the **Local level** on foraging and commuting bats.

Breeding Birds

8.6.50 It is likely that the local cat population will increase following completion of the proposed development, and there is the likelihood that they will predate on birds leading to a potential reduction in breeding pairs of certain species, if present within the site. Therefore, a **negative significant effect** at the **Local level** may occur in relation to birds and predation within the site.

8.6.51 Indirect operational impacts may include lighting disturbance of breeding bird nesting habitat, which would have a **negative significant effect** at **IZoI** in relation to nesting birds.

8.6.52 Vehicular and pedestrian movements around the site during the operational phase, will result in increased visual and noise disturbances and therefore could disrupt passerine birds nesting in retained woodland and retained and newly planted hedgerow and scrub habitats. However, as the operational activities of the site are likely to be regular, the passerine species present would be expected to habituate to any disturbance impacts. Disturbance to nesting birds within and adjacent to the site from vehicular and pedestrian activities is therefore unlikely to significantly affect medium to long-term breeding capabilities. The increased disturbance effect as a result of vehicular and pedestrian movements on nesting birds is **not significant**.

8.6.53 Incorporation of nesting habitat through inclusion of scrub, hedgerow and tree planting within the proposed development will provide habitat enhancements for nesting birds in the medium-term where previously arable habitat dominated. The proposed development will have a **positive significant effect** at the **IZoI** in relation to nesting birds in the medium-term.

8.6.54 Provision of hedgerow, scrub, unmanaged grassland and tree planting in addition to residential gardens within the proposed development will increase the foraging habitat available for the majority of bird species recorded within the site, compared to the existing dominant arable habitat. Therefore, the proposed development may have a **positive significant effect** at the **IZoI** in relation to foraging garden birds.

Amphibians

8.6.55 It is likely that the local cat population will increase following completion of the proposed development, and there is the likelihood that they will predate on amphibians leading to a potential reduction in these species if present within the site. Therefore, a **negative significant effect** within the **IZoI** may occur in relation to amphibians and predation within the site.

8.6.56 The increased traffic using the surrounding landscape and the roads within the proposed development may increase the risk of killing and injury to amphibians. Therefore, a **negative significant effect** within the **IZoI** may occur in relation to collision risk and amphibians.

8.6.57 Provision of hedgerow, scrub, unmanaged grassland and tree planting in addition to residential gardens and enhancement of Pond P1 within the proposed development will increase the refuge and foraging habitat available for amphibians within the site, compared to the existing dominant arable habitat. The proposed development may therefore have a **positive significant effect** within the **IZoI** in relation to foraging amphibians.

Hedgehog

8.6.58 The increased traffic using the surrounding landscape and the roads within the proposed development may increase the risk of killing and injury to hedgehog. A **negative significant effect** within the **IZoI** may therefore occur in relation to collision risk and hedgehogs.

8.6.59 Provision of hedgerow, scrub, unmanaged grassland and tree planting in addition to residential gardens within the proposed development will increase the refuge and foraging habitat available for hedgehogs within the site, compared to the existing dominant arable habitat. The proposed development may therefore have a **positive significant effect** within the **IZoI** in relation to foraging hedgehog.

Table 8.7: Summary of operational effects

Important Ecological Feature	Potential Effect(s) Prior to Mitigation	Significance CIEEM
Semi-improved Neutral Grassland	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at the IZoI.
	Strategically designed provision of diverse grassland habitat within areas of POS will provide higher quality grassland than that currently within the site.	Positive significant effect within the IZoI.
Hedgerows	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at the Local level.
	Strategically designed provision of hedgerow habitat within areas of POS will maintain and enhance the hedgerow resource across the site and the condition of hedgerows.	Positive significant effect within the IZoI.
Semi-natural Broad-leaved Woodland	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at the Local level.
Scattered Broad-leaved Trees	Degradation of habitat due to poor management and maintenance.	Negative significant effect within the IZoI.
Standing Water and Flowing Brooks	Degradation of habitat due to poor management and maintenance.	Negative significant effect within the IZoI.
Native Bluebell	Degradation of population due to increased resident recreational pressure.	Negative significant effect at the IZoI.
Badger	Road infrastructure within the site fragmenting badger foraging habitat and commuting routes and increasing risk of injury and death associated with vehicle collision.	Negative significant effect at the Local level.
	Lighting disturbance of badger dispersal corridors within the site.	Negative significant effect at the Local level.
Roosting Bats	Avoidance of potential roost sites in trees and installed boxes due to inappropriate lighting.	Negative significant effect at the Local level.
	Buildings and trees incorporated into the proposed development may over time develop roosting habitat suitable for use by bats, which would provide habitat enhancements where previously arable habitat dominated.	Positive significant effect at the Local level.

Important Ecological Feature	Potential Effect(s) Prior to Mitigation	Significance CIEEM
Foraging and Commuting Bats	Potential for erosion of bat commuting corridors where roads intersect hedgerow and treeline features used by commuting and foraging bats causing displacement and exclusion from habitats within the site.	Negative significant effect at the Local level.
	Lighting disturbance of bats foraging and commuting within the site and locality causing displacement and exclusion from habitats within the site.	Negative significant effect at the Local level.
Breeding Birds	Predation of birds by increased cat population.	Negative significant effect at the Local level.
	Potential effects of vehicular and pedestrian movements around the site during the operational phase	Not significant.
	Potential for lighting disturbance of breeding bird nesting habitat.	Negative significant effect at the IZoI.
	Buildings, shrubs, hedgerows and trees incorporated into the proposed development will over time develop nesting habitat suitable for use by breeding birds, which would provide habitat enhancements where previously arable habitat dominated. Landscaping and enhancement of habitats retained within the site will also increase the foraging resource for breeding birds within the site.	Positive significant effect at the IZoI.
Amphibians	Predation of amphibians by increased cat population.	Negative significant effect within the IZoI.
	Road infrastructure within the site increasing risk of injury and death associated with vehicle collision.	Negative significant effect within the IZoI.
	Woodland, grassland, shrubs, hedgerows, swales and enhanced P1 habitat incorporated into the proposed development will increase the refuge and foraging resource for amphibians within the site.	Positive significant effect within the IZoI.
Hedgehog	Road infrastructure within the site increasing risk of injury and death associated with vehicle collision.	Negative significant effect within the IZoI.
	Woodland, grassland, shrubs, hedgerows, swales and residential garden habitat incorporated into the proposed development will increase the refuge and foraging resource for hedgehogs within the site.	Positive significant effect within the IZoI.

8.7 Mitigation and Monitoring

8.7.1 This section describes the measures which are proposed to mitigate any significant environmental effects. It is anticipated that the delivery of these measures will be secured by way of appropriate planning conditions or obligations.

8.7.2 Mitigation or compensation is required for each ecological feature which experiences negative significant effects, in order to reduce or offset the specific impacts of the proposed development on that feature. This section sets out the ecological mitigation measures that will be delivered as part of the planning applications for the proposed development. They are additional to the embedded mitigation measures and any mitigation required by other disciplines and as part of the overall scheme design.

8.7.3 In considering the effectiveness of different mitigation measures, the time required for the mitigation to become effective is an important factor; works such as planting, for example, require an establishment period and a maturation period before they have the potential to replace mature and structured habitats that might be damaged or lost during the construction phase. In some instances, though, mitigation measures would have an immediate effect. Time periods are considered as follows:

- Immediate - effective immediately;
- Short term - effective within 2 years;
- Medium term - effective within 2 – 5 years; and
- Long term - effective within 5 – 10 years.

8.7.4 For legally protected species within the proposed development, any specific legal requirements for works affecting them would be met in addition to the proposed mitigation measures for the reduction of effects.

8.7.5 The mitigation hierarchy requires that adverse impacts are first avoided then where this is not possible, mitigated and as a last resort compensated (off-set). Mitigation measures are discussed with respect to demolition and construction and operation below.

Demolition and Construction

Standard Mitigation Measures

Construction Environmental Management Plan

8.7.6 All mitigation measures outlined within the ES to address significant construction effects will be included within the Construction Environmental Management Plan (CEMP), which will be conditioned within the planning permission and used to inform detailed phased CEMPs. Pre-construction surveys will be carried out to ensure baseline ecological data remains up to date.

8.7.7 The CEMP will include an Emergency Spill Response Plan and Dust Management Plan and associated monitoring. Those measures to be implemented prior to or during construction that are relevant to the ecological constraints identified are detailed below.

8.7.8 The CEMP will ensure a demarcation of the working areas (including storage areas and accesses), using appropriate fencing, to protect retained habitats and features. This mitigation measure will be effective immediately.

8.7.9 The effects of construction will be minimised by preventing runoff and works pollution from entering watercourses in the wider landscape by identifying any specific requirements to ensure protection of the two ditches/brooks within the south-west, west and centre of the site. This will be achieved through the use of bunds to catch and divert runoff, drip trays to prevent any oil and fuel spillages spreading. Windblown dust will be minimised by using wheel washing and damping down, while net fencing will catch windblown rubbish. This mitigation measure will be effective immediately.

8.7.10 Appropriate tree and hedgerow protection measures will be implemented, where required when works are in close proximity to retained trees and hedgerows and will be included in an Arboricultural Method Statement (AMS) appended to the CEMP. These measures will accord with BS 5837:2012. All tree and hedgerow works will comply with BS 3998:2010 'Tree Work – Recommendations'. These measures will minimise incidental damage and disturbance to the habitats and the species they support. All other retained habitats will also be appropriately protected to minimise incidental damage and disturbance. This mitigation measure will be effective immediately.

8.7.11 To restrict spread of tree pathogens, all equipment and machinery and vehicles used for tree, hedge and shrub removal will be cleaned, disinfected and used in accordance with current Forestry Commission biosecurity guidance and the EcCoW will advise on whether each working area requires 'red' or 'amber' level biosecurity precautions.

8.7.12 Any tree, scrub and other vegetation removal, will take place outside the bird nesting season (avoiding the period March to August inclusive). For small vegetation patches where this timing may not be achievable, removal/demolition will only be allowed on confirmation by an ecologist that no nesting birds are present. This mitigation measure will be effective immediately.

8.7.13 A Precautionary Working Measures Method Statement (PWMMS) will be required during vegetation clearance and will be implemented to ensure killing or injury to species such as hedgehog, amphibians and any reptiles that may be present will be avoided. This will take the form of staged vegetation clearance, to include strimming of vegetation to 150 mm, 24 hours before clearance/ground level works, followed by a hand search to move animals which are still present when clearance/ground level works are commenced. This mitigation measure will be effective immediately.

8.7.14 An Invasive Non-native Species Management Plan will be required to ensure appropriate removal and management of rhododendron and variegated yellow archangel and that appropriate biosecurity measures are undertaken to prevent their spread in accordance with

current guidelines. Measures undertaken within the Management Plan will include the following and would be immediate:

- Implementation of exclusion zones around each stand of these species, consisting of orange net fencing or similar to prevent the movement of contaminated soil and debris across the site;
- The location of invasive non-native species will be included in all site briefings and a toolbox talk will be given during the site induction to ensure that site workers are able to identify them;
- Use of herbicide spray methods for eradication within the site, including treatment with a Glyphosate based chemical herbicide spray, undertaking manual applications during May, July and September;
- Adhering to biosecurity measures including decontamination of vehicles and footwear when leaving areas contaminated with invasive non-native species; and
- Transporting vegetative waste material off site using a licensed waste carrier contractor and disposed of as controlled waste at a suitably licensed or permitted disposal facility.

8.7.15 An ecological watching brief will be implemented prior to and throughout the construction period, including landscaping and landscape enabling works. The watching brief will be performed by an Ecological Clerk of Works (EcCoW), whose role will be to:

- Confirm/identify ecological constraints on the ground;
- Review and update ecological surveys and method statements;
- Ensure compliance with method statements, plans and specification and with legislation, licences and planning conditions;
- Implement or supervise ecological method statement, mitigation compensation and enhancement works;
- Deliver toolbox talks and relevant training;
- Investigate incidents relating to ecological features;
- Document and maintain records of ecological measures undertaken; and
- Liaise with client, contractor and third parties.

Specific Ecological Mitigation Measures

Landscape Strategy for Proposed Development

8.7.16 A landscape strategy for the proposed development will act to create a naturalistic planting scheme with ecological enhancement in mind in order to maximise the ecological value of the site. This will include bands of woodland buffer planting in the south-west of the site and reinforcing the strategic old green lane corridor traversing the centre of the site. The landscape

strategy will also include areas of native shrub and tree planting, hedgerow planting, diverse grassland seeding, provision of swales and enhancement of Pond P1 and the watercourse in the north of the site to be designed and managed for wildlife. These mitigation measures will be effective in the medium to long-term.

8.7.17 New tree planting within the proposed development, will use locally appropriate species and be incorporated into the retained green corridors throughout the site. This mitigation measure will be effective in the long-term.

8.7.18 Replacement planting with locally suitable species-rich hedges will be provided within the proposed development. Planting within and along retained hedgerows will also be implemented where appropriate to enhance species diversity. This mitigation measure will be effective in the long-term.

Native Bluebell

8.7.19 The loss of native bluebells as a result of woodland and hedgerow section removal will be mitigated through the implementation of measures set out in a Bluebell Mitigation Method Statement. This will include a pre-commencement survey to identify the extent of bluebells to be lost, the identification of suitable receptor sites in areas of retained woodland with limited ground flora cover and a native bluebell translocation exercise. This mitigation measure will be effective in the short-term.

8.7.23 Precautionary Working Measures (PWMs) must be adhered to, to ensure best practice working methods are implemented during construction and risk of offences being committed by works are avoided. These must be updated following the pre-construction badger survey and include:

- Excavations will be boarded or otherwise suitably covered at the end of each working day, overnight to prevent entrapment of badgers;
- Any excavations which cannot be covered will include badger ramps (at an angle of no more than 45°) to allow any animal that may become trapped to escape;
- Defined construction access routes will be set out to ensure vehicle movements are contained;
- Pipes stored on site must be capped or if caps are not available, stored vertically to prevent entrapment;
- Any spoil piles present on site will be compacted to prevent use by badgers for sett construction;
- All hazardous materials will be kept off the ground or otherwise stored in protected and fenced areas to prevent badger access;
- Night time working will be avoided if possible, including within the hour before dusk and an hour after dawn; and
- In the event that any underground void is exposed, works must stop immediately, and an ecologist consulted to ascertain if the void is likely to form part of a tunnel network of a badger sett. Unless this can be completely ruled out, works will stop and NRW will be contacted for advice on how to proceed.

8.7.24 PWMs for badger must be referenced in contractor Method Statements and during construction, the PWMs must be kept on site and read by all contractors. This mitigation measure will be effective immediately.

Bats

8.7.25 Loss of roost habitat for bats due to the removal of trees, will be mitigated via the provision of replacement roost boxes which will replicate the size, height and aspects of potential tree roosts which are lost. These boxes will be installed on suitable retained trees within areas of POS, near habitat features which provide suitable flight lines, such as woodland, hedgerow or scrub edge habitats and away from direct lighting. Additional roost boxes will be incorporated to provide an enhancement to the bat roost resource within the site on buildings within the development zones. Bat boxes included within the site will provide a variety of designs to support a range of species and roost types. Details will be provided in a bat and bird box plan. All mitigation tree roost boxes will be installed prior the commencement of site clearance and will be effective immediately.

8.7.26 A single day roost of soprano pipistrelle species has been identified to date within T172. If T172 requires removal or pruning works, then detailed mitigation will be developed and a NRW mitigation licence obtained. This mitigation measure will be effective immediately.

8.7.27 Where works on trees are required (including removal or pruning) a Precautionary Working Measures Method Statement (PWMMS) will be produced and implemented. The PWMMS will

include details of precautionary soft felling measures to be implemented whilst removing or pruning trees with bat roost habitat suitability and will be effective immediately. Precautionary soft felling measures will include:

- A toolbox talk to contractors identifying the best practice methods to be adhered to and what to do in the event any bats are discovered during works;
- Pre-commencement checks of any Potential Roost Features (PRFs) prior to tree removal under supervision of a licensed bat ecologist via aerial inspection (ideally timed between October and February to avoid risk of disturbance to bird nesting and dense foliage). The licensed bat ecologist will inspect PRFs using an endoscope to confirm absence of bats;
- Work must be conducted in a sensitive manner, and where reasonably practicable, timber with bat roost habitat suitability should not be directly sawn through. If such timber is removed, crevices and holes will be checked by a licensed bat ecologist and then the timber must be left at the base of the tree for at least 48 hours; and
- If there is any concern that bats may be present within PRFs not previously identified, works will cease, and contractors will seek advice from a suitably qualified ecologist.

8.7.28 Trees with bat roost habitat suitability that are retained within proposals will be protected by implementing a buffer zone around the trees. The buffer zone around retained trees will as a minimum adhere to the root protection area in accordance with BS5837: 2012 Trees in Relation to Design Demolition and Development in order to maintain the health of the tree and to minimise impacts on bats roosting within the locality. This mitigation will be effective immediately.

8.7.29 The proposed development will provide and maintain bat roost habitat within the site through retention of trees and provision of bat boxes serving to retain and enhance the FCS of bat species within the locality.

8.7.30 With respect to the loss of foraging and commuting habitat for bats, the landscape strategy for the proposed development will include bands of woodland buffer planting in the south-west of the site and reinforcing the strategic old green lane corridor traversing the centre of the site, thereby protecting edge habitat used by bats. The landscape strategy will also includes areas of native shrub and tree planting, hedgerow planting, diverse grassland seeding, provision of swales and enhancement of Pond P1, enhancing foraging and commuting habitat for use by bats within and around the site. These mitigation measures will be effective in the medium to long-term.

8.7.31 A Sensitive Lighting Strategy will set out the lighting proposals during both construction and operation to ensure potential adverse effects on bats are avoided. The Sensitive Lighting Strategy will address four design principles and would be effective immediately:

- Unnecessary lighting will be avoided - this applies to both existing and proposed habitat features of value to bats.

- Spatial spread of lighting will be minimised - the horizontal and vertical spread of artificial light will be limited and take into account both primary and reflected light sources. Directional lighting can be achieved by angle and orientation of beam, use of a cowl, louvre or other light shield, or a combination of these.
- Considered timing and duration of lighting - timers and bespoke dimming regimes may be used to ensure that luminaires are reduced at times of predicted low use. These can be set to change with the seasons and therefore reflect the shifting time of dusk and dawn throughout the year. Motion sensors provide further control to ensure that areas are illuminated only when required.
- Intensity and colour of lighting will be limited - light intensity will be designed to be as low as possible whilst meeting the objectives of the intended function. The colour of lighting will need to take into account the sensitivity of the ecological features on site. Light sources selected should emit zero ultra-violet light wherever possible. Bat Conservation Trust (2016) guidance recommends that white and blue spectrum light should be avoided or where white lights are required these should be of warm/neutral colour and have a peak wavelength above 550 nanometres. Narrow spectrum light sources will be used to lower the range of species affected by lighting.

8.7.32 Where connectivity between foraging and commuting habitat within the site and to the wider landscape is protected during construction through protection of retained hedgerows and trees and implementation of the Sensitive Lighting Strategy, the FCS of bat species within the locality will be retained.

Breeding Birds

8.7.33 In order to mitigate for the temporary reduction of nesting habitat for tree and scrub nesting bird species (i.e., prior to new planting establishing), bird nest boxes appropriate for such species will be affixed to retained trees distributed across the site prior to site clearance works commencing onsite. Nest boxes will include a variety of designs to support a range of species and nest types. Details will be provided in a bat and bird box plan. This mitigation would be effective immediately.

8.7.34 With respect to the loss of foraging and nesting habitat for breeding birds, the draft landscape strategy for the proposed development will include areas of native shrub and tree planting, hedgerow planting and diverse grassland seeding, enhancing foraging and nesting habitat for use by bats within and around the site. These mitigation measures will be effective in the medium to long-term.

Operational Development

8.7.35 Much of the mitigation identified for the operational phase has been designed into the proposed development as embedded mitigation, during the iterative design process, in order to avoid effects wherever possible. Additional mitigation is provided below.

Landscape and Ecological Management Plans

8.7.36 Landscape and Ecological Management Plans (LEMPs) will be developed and implemented for the proposed development. This will ensure that retained and enhanced habitats as well as created habitats are managed and maintained in good condition in the long-term.

8.7.37 The LEMPs will include a section on biosecurity to reduce the risk of re-introduction/spread of invasive non-native plant species within the retained habitats. However, it is acknowledged that where the site offers public access, biosecurity measures can be difficult to enforce. Methods will therefore also be detailed within the LEMP to control/ eradicate any invasive non-native species found, in the event invasive non-native plant species were identified.

8.7.38 An access management strategy will also be included within the LEMP for areas of POS, the strategic old green lane corridor and strategic greenways within the site, which will set out the arrangements within the site. The strategy will detail where public access is to be encouraged, controlled, restricted or excluded according to the location, functional objectives and ecologically sensitive features present.

8.7.39 These mitigation measures will be effective immediately.

Badger

8.7.40 During implementation of the LEMP, badger collision rates will be assessed and where required ongoing management principles will be reviewed to reduce the impact of the loss of foraging habitat and direct badger activity to areas where conflict with road infrastructure is less likely.

8.7.41 The Sensitive Lighting Strategy as described above will ensure the potential adverse effects of operational lighting on badgers and other crepuscular and nocturnal species are avoided. The Sensitive Lighting Strategy would be effective immediately.

Bats

8.7.42 Where feasible, hedgerows, treelines and scrub along the proposed new access roads will be retained and managed to create hop-over features either side to connect to surrounding areas of retained woodland, hedgerows and treelines. Hedgerows, scrub and treelines bounding proposed new access roads will be managed to provide mature canopy cover to maintain and enhance the foraging resources for bats and assist with minimising disturbance from light spill. These measures will prevent fragmentation of habitats for species such as brown long-eared and lesser horseshoe, where roads intersect the strategic old green lane corridor.

8.7.43 The Sensitive Lighting Strategy as described above will also ensure the potential adverse effects of operational lighting on bats and other crepuscular and nocturnal species are avoided. The Sensitive Lighting Strategy would be effective immediately.

8.7.44 Where connectivity between foraging and commuting habitat within the site and to the wider landscape is enhanced and protected through incorporation of the landscape strategy and implementation of the Sensitive Lighting Strategy, the FCS of bat species within the locality will be maintained. Habitats within the site will continue to form part of the wider ecological network for bat species and maintain their distribution within their natural geographical range.

8.8 Residual Effects

8.8.1 This section summarises the significance of the anticipated residual environmental effects, which are those that remain after all proposed mitigation measures are implemented. The assessment of effects of an impact after mitigation measures have been applied is described as the residual impact.

8.8.2 **Table 8.8** details the anticipated residual effects of the proposed development during the construction phase, on those ecological features where a significant effect was identified prior to mitigation.

8.8.3 **Table 8.8** also details the anticipated residual effects of the proposed development during the operation phase, on those ecological features where a significant effect was identified prior to mitigation.

Table 8.8: Assessment of residual effects during demolition and construction and operation

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Demolition and Construction				
Semi-improved Neutral Grassland	Overall loss of this habitat, despite embedded retention in masterplan framework.	Negative significant effect at IZoI.	Strategically designed provision of diverse grassland habitat within areas of POS will provide higher quality grassland than that currently within the site.	Positive significant effect at IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
Hedgerows	Loss of this habitat, despite embedded retention of hedgerows where possible in masterplan framework.	Negative significant effect at the Local level.	Strategically designed provision of hedgerow habitat within areas of POS and through development parcels will maintain and enhance the hedgerow resource across the site and the condition of hedgerows.	Positive significant effect at IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at the Local level.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
Semi-natural Broad-leaved Woodland	Potential degradation through construction pollution events on ancient semi-natural broad-leaved woodland	Negative significant effect at IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Scattered Broad-leaved Trees	Masterplan has sought to retain as many trees as possible although some loss does occur.	Negative significant effect at the IZoI.	Landscape strategy will ensure diverse tree provision in areas of POS and through development parcels to maintain and enhance the tree resource across the site.	Positive significant effect within the IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at the IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
Standing Water and Flowing Brooks	Embedded retention and enhancement of pond P1 in draft landscape strategy.	Positive significant effect within the IZoI.	n/a	Positive significant effect within the IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
	Loss of sections of the central ditch/brook in three places to facilitate road access	Negative significant effect at IZoI.	Enhancement of retained sections of the watercourse to be of benefit for wildlife	Positive significant effect within the IZoI.
Native Bluebell	Loss of native bluebells due to site clearance.	Negative significant effect at IZoI.	Implementation of Bluebell Mitigation Method Statement.	Not significant.
Badger	Destruction of three badger setts including one main sett through accidental encroachment or due to development.	Negative significant effect at the Local level.	Preconstruction survey to determine need for detailed mitigation. Protection of retained setts adhering to 30 m buffer zones. NRW Mitigation Licence acquired for any sett if works are to cause impacts.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
	Reduction in the availability of foraging and commuting habitat within the site and restriction to dispersal from setts to the wider landscape.	Negative significant effect at the Local level.	Connectivity between setts and the surrounding landscape will be considered during construction when erecting protective fencing and within draft landscape strategy to ensure badger commuting routes around the site are maintained, fragmentation is avoided and minimised where necessary and access to foraging habitat in the south is provided.	Not significant.
	Potential to cause killing or injury of badgers should they get trapped within groundworks or range around the site during clearance, earthworks or construction.	Negative significant effect at the Local level.	Preconstruction survey to determine need for detailed mitigation. Implementation of PWMs.	Not significant.
Roosting Bats	Loss of trees with bat roost habitat suitability.	Negative significant effect at the Local level.	Installation of a range of bat boxes on suitable retained trees for mitigation and enhancement.	Positive significant effect within the IZoI.
	Potential for killing/ injury of roosting bats and/or damage/destruction of bat roosts during removal or pruning of trees with bat roost habitat suitability and of confirmed day roost at T172 (if removal is required).	Negative significant effect at the Local level.	Implementation of PWMs for soft felling/ pruning under supervision of licensed bat ecologist. NRW Mitigation Licence acquired for confirmed roost if works are to cause impacts.	Not significant.
	Potential for direct damage and disturbance of retained trees with bat roost suitability from construction activities.	Negative significant effect at the Local level.	Protection of trees with a buffer zone based on root protection area as a minimum.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Foraging and Commuting Bats	Loss of habitats of moderate value for supporting commuting and foraging bats.	Negative significant effect at the Local level.	Landscape strategy will deliver woodland, shrub, hedgerow and diverse grassland planting and retain key boundary habitats providing linear connectivity across the site.	Positive significant effect within the IZoI.
Breeding Birds	Site clearance will lead to the loss of a range of habitats which provide nesting opportunities for up to 37 species.	Negative significant effect at the Local level.	Installation of a range of bird boxes on suitable retained trees for mitigation prior to vegetation removal. Draft landscape strategy will deliver woodland, shrub and hedgerow planting creating new foraging and nesting habitat for birds.	Positive significant effect within the IZoI.
	Potential for killing and injury to nesting birds and their young.	Negative significant effect at the Local level.	Vegetation clearance outside bird nesting season or undertake nesting bird checks prior to vegetation removal.	Not significant.
Amphibians	Site clearance will lead to the loss of a range of terrestrial habitats which possibly provide refuge, foraging and commuting habitat for amphibians and may result in the killing or injury of common amphibians.	Negative significant effect at IZoI.	Implementation of PWMMS for vegetation clearance under supervision of an EcCoW.	Not significant.
Hedgehog	Site clearance will lead to the loss of a range habitats which possibly provide refuge, foraging and commuting habitat for hedgehogs and may result in their killing or injury.	Negative significant effect at IZoI.	Implementation of PWMMS for vegetation clearance under supervision of an EcCoW.	Not significant.
Polecat	Site clearance will lead to the loss of a range habitats which possibly provide refuge, foraging and commuting habitat for polecats and may result in their killing or injury.	Negative significant effect at IZoI.	Implementation of PWMMS for vegetation clearance under supervision of an EcCoW.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Completed Development				
Semi-improved Neutral Grassland	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at IZoI.	Implementation of LEMPs to manage and maintain habitats in good condition in the long-term.	Not significant.
Hedgerows	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at the Local level.	Implementation of LEMPs to manage and maintain habitats in good condition in the long-term.	Not significant.
Semi-natural Broad-leaved Woodland	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at the Local level.	Implementation of LEMPs to manage and maintain habitats in good condition in the long-term.	Not significant.
Scattered Broad-leaved Trees	Degradation of habitat due to poor management and maintenance.	Negative significant effect at IZoI.	Implementation of LEMPs to manage and maintain trees in good condition in the long-term.	Not significant.
Standing Water and Flowing Brooks	Degradation of habitat due to poor management and maintenance.	Negative significant effect at IZoI.	Implementation of LEMPs to manage and maintain pond P1 and ditches/brooks in good condition in the long-term.	Not significant.
Native Bluebell	Degradation of population due to increased resident recreational pressure.	Negative significant effect at IZoI.	Implementation of LEMPs to manage and maintain native bluebell population and other ancient woodland indicator flora in good condition in the long-term.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Badger	Road infrastructure within the site fragmenting badger foraging habitat and commuting routes and increasing risk of injury and death associated with vehicle collision.	Negative significant effect at the Local level.	Implementation of LEMPs to assess badger collision rates and manage and maintain habitat strategically designed to provide connectivity around the site for badger in order to minimise road use.	Negative significant effect at the IZoI.
	Lighting disturbance of badger dispersal corridors within the site.	Negative significant effect at the Local level.	Implementation of a Sensitive Lighting Strategy.	Not significant.
Roosting Bats	Avoidance of potential roost sites in trees and installed boxes due to inappropriate lighting.	Negative significant effect at the Local level.	Implementation of a Sensitive Lighting Strategy.	Not significant.
	Buildings and trees incorporated into the proposed development may over time develop roosting habitat suitable for use by bats, which would provide habitat enhancements where previously arable habitat dominated.	Positive significant effect at the Local level.	N/A	Positive significant effect at the Local level.
Foraging and Commuting Bats	Poor management of trees and hedgerows where roads intersect features used by commuting and foraging bats could result in the erosion of bat commuting corridors causing displacement and exclusion from habitats within the site.	Negative significant effect at the Local level.	Implementation of LEMPs to manage and maintain habitat strategically designed to provide connectivity and hop-over featues around the site for bats in order to minimise erosion of commuting routes for more sensitive species.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
	Lighting disturbance of bats foraging and commuting within the site and locality causing displacement and exclusion from habitats within the site.	Negative significant effect at the Local level.	Implementation of a Sensitive Lighting Strategy	Not significant.
Breeding Birds	Predation of birds by increased cat population.	Negative significant effect at the Local level.	Offset by increase in suitable habitats for specific urban birds i.e., POS, gardens, hedgerows and scrub and inclusion of nest boxes.	Not significant.
	Lighting disturbance of breeding birds nesting habitat.	Negative significant effect at IZoI.	Implementation of a Sensitive Lighting Strategy	Not significant.
	Buildings, shrubs, hedgerows and trees incorporated into the proposed development will over time develop nesting habitat suitable for use by breeding birds, which would provide habitat enhancements where previously arable habitat dominated. Landscaping and enhancement of habitats retained within the site will also increase the foraging resource for breeding birds within the site.	Positive significant effect at IZoI.	N/A	Positive significant effect at IZoI.
Amphibians	Predation of amphibians by increased cat population.	Negative significant effect at the IZoI.	Offset by increase in suitable habitats for amphibian refuge i.e., POS, gardens, hedgerows and scrub.	Not significant.
	Road infrastructure within the site increasing risk of injury and death associated with vehicle collision.	Negative significant effect at the IZoI.	Implementation of Landscape and Ecological Management Plans (LEMPs) to manage and maintain habitat strategically designed to provide connectivity around the site for wildlife in order to minimise road use.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
	Woodland, grassland, shrubs, hedgerows, swales and enhanced P1 habitat incorporated into the proposed development will increase the refuge and foraging resource for amphibians within the site.	Positive significant effect at the IZoI.	N/A	Positive significant effect at the IZoI.
Hedgehog	Road infrastructure within the site increasing risk of injury and death associated with vehicle collision.	Negative significant effect at the IZoI.	Implementation of Landscape and Ecological Management Plans (LEMPs) to manage and maintain habitat strategically designed to provide connectivity around the site for wildlife in order to minimise road use.	Not significant.
	Woodland, grassland, shrubs, hedgerows, swales and residential garden habitat incorporated into the proposed development will increase the refuge and foraging resource for hedgehogs within the site.	Positive significant effect at the IZoI.	N/A	Positive significant effect at the IZoI.

8.9 Summary

8.9.1 The site is located on the western side of Wrexham and is adjoined by Ruthin Road to the north beyond which there are established areas of housing and the emerging Western Gateway Business Park. To the west the site is separated from the wider arable landscape by the A483 dual carriageway. To the south the site adjoins part of the Village of Bersham and is directly bounded by the B5099 (Bersham Road).

8.9.2 An Ecology Desk Study and field surveys including extended Phase 1 habitat, hedgerow, badger, bat, breeding bird and great crested newt assessments were undertaken in 2021 and 2022 to establish baseline conditions at the site.

8.9.3 There are four internationally statutory designated wildlife sites within 10 km of the site; Johnstown Newt Sites SAC, Clwyd/Berwyn and South Clwyd Mountains SAC, Midland Meres and Mosses Phase 2 Ramsar and River Dee and Bala Lake/Afon Dyfrdwy a Llyn Tegid SAC. There are five nationally statutory designated SSSIs within 5 km of the site. No statutory or non-statutory designated wildlife sites lie within or adjacent to the site.

8.9.4 The site is predominantly comprised of agricultural grazing pasture and cropland, with other habitats including; a narrow belt of woodland identified as ancient woodland within the south-west corner of the site, semi-improved neutral grassland, hedgerows, scrub, semi-natural broad-leaved woodland, scattered broad-leaved trees and standing and flowing water. Native bluebell is present along multiple hedgerows, within woodlands and along the old green lane traversing the site. Invasive non-native plant species recorded within the site include rhododendron and variegated yellow archangel.

8.9.5 . Eighty trees within or adjacent to the site were identified as having bat roost habitat suitability. A single day roost of soprano pipistrelle bats was recorded in T172 during nocturnal surveys. Bat species recorded within the site during surveys included; common pipistrelle, soprano pipistrelle, brown long-eared, *Myotis* species, noctule and lesser horseshoe. A total of 37 bird species were recorded within the site boundary and 100 m survey buffer, representing a moderate species diversity with many of the species recorded being commonplace and widespread. No amphibians were recorded within the site during surveys though great crested newt, common frog, common toad, palmate newt and smooth newt have been recorded within 2 km of the site. Other notable species likely to be present based on habitats present and historic records include hedgehog and polecat and common and widespread invertebrate species.

8.9.6 Temporary construction and ongoing operational effects were identified, many of which are avoided through a combination of scheme design, embedded and additional mitigation. Negative significant residual effects at the Local level as a result of habitat losses comprise those affecting semi-improved neutral grassland habitats. Provision of road infrastructure within the site may have a negative significant residual effect on badger due to fragmentation of

foraging habitat and commuting routes and increasing risk of injury and death associated with vehicle collision.

8.9.7 Positive significant residual effects within the IZoI will be achieved in the medium to long-term with respect to a gain in bat roost and bird nesting site potential and in respect to gains in grassland, pond, scrub and hedgerow habitat for bat foraging and commuting habitats and bird breeding and foraging habitats.

8.9.8 The landscape strategy for the proposed development will act to create a naturalistic planting scheme with ecological enhancement in mind in order to maximise the ecological value of the site and contribute to biodiversity gain in the medium to long-term. Implementation of Landscape and Ecological Management Plans (LEMPs) to manage and maintain habitat strategically designed to provide habitat within and around the site for wildlife will also ensure delivery of biodiversity enhancements.

Climate Change

8.9.9 EU guidance requires that EIA considers the effects of projects on climate change and on biodiversity. Although the guidance document treats the two topics as separate issues, it notes that there are interactions between climate change and biodiversity and advises that assessment of permanent effects of a proposed development, and the mitigation thereof, should take account of climate change projections applicable to the nature and scale of development.

8.9.10 The EU guidance indicates that effects which are only likely to be experienced in the next 20 years should be based on current weather patterns or near-future projections if available and relevant. In relation to biodiversity, all significant effects of the proposed development are experienced in this timeframe. The assessment of residual effects finds that affected habitats and species are adequately mitigated. However, there are three material considerations pertinent to climate change and biodiversity that the assessment of longer-term effects must take into account.

8.9.11 Firstly, how projects might be assessed in terms of their effects on the ‘manageability’ of the Natura 2000 network. There are no Natura 2000 sites located within 10 km and development of the site is very unlikely contribute to existing pressures on Natura 2000 sites, affect the ability for site managers to maintain dialogue with a range of stakeholders, constrain the possibility of adaptive management plans for the sites themselves, or constrain future monitoring of climate change effects on biodiversity within the sites.

8.9.12 Secondly, the EIA Guidance requires developers to ensure that their designs and mitigation measures are resilient to projected climate change. For the proposed development, the retention and creation of new green corridors, public open space and other landscape enhancement through tree, shrub and grassland planting will maintain network connectivity and increase opportunities for biodiversity to thrive. Any tree, scrub and hedgerow planting and other

new landscapes will be planted in accordance with guidance set out by Forestry Commission's UK Forestry Standard concerning Forests and Climate Change[46].

8.9.13 Thirdly, the EU guidance about assessing the impact of development on the manageability of Natura 2000 sites is transferable to a consideration of the impact on general manageability of biodiversity in the area of the proposed development. This can be assessed in terms of management of the network of designated sites, bearing in mind Government commitments to maintain SSSIs in favourable condition and for the majority of local wildlife sites to be actively managed. No direct or indirect residual effects of the proposed development are predicted for the surrounding designated sites during construction or operation, taking into account all mitigation. Through a long-term landscape environmental management plan (LEMP) including an access management strategy the proposed development will not contribute to existing pressures on surrounding habitat and local wildlife sites.

8.9.14 Climate change may cause changes in distribution of fauna with certain species moving north as temperatures warm, as has been seen with certain species such as the Cetti's warbler *Cettia cetti.* Provision of a green network consisting of both POS and more naturalised features within the proposed development, will ensure migration corridors are available along which fauna can move.

8.9.15 The potential long-term effects of the proposed development, taking into account all design and embedded mitigation, have been considered as to whether they are resilient in a changing climate with respect to biodiversity. In summary, the proposed development will be constructed, and created/ enhanced habitats established within 10 to 15 years of commencement. The replacement habitat designs will utilise species, which take account of climate change predictions and therefore the embedded mitigation is likely to be resilient in the long-term.

46 Forestry Commission, (2017), The UK Forestry Standard. Forestry Commission, Edinburgh.

9 Archaeology and Heritage

9.1 Introduction

9.1.1 This Chapter of the ES assesses the impact of the proposed development on the historic environment. The historic environment includes all physical remains of past human activity (whether visible, buried, landscaped or planted). Those aspects of the historic environment that hold value to this and future generations because of their historic, evidential, aesthetic, artistic or communal value are called historic assets.

9.1.2 Some historic assets are designated; these include World Heritage Sites, Scheduled Monuments, Listed Buildings, Registered Landscapes, Registered Historic Parks and Gardens, Registered Battlefields, and Conservation Areas. Non-designated historic assets are any building monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest.

9.1.3 The following technical appendices accompanying this Chapter of the ES are included in Volume 3 of the ES and should be read in conjunction. They are as follows:

- Technical Appendix 9.1: Historic environment baseline assessment
- Technical Appendix 9.2: Geophysical survey report

9.1.4 This chapter has been wirtten by Heritage Archaeology Ltd. The author is a full member of the Chartered Institute for Archaeologists and has a degree in Heritage Conservation. She is a Director of Heritage Archaeology Ltd with over 27 years' experience of planning and the historic environment. She has worked in both local authority advisory roles and in consultancy organisations and her experience includes the preparation of historic environment assessments for numerous EIA projects across the UK, including a number of projects in Wales, in a range of sectors including residential and energy projects. She has provided historic environment input to EIA projects determined under local planning consent, as well as Developments of National Significance in Wales.

9.2 Planning Policy Context

9.2.1 The following legislation, policy and guidance have been taken into consideration during the assessment of historic environment effects. An assessment of the Proposed Development against policies contained within the adopted Development Plan is contained within the supporting Planning Statement.

9.2.2 The statutory legislation most relevant to this Chapter of the ES is set out more fully in Appendix 9.1, but in summary comprises:

- Historic Environment (Wales) Act 2023;

- Planning (Wales) Act 2015; and
- Hedgerow Regulations, 1997.

9.2.3 The planning context most relevant to this Chapter of the ES is set out more fully in Appendix 9.1, but in summary comprises:

- Planning Policy Wales, Edition 12, Welsh Government, February 2024 (Section 6.1);
- Wrexham Local Development Plan 2013 - 2028

9.2.4 The guidance most relevant to this Chapter of the ES is set out more fully in Appendix 9.1, but in summary comprises:

- Technical Advice Note 24 (TAN24): The Historic Environment, Welsh Government, 2017;
- Conservation Principles; Policy for the Sustainable Management of the Historic Environment in Wales, Welsh Assembly Government, 2011;
- Heritage Impact Assessment in Wales, Welsh Government, 2017;
- Setting of Historic Assets in Wales, Welsh Government, 2017;
- Principles of Cultural Heritage Impact Assessment in the UK, IEMA, IHBC and CIFA, July 2021; and
- Chartered Institute for Archaeologists, Standard and guidance for historic environment desk-based assessment, CIFA, 2020.

9.3 Approach

Assessment Methodology

9.3.1 The potential for effects on the historic environment has been assessed in accordance with the best practice guidance notes described above.

9.3.2 The historic environment assessment included the following surveys:

- A desk-based assessment (the scope and sources are set out below and more fully in Appendix 9.1);
- A walkover survey (this was undertaken for the entire site area, with additonal vantage point surveys for the surrounding assets where the proposals could be capable of impacting the contribution made by setting to their significance). The methodology and results are provided in Appendix 9.1, Annex B); and
- A geophysical survey (a fluxgate gradiometer survey was undertaken for the entire site area (c. 74 ha). The methodology and results are provided in Appendix 9.1.

9.3.3 These surveys were undertaken following advice received from CPAT and Cadw in their preapplication consultation responses, and were implemented in accordance with the relevant guidance and best practice documents set out more fully in Appendices 9.1 and 9.2.

9.3.4 Data on designated and non-designated historic assets was obtained for the development site and a buffer of 1km. This is the area in which it is anticipated significant historic environment effects could occur in relation to the settings of designated and non-designated assets, given the scale of the potential development and surrounding topography. This study area was also designed to include assets adjacent to the site but with the potential to extend into it and to place known assets into a wider context, to assist in considering the archaeological potential of the development site.

9.3.5 Cadw advised that the Stage 1 assessment for the settings of historic assets included designated assets wtihin a 3km study area. Those assets were compared to the ZTV, and the assets' values and how and to what degree setting contributes to those values was considered. The majority of the assets in the 3km study area were then scoped out of the assessment at Stage 1. This is reported in Appendix 9.1.

9.3.6 The following data sources were consulted in compiling this report:

- Historic Environment Record, Clwyd Powys Archaeological Trust;
- Cadw data on designated historic assets;
- Historic Wales map enabled portal for historic environment information in Wales;
- Coflein the online database for the National Monuments Record of Wales (NMRW);
- LANDMAP the all-Wales landscape resource containing information on historic landscape characterisation;
- Wrexham Council data;
- British Geological Survey data;
- Archaeological Data Services;
- Historic Ordnance Survey mapping;
- Aerial photography and publicly accessible Lidar data; and
- Site walkover and setting assessment.

Significance Criteria

9.3.7 An assessment of the heritage value (also referred to as significance) of the assets within the baseline data, and the contribution made by setting to those values, has been undertaken. The value of the historic asset is described in terms of its heritage value (evidential, historical, aesthetic, communal).

9.3.8 For designated assets (Listed Buildings, Scheduled Monuments, Registered Parks and Gardens and Conservation Areas), the importance is recorded as 'high' or 'very high' as these assets meet the national criteria for designation under the relevant legislation. The relative importance of each non-designated historic asset within the historic environment baseline has also been determined to provide a framework for comparison. The categories (negligible to high)

do not reflect a definitive level of importance or value of a historic asset, but a provisional one based on the asset's heritage values to provide an analytical tool that can inform later stages of assessment and the development of appropriate mitigation, where needed. The degree of survival is also considered in determining heritage value. Determining heritage value is a professional judgment made with reference to Conservation Principles (Cadw 2011). The criteria for determining the heritage value of the assets within the baseline data is also set out in Appendix 9.1.

9.3.9 The magnitude of impact in relation to the historic environment relates to harm to or loss of value through alteration or destruction of the asset or development within its setting. The former relates to any direct physical harm, including total or partial loss of the asset. Where the development only affects the setting of the asset, there is no direct physical harm but loss of or change to the asset's setting can (where setting contributes to the significance of the asset) result in a reduced ability to experience and understand the asset's heritage significance.

9.3.10 Assessing the impact of the proposed development in relation to the historic environment baseline was considered in relation to the following criteria and a professional judgement was made with reference to the relevant guidance referred to above.

Table 9.1: Impact Magnitude

Magnitude	Example
High	Adverse: Total loss or substantial harm to key elements of the heritage interest of the asset, or features or characteristics of the baseline (pre-development) conditions such that the adverse impact seriously affects a key element of its special interest of the asset; post development character or composition or attributes of baseline will be fundamentally changed. Beneficial: Major appropriate reinstatement of key elements of heritage interest.
Moderate	Adverse: Partial loss or harm to one or more important elements or features or characteristics of the baseline (pre-development) conditions such that post development character or composition, or attributes of baseline will be significantly changed. Beneficial: Substantial appropriate reinstatement of key elements of heritage interest.
Low	Minor loss. Change arising from the loss or alteration will be discernible but underlying character or composition or attributes of the baseline condition will be similar to pre-development circumstances or patterns. Beneficial: Some appropriate reinstatement of key elements of heritage interest.
Negligible	Change barely distinguishable or does not result in loss of heritage significance.
No change	No loss or reinstatement of heritage value

9.3.11 Professional judgement was also applied in determining the overall significance of effect within the broad categories identified by the below matrix. The assessment took account of the relative value of the asset, the contribution made by setting to that value, and the predicted magnitude of effect that would result from the proposed development.

Table 9.2: Impact Significance

Magnitude	Receptor value				
	Very High	**High**	**Medium**	**Low**	**Negligible**
High	**Major**	**Major or Moderate**	**Moderate**	Minor	Negligible
Moderate	**Major or Moderate**	**Major or Moderate**	**Moderate**	Minor	Negligible
Low	**Moderate** or minor	**Moderate** or Minor	**Moderate** or Minor	Negligible	Negligible
Negligible	Minor	Minor or Negligible	Negligible	Negligible	Negligible
No change	None	None	None	None	None

9.3.12 Effects of major or moderate significance are significant effects in EIA terminology (highlighted in bold in above). Effects of minor or negligible significance are not significant in EIA terms.

9.3.13 Effects are also described in terms of their duration (short, medium or long term), their permanence (temporary / permanent and/or reversible/ irreversible), and the spatial extent of the effect (local, regional or national).

Assumptions and Limitations

9.3.14 Data from the sources listed above includes secondary information. This data, as well as that derived from other sources such as historic mapping, is generally accurate. There are, however, several limitations to the data set, generic to any historic environment assessment. For example, where the known archaeological data relates to chance finds or place name evidence the full extent, date and nature of the asset is often uncertain. Also, asset records, particularly older records, can fail to accurately locate assets. Due to these limitations, it is possible that previously unrecorded archaeological assets could survive within the proposed development site. Additionally, due to the buried nature of archaeological assets there is often an element of uncertainty regarding the precise survival, condition and extent of the asset. However, these potential limitations have been taken into account in preparing the baseline assessment, for example by augmenting desk-based material with a site walkover and geophysical survey. The potential for previously unrecorded archaeological assets is taken into account, and a precautionary approach has been taken in determining heritage value; where value is uncertain the assessment assumes to the higher likely value.

9.3.15 A thorough assessment has therefore been made and on this basis the assessment is believed to be accurate and correct.

9.4 Baseline Conditions

9.4.1 The baseline conditions for the historic environment are set out fully in Appendix 9.1. A summary overview is provided below.

9.4.2 There is one designated historic asset within the proposed development site; Grade II* Lower Berse Farmhouse (Asset ID LB1). The farmhouse includes elements of a 14th -15th century timber framed hall as well as later extensions and alterations. It is an asset of very high historic, aesthetic and evidential value given its period and condition. The farmhouse is associated with the immediately surrounding fields which were farmed from it. The setting of the listed building is its association with the historic buildings in the farm group and the immediately surrounding fields. This setting makes a positive contribution to appreciating the heritage values of the listed building and non-designated 19th century farm buildings. The adjacent A483 is a modern dual carriage way, with Berse Lane effectively forming a break between the fields that make a positive contribution and the area beyond is characterised by the modern road.

9.4.3 The historic farm buildings at Lower Berse Farm are referred to throughout this chapter as a non-designated historic asset. It is, however, noted that the buildings include both outbuildings extant before 1948 and buildings likely built since that date (further information on this and a phasing plan is provided in Appendix 9.1). The buildings built after 1948 are modern and are not curtilage structures or considered part of the non-designated historic asset. The late 18th or 19th century buildings are a non-designated historic asset but could also be considered curtilage structures to grade II* listed Lower Berse Farmhouse. As such, any subsequent applications for Listed Building Consent (LBC) may need to include those buildings as they could be treated as part of the listing. This would be determined in consultation with Cadw and Wrexham Council.

9.4.4 The Proposed Development site includes, or is immediately adjacent to, four non-designated historic assets, comprising the potential medieval moat at Lower Berse Farm, the post medieval farmstead at Lower Berse (referenced above), the Pritchards Tenements (now Bryn-moel) and the former extent of the park and garden at Plas Power Park (Asset IDs A17, A18, A109 and A110 respectively). Also, some stonework was observed in the bank of a watercourse which could indicate a former crossing point. These assets have evidential value (the possible moat and stonework), aesthetic and historic value (the farmstead at Lower Berse and Pritchard's Tenement) and historic value (the former extant of Plas Power Park). However, given the condition of these assets they are of local significance and low heritage value.

9.4.5 The potential for archaeology dating to the medieval and post medieval period is moderate to high, although most likely in association with assets of low value associated with the agricultural land use of the site. The archaeological potential for the prehistoric, Roman and early medieval period is low given the lack of any features from these periods on or adjacent to the site.

9.4.6 The geophysical survey of the site supports this assessment of potential, having identified features associated with medieval and post medieval farming practice and field boundaries that correlate to boundaries depicted on the tithe and early Ordnance Survey mapping.

9.4.7 The site is also within the setting of Bersham Conservation Area (CA1) and the associated Bersham Iron Works (SM1 and associated listed buildings) and other associated listed buildings. Also, grade II listed 1-3 Laurel Grove, and non-designated Fawnog farmstead. Given the relationship between these assets and their rural surroundings, where there is available intervisibility between the asset and the proposed development site, the site makes a slight positive contribution to the heritage value of these assets.

9.5 Embedded Mitigation

9.5.1 This section describes those mitigation measures which have been 'embedded' into the development through an interactive process of assessment and redesign. In particular, this section reflects measures that have been incorporated into the masterplan farmwork or other assessment parameters that will be automatically incorporated into any forthcoming planning permission by way of the approval of submitted plans. Embedded mitigation does not include any measures that must be secured through planning conditions/obligations, management plans or further survey.

Demolition and Construction

9.5.2 In relation to the historic environment, the relevant embedded mitigation comprises:

- Strategic open space to north of Bersham Conservation Area to maintain the rural context and setting of the conservation area and the associated SM and listed buildings;
- Retention and strengthening of some hedgerows within the development site to preserve, to a degree, the historic landscape character;
- Retention of the public right of ways at Bryn-moel, to preserve those historic assets;
- Removal of the large, modern barns at Lower Berse Farm, and
- Retention and refurbishment of historic buildings at Lower Berse Farm.

Operational Development

9.5.3 No additional operational embedded mitigation is included, although the above measures implemented during the construction phase will continue throughout the operational phase of the development.

9.6 Potential Effects

9.6.1 This section sets out the potential effects of the development on the basis of the assessment masterplan framework and assumes the inclusion of embedded mitigation as set out in the preceding section.

Demolition and Construction

9.6.2 The demolition and construction phase of the proposed development has the potential to physically impact assets within the red line boundary for the development. It also has the potential to impact assets as a result of development within their settings. The latter are temporary effects that are reversible on completion of demolition and construction. Those effects are therefore not significant and are not set out below. Setting effects that continue as a result of the permanent/ long term presence of the development are described under operational effects, below.

9.6.3 The demolition and construction of the proposed development would have a direct physical impact on one grade II* listed building (an asset of very high value) and four non-designated historic assets (all assets of low value). It would also physically impact an asset identified during the site walkover and features that contribute to the historic landscape character of the site.

Grade II* Lower Berse Farmhouse (Asset ID LB1)

9.6.4 The farmhouse includes elements of a 14th -15th century timber framed hall as well as later extensions and alterations. It is an asset of high historic, aesthetic and evidential value given its period and condition. The proposed development includes scope for a Local Centre in the area of the farm buildings. The works would involve alterations to the historic building to change it from its current use as a farmhouse to a use associated with the Local Centre. The design details are not currently available as those would be determined as part of the detailed application. However, in terms of the principles of this redevelopment, it is assumed that there would be some impacts on the historic building fabric of the grade II* listed building. Those effects would be limited to refurbishment works and the building would be retained within the scheme. The proposals would also ensure the long term viability and maintenance of the building. A reasonable worse case would therefore be an impact of moderate magnitude in relation to an asset of very high value. This would result in an effect of moderate adverse significance, a permanent effect at the local level. This is a significant effect, before any additional mitigation measures are implemented.

Non-designated potential moat at Lower Berse Farm (Asset ID A17)

9.6.5 Moats were built as symbols of power or affluence in association with higher status farms and rural buildings. Most date to the early to mid- medieval period. The moat is most likely to have been in the fields immediately adjacent to or including the extant farm house and farmstead buildings. It does not survive as an earthwork feature and is of low heritage value. It is not thought to be within the footprint of the residential development area, most likely being within the area of public open space around the Local Centre, but a reasonable worse case would be an impact of moderate magnitude in relation to an asset of low value. This would result in an

effect of minor adverse significance, a permanent effect at the local level. This is not a significant effect, before any additional mitigation measures are implemented.

Non-designated 18th/19th century farm buildings at Lower Berse Farm (Asset ID A18)

9.6.6 The buildings associated with the farmstead at Lower Berse are of local interest as an example of an evolving farmstead dating to the late medieval period but adapted during the period of high farming. The buildings have been altered and interspersed with modern barns. They are of low heritage value. They are within the area allocated as a Local Centre and as stated the detailed design would be determined as part of a reserved matters application. However, in terms of the principles of this redevelopment, it is assumed that there would be some impacts on the historic building fabric. Those effects would be limited to refurbishment works and the buildings would be retained within the scheme. Removal of the modern barns would better reveal the heritage values of theses assets. A reasonable worse case would therefore be an impact of moderate magnitude in relation to an asset of low value. This would result in an effect of minor adverse significance, a permanent effect at the local level. This is not a significant effect, before any additional mitigation measures are implemented.

The former extent of the parkland at Plas Power Park (Asset ID A110)

9.6.7 The former parkland as depicted on historic mapping is partially within the development area. The area affected is a thin detached strip that includes some parkland woodland (also an ancient wood). It was separated from the remainin area of park by the construction of the A483. The parkland is believed to date to the late 18th century and was associated with the no-longer extant Plas Power House. Historic maps show that this area of the park was enclosed as agricultural land during the late 19th century and an area of opencast coal working is indicated on mid-20th century mapping. A perimeter wall still runs along the boundary of the site with Berse Lane. The plantation woodland and perimeter wall are retained within the proposed development and given the later 20th century landuse and road construction across this part of the park, it has low heritage value. A reasonable worse case would therefore be an impact of low magnitude in relation to an asset of low value. This would result in an effect of negligible significance, a permanent effect at the local level. This is not a significant effect.

Other historic environment assets

9.6.8 Stonework identified during the site walkover in the banks of a watercourse may indicate a crossing of the watercourse, possibly associated with an access to Lower Berse Farm. The asset has potential historic and evidential heritage value and is therefore being treated as an historic asset of low value for assessment purposes. The watercourse may not be maintained and a reasonable worse case would therefore be an impact of high magnitude in relation to an asset of low value. This would result in an effect of minor adverse significance, a permanent

effect at the local level. This is not a significant effect, before any additional mitigation measures are implemented.

9.6.9 Historic landscape features comprising hedgerows shown on the Bersham Township tithe map (1841) and still extant and the public rights of way that run past Bryn-moel have a degree of heritage value. The extant hedgerow are also 'important' in terms of the Hedgerow Regulations, 1997 (archaeology and history criteria, Schedule 1, part II, section 5). These assets contribute to the historic landscape character of the site. That has been modified but is still partially evident and has locally significant historic and evidential heritage value. The masterplan allows for the retention of the public rights of way and some hedgerows within the site. Therefore a reasonable worse case would be an impact of moderate magnitude in relation to an asset of low value. This would result in an effect of minor adverse significance, a permanent effect at the local level. This is not a significant effect, before any additional mitigation measures are implemented.

Operational Development

9.6.10 The majority of the assets within the 1km and 1-3km study areas were not with in the ZTV and therefore lack any intervisibility with the proposed development, have settings that are very localised to the asset or have heritage values that setting does not contribute to. Those assets are set out in Appendix 9.1 and were scoped out at the stage 1 setting assessment.

9.6.11 The following assets have settings that make a positive contribution to their heritage value and that setting includes, at least in part, the proposed development site.

9.6.12 Grade II* listed Lower Berse Farmhouse (Asset ID LB1) and non-designated farm buildings (Asset ID A18). In addition to the predicted construction phase effects the late medieval farmhouse and later 18th/ 19th century farm buildings at Lower Berse Farm have group value and a shared setting that includes the northern part of the proposed development site. This is a farm complex that demonstrates the development of a farm from the late medieval period into the period of high farming in the late 18th and early 19th centuries. The setting of the buildings is the farmstead in which they are situated, and this includes their group value and intervisibility, as well as the immediately surrounding fields which convey the context of these as agricultural buildings closely associated with the land farmed from them. Both of these aspects make a positive contribution to the heritage values of the listed and non-designated buildings. The A483 makes a negative contribution to the asset's heritage values, given that it is a modern feature. The part of the development site to the west of the A483 is not within the setting of the asset. The southern part of proposed development site makes a neutral contribution to the heritage values of the asset, given the distance of separation and lack of intervisibility. The proposed development would retain the historic buildings and their intervisibility and would remove some of the modern structures that detract from the historic farmstead layout. The modern buildings are of a scale and mass that detracts from the visual prominence of Lower Berse Farmstead and the ability to appreciate the arrangement of the historic building group. The removal of these structures would better reveal the heritage values of these assets and have a beneficial effect on their value. This mitigation is embedded in the design through the masterplan framework.

However, the development would reduce the amount of farmland surrounding the buildings and therefore impact the ability to appreciate their historic context. This would have an adverse effect on the buildings' heritage value. The magnitude of impact would be low (adverse), considering both of the above factors and given that the buildings and their immediate surroundings is preserved, and also the degree of retained strategic open space to further preserve their historic context that is embedded into the masterplan framework. In relation to grade II* Lower Berse Farmhouse, an asset of very high value, this would result in an effect of minor adverse significance and in relation to the non-designated farm buildings an effect of negligible significance. These are long term effects at the local level, they not significant effects.

9.6.13 The eastern extent of the Bersham Conservation Area (Asset ID CA1), and associated listed buildings (Bridge Cottages, LB20; Squire Cottage, LB21; and 9-10 Bunkers Hill, LB22 and non-designated Bersham Hall) are to the south of the proposed development site. This part of the conservation area relates to the Bunkers Hill, Y Ddol and East Ironworks areas. Y Ddol is an area of high-density building set into the steep valley side close to the river, it is characteristic of 19th and 20th century industrial housing with terraces in red brick with slate roofs. The East Ironworks are no longer extant, and this part of the conservation area is largely rural. Bunkers Hill was built in 1785 and the original 13 cottage housed some of the workforce of Wilkinson's Ironworks. Bersham Hall may have 16th or 17th century origins, but it was rebuilt in 1890 although the initials C&M and JE 1840 are carved into the wall near the entrance, probably members of the Edisbury family. Bersham Hall Cottage may have once been the lodge to Bersham Hall, it dates to c. 1906. Views of significance noted in the conservation area appraisal for this area are to the south and east – west along the Bersham Road. The rural context of the conservation area is noted although the highway treatments in the Bunkers Hill area are commented on as being more urban in character. Views to the north from within the conservation area are limited (even from the footpath to the north of Bersham Hall) by mature vegetation and it is more the views to the east along Berhsam Lane and to the south towards to the river that convey the rural context of the conservation area, than views to the north. However, there is a degree of intervisibility between the conservation area and the proposed development site, particularly when looking south within the site back towards the conservation area. The proposed development does not propose any accesses onto Bersham Road within the conservation area and a large area of strategic open space that provides a buffer between the conservation area and the proposed built form of the development is retained within the masterplan framework. Taking this into account, the magnitude of impact in relation to the conservation area, grade II listed buildings within it and the non-designated Bersham Hall is low. In relation to the conservation area and grade II listed buildings, assets of high value, this would result in an effect of minor adverse significance and in relation to the non-designated Bersham Hall an effect of negligible significance. These are long term effects at the local level, and they are not significant effects.

9.6.14 Bersham Ironworks (SM1) and associated grade II* listed buildings (Octagonal building, LB6; Single storeyed building, LB7) and grade II listed mill (LB35) are within the Bersham

Conservation Area (the area of the west Ironworks site). The key views noted in the conservation area appraisal are internal views although again the rural context of the conservation area and Ironworks is noted. The proposed development site is separated from the Ironworks by the A483, which has tree planting on banks on both sides of the road, and other intervening mature trees along Bersham Bank and Bersham Road. The rural context that is visible in conjunction with the Ironworks does not include the proposed development site. The proposed development would therefore not introduce an urbanising element to the area in which the scheduled monument is experienced and is at the periphery of its setting. This would result in no change to the way that the monument and associated listed buildings are currently experienced and the assets' heritage values would be preserved. The magnitude of impact is 'no change' and the significance of effect is none in relation to these assets.

9.6.15 Grade II listed No1-3 Laurel Grove (Asset ID LB24) is believed to have been built in c.1807, for the then owner of the Paper Mill built on the opposite side of the River Clwyedog. A title deed of 1866 shows that the house was built by an Edward Bozley, and it is described as 'afterwards greatly enlarged and improved by Messrs Williams and Joseph Harris', probably in the 1830s. The house was subdivided in the 1950's. The topography, which slopes to the River Clwyedog, is such that only the roof of the house can be seen from the site and the site is not perceptible from the house. The house is orientated to allow for views to the east over the former formal gardens and to the south towards the River. These views do not include the proposed development site. The intervening distance of separation, mature vegetation and topography is such that the proposed development would not introduce any urbanising element to the setting of this asset and would result in no change to the way that the building is currently experienced, and its heritage values would be preserved. The magnitude of impact is 'no change' and the significance of effect is none in relation to this asset.

9.6.16 Offa's Dyke (SM DE181,182) consists of the remains of a length of Offa's Dyke, a presumed 8th century AD defensive bank and ditch. It consists of a stretch of bank, with a ditch on the western side. A counterscarp (raised bank) may be visible on the west side of the ditch in places. It is 1.25km to the west of the proposed development site at its closest point although at this point the monument lacks intervisibility with the proposed development site. However, as the land rises towards Rhos-berse, the ZTV indicates that there is some potential intervisibility between the monument and the site. There are long range views from points along Offa's Dyke in this location. At this point the proposed development site is c2km to the southeast of the monument and would be viewed in the context of the urban fringe of Wrexham. The relationship between Offa's Dyke and the landscape through which it passes would not be altered by the proposed development and the development would not interrupt views to the south or north along the course of this linear monument. The proposed development would not introduce any urbanising element to the setting of this asset and would result in no change to the way that the monument is currently experienced, and its heritage values would be preserved. The magnitude of impact is 'no change' and the significance of effect is none in relation to this asset.

9.6.17 Non-designated Fawnog (Asset ID A24) Farmstead (extant) shown on historic mapping to south of Bersham Road. The farmstead is shown as 'The Vownog' on the tithe map, it was then owned by Thomas Fitzhugh Esq. and occupied by William Harris. It is shown on the historic map sequence and the historic stone barns and farmhouse are largely intact. The farmstead has locally significant historic, aesthetic and evidential value as a late 18th or early 19th century farmstead dating to the period of high farming, it is of low heritage value. The farmstead is on the opposite side of Bersham Road to the proposed development and an access point to the development is proposed onto Bersham Road to the west of the farmstead. The farm is currently appreciated with surrounding fields which provide context to its historic use and development and makes a positive contribution to appreciating the assets heritage values. A large part of this setting would be changed from agricultural/ rural to urban in character. The masterplan framework includes for the retention and strengthening of the hedgerow along Bersham Road which would help to soften views of the proposed development and have been considered in the assessment. The magnitude of impact in relation to non-designated Fownog Farmstead is moderate. In relation to an asset of low value, this would result in an effect of minor adverse significance. This is a long-term effect at the local level, and it is not a significant effect.

9.6.18 Non-designated Pritchard's Tenement (Asset ID 109) is shown on historic mapping as Bryn-moel and is named as Pritchard's Tenement' on the tithe map, indicating a row of three houses with attached gardens; these are now one cottage. The building and surrounding crofts are intact. The property has locally significant historic, aesthetic and evidential value as a late 18th or early 19th century row of cottages, potentially for farmworkers. It is of low heritage value. The property is surrounded by the development proposals although the paddocks (former crofts) that immediately surround the property would not be developed. These currently include a telecommunications mast site but otherwise retain their historic character. Beyond these paddocks, the asset's setting would be changed from agricultural/ rural to urban in character. This would impact the ability to appreciate the historic rural character of this asset and would affect the contribution made by setting to the asset's heritage value. The magnitude of impact in relation to non-designated Pritchard's Tenement (Bryn-moel) is moderate. In relation to an asset of low value, this would result in an effect of minor adverse significance. This is a long-term effect at the local level; it is not a significant effect.

9.6.19 Non-designated former extent of parkland at Plas Power (Asset ID A110), now detached from the main area of parkland, it is shown on historic mapping and dates from the late 18th century. It is shown as parkland until the late 19th century, after which it was enclosed presumably as farmland. The area was then part of an opencast coal mine working in the early to mid-20th century and was separated from the main parkland area in the late 20th century by the construction of the A483 Wrexham Bypass. The former parkland character of this area is retained by the plantation woodland belt along Bersham Lane (an area of Ancient Woodland) and the stone wall that runs parallel to Bersham Lane. Both of those elements are retained by the proposed development. The loss of historic parkland character is such that this is an asset of low value (historic). The magnitude of change, given that the proposals affect only a small

and detached part of the parkland, is low. The significance of effect is therefore negligible. This is a long-term effect at the local level; it is not a significant effect.

9.7 Mitigation

9.7.1 This section describes the measures which are proposed to mitigate any significant environmental effects. It is anticipated that the delivery of these measures will be secured by way of appropriate planning conditions or obligations.

Demolition and Construction

9.7.2 In relation to the assessed effects described above the following mitigation is proposed:

9.7.3 Historic Building Recording: An appropriate record of the historic buildings that would be directly physically impacted is proposed (Grade II* listed Lower Berse Farm, Asset ID LB1, and non-designate historic farm buildings at Lower Berse Farm, Asset ID A18). The level of recording would be set out in a written scheme of investigation to be agreed with CPAT on behalf of Wrexham Council and Cadw. The recording would be undertaken prior to any alterations to the buildings.

9.7.4 Archaeological programme of work: An appropriate level of archaeological field survey and recording for those assets physically impacted by the proposed development (Lower Berse moat, Asset ID A17, and the stonework observed during the site walkover) as well as features with potential evidential value such as anomalies identified during the geophysical survey. The programme of archaeological work would be set out in a written scheme of investigation to be agreed with CPAT on behalf of Wrexham Council and Cadw. The level of recording and any further field surveys would be undertaken prior to any development commencing.

9.7.5 Design principles: a series of design principles could provide further mitigation to that already embedded in the masterplan framework, and these could be secured by condition. The detailed design of the proposed development could include further historic environment design principles as follows:

a. To ensure that heritage design principles are included that are sympathetic to the aesthetic value of grade II* Lower Berse Farmhouse and the associated non-designated historic farm buildings. These could be informed by a Heritage Impact Assessment (HIA) for the listed building and discussed and agreed with Cadw and CPAT. The design principles would seek to retain features of particular interest as far as reasonably practicable and to ensure that interventions into historic building fabric were limited as far as reasonably practicable and that the design reflected the historic building grain, scale and mass; and
b. Design principles that further embed the mitigation in relation to the settings of Lower Bersham Farm, Bersham Conservation Area, non-designated Bersham Hall, Fawnog, Plas Power Park and Pritchard's Tenement (Bryn-moel). Areas of public open space are included in the masterplan framework in proximity to these assets that preserves their

settings in part and reduces the potential effects of the proposed development. The detailed design principles for these areas could further mitigate the predicted effects. While this has not been included in the assessment of residual effect below, the detailed design could for example, ensure that any entrance to the development parcel to the west of Berse Lane uses an existing opening in the Plas Power Park stone wall or reflects the style of openings through the wall, and that the strategic open space to the north of Bersham Conservation Area is managed to retain a predominantly rural character.

9.7.6 It is understood that listed building consent will be required for works to Lower Berse Farmhouse and curtilage structures. This will be informed by the HIA referenced above and detailed design that follows which would follow the outline permission.

Operational Development

9.7.7 No additional operational mitigation is proposed, although the above design principles implemented during the construction phase would continue throughout the operational phase of the development.

9.8 Residual Effects

9.8.1 This section summarises the significance of the anticipated residual environmental effects, which are those that remain after all proposed mitigation measures are implemented.

9.8.2 The assessed effects, and the residual effect taking account of the above additional proposed mitigation measures is provided in Table 9.3 below.

Table 9.3: Summary of Residual Effects

Potential Effect	Significance	Mitigation	Residual Effect
Construction and Demolition			
Grade II* Listed Lower Berse Farmhouse (Asset ID LB1)	Moderate (adverse)	Provision of HIA and relevant design principles. Record of the building.	Minor (adverse)
Potential former moat at Lower Berse Farm (Asset ID A17)	Minor (adverse)	Archaeological programme of work (conditioned)	Negligible
Non-designated historic buildings at Lower Berse Farm (Asset ID A18)	Minor (adverse)	Record of the building and historic environment input to final design	Negligible
Former extent of parkland at Plas Power Park (Asset ID A110)	Negligible	None	Negligible

Stonework in bank of watercourse	Minor (adverse)	Archaeological programme of work (conditioned)	Negligible
Historic landscape features (public rights of way and field boundaries)	Minor (adverse)	Archaeological programme of work (conditioned)	Negligible
Completed Development			
Grade II* Listed Lower Berse Farmhouse (Asset ID LB1)	Minor (adverse)	Design principles	Minor (adverse)
Non-designated buildings at Lower Berse Farm (Asset ID A18)	Negligible	None	Negligible
Bersham Conservation Area (Asset ID CA1), and associated listed buildings (Bridge Cottages, LB20; Squire Cottage, LB21; and 9-10 Bunkers Hill, LB22)	Minor (adverse)	Design principles	Minor (adverse)
Non-designated Bersham Hall and gardens (Asset ID A68)	Negligible	None	Negligible
Bersham Ironworks (SM1) and associated grade II * listed buildings (Octagonal building, LB6; Single storeyed building, LB7) and grade II listed mill (LB35)	None	None	None
Grade II listed No1-3 Laurel Grove (Asset ID LB24)	None	None	None
Offa's Dyke (SM DE181,182)	None	None	None
Non-designated Fawnog (Asset ID A24)	Minor (adverse)	Design principles	Minor (adverse)
Bryn-moel - Pritchard's Tenement (Asset ID 109)	Minor (adverse)	Design principles	Minor (adverse)
Former extent of parkland at Plas Power Park (Asset ID 110)	Negligible	Design principles	Negligible

9.9 Summary

9.9.1 There is one designated historic asset within the proposed development site; Grade II* Lower Berse Farmhouse. The farmhouse includes elements of a 14th -15th century timber framed hall as well as later extensions and alterations. It is an asset of high historic, aesthetic and evidential value given its period and condition. The proposed development site also includes three recorded historic assets, comprising a potential medieval moat at Lower Berse Farm, the post medieval farmstead at Lower Berse and the former extent of the park and garden at Plas Power

Park (Asset IDs A17, A18, and A110 respectively). Stonework was also observed during the site visit in the bank of a watercourse, indicating a possible crossing point.

9.9.2 The parts of the Proposed Development site that can be experienced in association with Bersham Conservation Area (CA1 and associated listed buildings and non-designated Bersham Hall), Bersham Ironworks (SM10 and associated listed buildings), grade II listed 1-3 Laurel Grove and non-designated Fawnog farmstead, and therefore provide context to the rural location of these assets, are considered to be within their settings. The proposed development site does then in part makes a positive contribution to the heritage values of these assets.

9.9.3 The proposed development site has a low potential for as yet unrecorded archaeology to be present dating from the prehistoric, Roman, and early medieval periods. There is a moderate to high potential for medieval and post medieval archaeology, although that would most likely be of local significance associated with the documented medieval and post medieval agricultural use of the site, and therefore of low heritage value. This is supported by the results of the geophysical survey which also identified evidence for medieval and post medieval farming activity.

9.9.4 The demolition and construction phase of the proposed development would result in a moderate adverse effect (a significant permanent effect at the local level) in relation to grade II* listed Lower Berse Farmhouse (Asset ID LB1). Further mitigation through the provision of a HIA, detailed design principles and historic building recording is advised, which could reduce the predicted impact and result in a residual effect that is minor adverse, and not significant.

9.9.5 A minor adverse effect is also predicted in relation to direct physical impacts on the non-designated historic buildings at Lower Berse Farm (Asset ID A18), possible moat at Lower Berse Farm (Asset ID A17), stonework in the bank of a watercourse and historic landscape features, primarily historic hedgerows. There is also potential for the proposed development to physically impact as yet unknown historic assets with evidential value. A programme of archaeological and historic building recording is proposed to reduce the predicted impact and the residual effect in relation to these assets would be negligible and not significant after the implementation of an appropriate programme of recording.

9.9.6 The operational phase of the proposed development would result in a negligible impact in relation to the non-designated former extent of Plas Power Park (Asset ID A110) and Bersham Hall (Asset ID A68) and a minor adverse impact in relation to the effect of the development on Bersham Conservation Area (Asset ID CA1), grade II* listed Lower Berse Farm, non-designated Fownog (Asset ID A24) and non-designated Bryn-moel (Asset ID A109), as a result of development within the settings of those assets. These assessed effects take account of the mitigation embedded into the design of the proposed development as shown on the masterplan framework. The residual effects are as predicted at the operational stage of the development; however, it may be possible to achieve further mitigation through the detailed design in relation to these assets.

9.9.7 In relation to grade II* listed Lower Berse Farmhouse (Asset ID LB1), non-designated historic farm buildings at Lower Berse Farm (Asset ID A18) and non-designated former parkland extent

at Plas Power Park (Asset ID A110) both direct physical and setting effects are predicted. A review of these effects in combination has been undertaken. In relation to these assets, the residual combined effect in relation to Asset ID LB1 is minor adverse (permanent, at the local level), in relation to Asset ID A18 it is negligible adverse (permanent, at the local level), and in relation to Asset ID A110 it is negligible adverse (permanent, at the local level). This assessment takes account of both the embedded and additional proposed mitigation measures set out above.

10 Ground Conditions, Minerals and Soils

10.1 Introduction

10.1.1 This ES Chapter has been prepared by E3P and will assess how the Proposed Development will impact the ground stability, groundwater, surface water resources, contamination, soils and mineral resources beneath the Proposed Development Site.

10.1.2 This Chapter considers the effects of the construction and operational phases of the Proposed Development and how it may affect the ground conditions and the Site's contaminative status. An assessment of the potential effects upon controlled waters is presented, but the potential effects of the development are presented in Chapter 11: Drainage and Water Quality.

10.1.3 To inform the content of the assessment, E3P has completed a review of pertinent British Geological Survey, Environment Agency and Ordnance Survey maps and corresponding memoirs to ascertain potential issues that have been considered as part of the Proposed Development. E3P's review has also included the Phase 1 Desk Study report (Ref: 14-854-R3-RevE dated June 2024). A copy of the E3P report is provided in Appendix 10.1.

10.1.4 The assessment has also been informed by a Minerals Report completed by E3P (Ref: 14-854-RD dated June 2024) and an Agricultural Soils Report prepared by ADAS. These reports are presented at Appendix 10.2 and 10.3 respectively.

10.1.5 This ES Chapter has been written by Roy Walker. I am a Bachelor of Science (Honours – Geography and Geology) University of Manchester. I am a Fellow of the Geological Society, an Associate Member of the Institute of Environmental Management and Assessment, a Member of the Institution of Environmental Science and a Member of the Institute of Civil Engineers. I am a Chartered Environmental Scientist (CEnv) registered through the Society for the Environment.

10.1.6 I am Associate Director within E3P Ltd, a consultancy specialising in the assessment of contaminated land, land remediation and pollution control. Through my current position and previous employment in the UK I have taken a Principal role in the assessment of contamination risk for some of the UK's most polluted sites for over 8 years. In house E3P has over 10 chartered persons with multiple years of experience in this field.

10.1.7 In my career to date I have acted as the consultant for the land remediation works of highly contaminated sites such as former landfill sites, chemical manufacturing facilities, asbestos factories, former petroleum refineries and distribution facilities and hazardous installations.

10.1.8 The primary focus of my work centres on the assessment of contamination risk and/or protection of human health, controlled waters and the wider environment and the land quality of both greenfield and brownfield sites likely to be impacted by pollutants arising from current and historical land use. This work includes extensive pre-development contamination and land quality risk assessment and detailed site-specific advice concerning the mitigation of adverse impacts and detailed design of land remediation works and subsequent validation.

10.1.9 In the last two years, I have undertaken and/or managed the contaminated land risk assessment, detailed investigation, remediation and subsequent validation for over 100 brownfield and potentially contaminated sites across the UK and been involved in three significant EIA schemes.

10.2 Planning Policy Context

10.2.1 This ES Chapter is based on the published guidance and documents/studies identified in this Section. A list of the relevant legislation and national, regional and local policies are summarised in Table 10.1.

Table 10.1 Summary of Relevant Legislation and Guidance

Policy / Legislation	Key Provisions
Planning Policy Wales (February 2024)	Sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales
Environmental Protection Act (1990)	Governmental legislation to define the fundamental structure and authority for waste management and control of emissions into the environment
Land Contamination: Risk Managements (LCRM) (2023)	Model procedures for the management of land contamination. (Environment Agency and DEFRA)
British Standard (BS10175): Code of Practice for Investigation of Potentially Contaminated Land	Provides recommendations for, and guidance on, the investigation of land potentially affected by contamination and land with naturally elevated concentrations of potentially harmful substances, to determine or manage any risks.
CIRIA C352: Control of Water Pollution from Construction Sites (2001)	Provides practical help and guidance for consultants and contractors on how to plan and manage construction projects to control water pollution.
BGS Northeast Wales Minerals Resource Mapping	Provides detail of mineral resources in the area
BGS Northeast Wales Aggregates Safeguarding	Based on the minerals assessment mapping – the safeguarding maps outline key resource areas that have been determined to be protected assets currently.

IEMA 'A New Perspective on Land and Soil in Environmental Impact Assessment'	Guidance for assessment and management of the effects of development on land and soils
Wrexham Unitary Development Plan 1996-2011 (2005)	Defines the strategy of the council for development in the area and provides a framework for decision making
Local Development Plan (2013-2028)	Long-term land use and development strategy, focused on achieving sustainable development.

Planning Policy Wales

10.2.2 Planning Policy Wales (PPW) primary objective is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. A well functioning planning system is fundamental for sustainable development and achieving sustainable places.

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

10.2.4 The policy suggests that as part of the decision-making process; ensuring supply, supply and demand, existing inactive sites, efficient use of minerals and alternative future working should be considered when determining the significance of any one site.

10.2.5 Ground conditions by way of contamination is much less significantly discussed in the policy and relates mainly to the preferance of brownfield sites for development wherever possible due to the potential benefits from remediation as part of the redevelopment.

Local Development Plan 2013 - 2028

10.2.6 The 2013-2028 local plan was adopted in December 2023 as presents the long-term land use and development strategy for the borough. It is focused on achieving sustainable development and will (amongst other aspects) safeguard areas of land requiring protection or enhancement.

10.2.7 Policy SP16 Minerals Supply and Safeguarding states that minerals will be sustainably managed through:

a) *The protection of minerals from unnecessary sterilisation by directing new development away from areas underlain by mineral of importance of where this is not possible, through the requirement to extract mineral prior to the non-mineral development, and ,*
b) *Avoiding conflict between mineral working and sensitive development through the use of buffer zones:and*
c) *Contributing towards meeting the regional need for aggregate minerals in collaboration with Flintshire County Council: and*
d) *Supporting proposals for mineral extraction within the County Borough which contribute towards maintaining an adequate supply of minerals in sustainable locations including the delivery of high quality restoration and aftercare programmes which enhance and provide linkages with the natural environment.*

10.2.8 Policy MW1 Minerals Safeguarding states that non-mineral development within Mineral Safeguarding Areas, as defined on the proposals map, will only be permitted where it can be demonstrated that:

i. The mineral underlying the site does not merit extraction; or
ii. The need for the non-mineral development outweighs the need to protect the resource; or
iii. The mineral can be satisfactorily extracted prior to the non-mineral development; or
iv. The development is of a temporary nature or can be removed within the timescales within which the mineral is likely to be needed; and
v. Essential infrastructure that supports the supply of minerals would not be compromised or would be provided elsewhere;

10.2.9 The policy requires that all applications for development in these areas shall be supported by a Mineral Safeguarding Assessment. Proposals for non-mineral development on allocated sites of 4ha or more and which are underlain by Category 1 sand and gravel shall be supported by a Prior Extraction Assessment.

10.2.10 Policy SP14 Natural Environment states that development will only be permitted where it seeks to protect, conserve and enhance the natural environment including the quality of natural services including water, soundscape, air and soils.

10.3 Approach

Human Health and Controlled Waters Assessment

10.3.1 The ES assessment has been undertaken in accordance with the requirements of the Regulation and Guidance and assesses both ground conditions and contamination risk to and from the Proposed Development.

10.3.2 The generally accepted method of assessing the risks associated with ground conditions is based on Environment Agency (Environment Agency, Land Contamination: Risk Management (LCRM) (2023) and this requires:

- To establish the environmental setting of the Site, particularly with regard to ground conditions including local geology, hydrology and hydrogeology;
- To identify historic use or current potential sources of contamination and how these may affect the proposed scheme or indeed the wider environment;
- To develop a Conceptual Site Model [CSM] of the site. This would be carried out in line with requirements of the Environmental Protection Act Part 2a source-pathway-receptor 'pollutant linkage' methodology;
- To undertake a geotechnical appraisal of the site and identify any site constraints and potential risks;
- To characterise, where possible, constraints and development considerations, including recommendations for further investigations, assessments and mitigation.

10.3.3 The methods to understand the ground conditions and detail the mitigation measures for any identified risk include:

- Ground Investigation;
- Unexpected contamination plan;
- Remediation and enabling works plan;
- Inclusion of robust pollution prevention measures within CEMP;
- Materials Management Plan (implemented during the construction phase).

10.3.4 The construction process with respect to ground conditions includes two elements:

- Site enabling works; and
- Provision of foundation structures.

10.3.5 E3P has completed a Phase 1 Desk-Based Assessment, which is presented at Appendix 10.1. The information obtained and considered in the desk study includes historical Ordnance Survey maps, geological maps, hydrological and hydrogeological records, environmental databases, coal mining and mineral extraction records and the results of the site investigations carried out previously near the site. The purpose of the desk study was:

- To establish the environmental setting of the site, particularly with regards to ground conditions including local geology, hydrology and hydrogeology;
- To identify historic use or current potential sources of contamination and how these may affect the proposed scheme or indeed the wider environment;

- To develop a Conceptual Site Model [CSM] of the site. This would be carried out in line with requirements of the Environmental Protection Act Part 2A (Ref 10.3) source-pathway-receptor 'pollutant linkage' methodology;
- To undertake a geotechnical appraisal of the site and identify any site constraints and potential risks;
- To characterise, where possible, constraints and development considerations, including recommendations for further investigations, assessments and mitigation.

10.3.6 The potential effects in relation to land quality and geology were assessed using guidelines given in CIRIA document 552 'Contaminated Land Risk Assessment, A Guide to Good Practice' and BS10175.

Sensitivity of Receptors

10.3.7 The receptors identified as susceptible to potential impact from the development are controlled waters and human health risks both on and in the vicinity of the Site. The identified receptors have been ranked based upon their sensitivity to potential impact from the development and relate to controlled waters and human health risks both on and in the vicinity of the site. These receptors are described in the Baseline Conditions section of this chapter.

Magnitude of Impacts

10.3.8 The environmental impacts identified as a result of works at the Site can be associated with a magnitude from neutral to major based on the potential risk level. Within each magnitude level, a positive or negative effect can be determined. This assessment is based on professional judgement.

10.3.9 The magnitude of the effect on the local sensitive receptors can be associated with a scale of neutral (having no effect) to major (having a significant effect). For example:

- Remediation works to the underlying impacted soils would be considered a major positive effect as those contaminants identified at the Site have the potential for long-term release to human health and controlled waters receptors.
- Conversely, the potential environmental impact of advancing a driven pile through un-remediated contaminated soils could extend a preferential pathway into the bedrock aquifer and subsequently increase the rate of downward migration and therefore negatively impact the receptor.

Table 10.2: Magnitude of Environmental Impacts

Magnitude	Environmental Impact
Major	**Adverse** - Activities are likely to increase long-term contaminant release over and above the baseline conditions with significantly increased risks to human health and the wider environment. Effects are likely to be important considerations at a regional or district scale. **Beneficial** - Remedial work may mitigate such effects to some degree but is unlikely to remove all of the effects upon the affected receptors.
Moderate	**Adverse** - Activities may result in a moderate contaminant release, or cause degradation of other soil quality parameters, over and above the baseline conditions, with moderately increased risk to human health or controlled waters. Effects could be permanent on a local scale or have a wider, temporary impact. **Beneficial** - Remediation measures are likely to be largely effective although some residual effects may still arise.
Minor	**Adverse** - Activities may result in some contaminant release or cause degradation of other soil quality parameters over and above the baseline conditions with significantly increased risks to human health or controlled waters. **Beneficial** - Effects are likely to be both temporary and local in nature and can be successfully addressed by remediation to leave minimal residual risk.
Negligible	Activities may result in small risks to human health or controlled waters.
Neutral	Activities will neither better nor worsen the environmental situation currently.

Significance Criteria

10.3.1 Significance is a function of the sensitivity of a receptor or the receiving environment and the magnitude of the potential effect. Based on the findings of the Phase I Geoenvironmental Site Assessment (see Appendix 10.1) the significance of potential effects has been assessed. This assessment is based on professional judgement of the magnitude of the effect and the sensitivity of the affected receptor (as defined in the Baseline Conditions section of this chapter). Significance is defined as:

- **Large Beneficial**; Remedial work may mitigate such effects to some degree but is unlikely to remove all of the effects upon the affected receptors.
- **Moderate Beneficial**; Remediation measures are likely to be largely effective although some residual effects may still arise.
- **Slight Beneficial**; Are likely to be both temporary and local in nature and can be successfully addressed by remediation to leave minimal residual risk.

- **Negligible**; Activities may result in small risks to human health or controlled waters.
- **Slight Adverse**; Activities may result in some contaminant release or cause degradation of other soil quality parameters over and above the baseline conditions with significantly increased risks to human health or controlled waters.
- **Moderate Adverse**; Activities may result in a moderate contaminant release, or cause degradation of other soil quality parameters, over and above the baseline conditions, with moderately increased risk to human health or controlled waters. Effects could be permanent on a local scale or have a wider, temporary impact. and,
- **Large Adverse**; Activities are likely to increase long-term contaminant release over and above the baseline conditions with significantly increased risks to human health and the wider environment. Effects are likely to be important considerations at a regional or district scale.
- **Neutral**; Activities will neither better nor worsen the environmental situation currently.

10.3.2 By way of an example of the application of significance criteria, remediation works to the underlying impacted soils would be considered a positive effect as those contaminants identified at the Site have the potential for long term release to human health and controlled waters receptors. Conversely, the potential environmental impact of advancing a driven pile through un-remediated contaminated soils could extend a preferential pathway into the bedrock aquifer and subsequently increase the rate of downward migration and therefore negatively impact the receptor.

Minerals and Soils Assessments

10.3.10 A Minerals Safeguarding Assessment (Appendix 10.2) was completed in June 2024. The purpose of the Minerals Safeguarding Assessment was:

- Review geological data in relation to the proposed development site;
- Review local authority and county council information in relation to Mineral Safeguard Areas.
- Assess the implications of any proposed development upon the mineral resource.
- Assess the likely impacts associated with the extraction of minerals upon the wider environment.

10.3.11 An assessment of agricultural soil quality has also been completed and this report is presented at Appendix 10.3.

10.3.12 Guidance on assessment of impacts in soils is provided by ‘A New Perspective on Land and Soil in Environmental Impact Assessment’ published by the Institute of Environmental Assessment and Management (IEMA) in 2022. The guidelines aim to help practitioners

understand and record the full environmental implications of development on land and soil and embed sustainable soil management throughout EIA practice.

10.3.13 This methodology has been employed for the assessment of the impacts upon mineral reserves and agricultural soils at the site.

Receptor Sensitivity

10.3.14 The IEMA guidance seeks to establish the sensitivity of a soil receptor by reference to its resource or function. Table 10.3, below, provides a summary of the features of soils that can influence it sensitivity for assessment purposes.

Table 10.3: Receptor Sensitivity

Receptor Sensitivity	Soil Resource and Soil Functions
Very High	• **Biomass production: ALC Grades 1 & 2 or LCA Classes 1 & 2 (for Wales all BMV (Grade 1, 2 and 3a) is considered Very High*)** • Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a European site (e.g., SAC, SPA, Ramsar); • Peat soils; Soils supporting a National Park, or Ancient Woodland • Soil carbon: Peat soils • Soils with potential for ecological/landscape restoration • Soil hydrology: Very important catchment pathway for water flows and flood risk management • Archaeology, Cultural heritage, Community benefits and Geodiversity: SAMs and adjacent areas; • World Heritage and European designated sites; Soils with known archaeological interest; Soils supporting community/recreational/educational access to land covered by National Park designation • Source of materials: Important surface mineral reserves that would be sterilised (i.e., without future access)
High	• Biomass production: ALC Grade 3a (for Wales all BMV is considered as Very high*), or LCA Grade 3.1. • Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected features within a UK designated site (e.g., UNESCO Geoparks, SSSI or AONB, Special Landscape Area, and • Geological Conservation Review sites); Native Forest and woodland soils; Unaltered soils supporting semi-natural vegetation (including UKBAP Priority habitats or Section 6 habitats in Wales) • Soil carbon: Organo-mineral soils (e.g., peaty soils) • Soil hydrology: Important catchment pathway for water flows and flood risk management

	• Archaeology, Cultural heritage, Community benefits and Geodiversity: Soils with probable but as yet unproven (prior to being revealed by construction) archaeological interest; Historic parks and gardens; RIGS; Soils supporting community/recreational/educational access to RIGS and AONBs • **Source of materials: Surface mineral reserves that would be sterilised (i.e. without future access)**
Medium	• Biomass production: ALC Grade 3b or LCA Grade 3.2 • Ecological habitat, soil biodiversity and platform for landscape: Soils supporting protected or valued features within non-statutory designated sites (e.g. Local Nature Reserves (LNR), Local Geological Sites (LGSs), Sites of Nature Conservation Importance (SNCIs), Special Landscape Areas; Non-Native Forest and woodland soils • Soil carbon: Mineral soils • Soil hydrology: Important minor catchment pathway for water flows and flood risk management • Archaeology, Cultural heritage, Community benefits and Geodiversity: Soils with • possible but as yet unproven (prior to being revealed by construction) archaeological interest; Soils supporting community/recreational/educational access to land • Source of materials: surface mineral reserves that would remain accessible for extraction
Low	• Biomass production: ALC Grades 4 & 5 or LCA Grades 4.1 to 7 or Urban soils • Ecological habitat, soil biodiversity and platform for landscape: Soils supporting valued features within non-designated notable or priority habitats/landscapes. Agricultural soils • Soil carbon: Mineral soils • Soil hydrology: Pathway for local water flows and flood risk management • Archaeology, Cultural heritage, Community benefits and Geodiversity: Soils supporting no notable cultural heritage, geodiversity nor community benefits; Soils supporting limited community/recreational/educational access to land • Source of materials: Surface mineral reserves that would remain accessible for extraction
Negligible	• As for low sensitivity, but with only indirect, tenuous, and unproven links between sources of impact and soil functions

Impact Magnitude

10.3.15 Magnitude is a measure of the scale of the impact upon an identified receptor. Table 10.4 sets out the criteria for evaluating the magnitude of impact, based upon the IEMA guidance.

Table 10.4: Impact Magnitude

Magnitude of Impact (Change)	Description of Impacts
Major	Permanent, irreversible loss of one or more soil functions or soil volumes (including permanent sealing or land quality downgrading), over an area of more than 20ha or loss of soil-related features set out above, as advised by other topic specialists in EIA team (including effects from 'temporary developments') or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of more than 20ha, or gain in soil-related features, as advised by other topic specialists in EIA team (including effects from 'temporary developments')
Moderate	Permanent, irreversible loss of one or more soil functions or soil volumes, over an area of between 5 and 20ha or loss of soil-related features, as advised by other topic specialists in EIA team (including effects from 'Temporary Developments') or Potential for improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of between 5 and 20ha, or gain in soil-related features, as advised by other topic specialists in EIA team
Minor	Permanent, irreversible loss over less than 5ha or a temporary, reversible loss of one or more soil functions or soil volumes), or temporary, reversible loss of soil-related features, as advised by other topic specialists in EIA team or Potential for permanent improvement in one or more soil functions or soil volumes due to remediation or restoration over an area of less than 5ha or a temporary improvement in one or more soil functions due to remediation or restoration or off-site improvement, or temporary gain in soil-related features.
Negligible	No discernible loss or reduction or improvement of soil functions or soil volumes that restrict current or proposed land use

Impact Significance

10.3.16 The significance of an impact is a function of the sensitivity of a receptor and the magnitude of the impact. The IEMA guidance recommends the use of the following matrix to determine how significant an impact is. Impacts identified in this way can be adverse or beneficial.

Table 10.5: Significance Matrix

		Nature of impact (magnitude/probability/reversibility)				
		No Change	**Negligible**	**Minor**	**Moderate**	**Major**
Nature of Receptor (sensitivity/ value/ importance)	**Very high**	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate
	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight

10.3.17 The table below is also taken from the IEMA Guidance and sets out the theoretical relationship between EIA 'significance' and whether an impact should be considered to be a 'material consideration' in planning terms.

Table 10.6: Impact Significance and Material Consideration

Significance Category	**Typical Description**
Very Large	Effects at this level are material in the decision-making progress
Large	Effects at this level are likely to be material in the decision-making progress
Moderate	Effects at this level can be considered to be material in the decision-making process
Slight	Effects at this level are not material in the decision-making process
Neutral	No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error

Note 1: Where relevant, individual environmental factors can set out variations in significance description requirements.

Note 2: The approach to assigning significance to effect relies on reasoned argument, the professional judgement of competent experts and using effective consultation to ensure the views of relevant stakeholders are taken into account.

10.4 Baseline Conditions

10.4.1 This Section sets out all of the baseline data that has been collected to inform the proposal and the assessment of the environmental impact of ground conditions and contamination. All baseline data used in this assessment can be found in the Appendices to this Chapter.

Previous Land Uses

10.4.2 A review of the pertinent Ordnance Survey mapping suggests that the site has comprised agricultural land with two farm buildings from circa 1872 until the present day with a number of field boundaries and ponds. A wireless electricity station was constructed next to Bryn-Moel in 1992. No significant changes occur on-site from 1992 onwards.

Geology

10.4.3 The British Geological Survey (BGS) map (Sheet 121) for the site, (1:50,000, Solid and Drift editions) and online records indicate the site is underlain by Glacial Till – CLAY, SAND, GRAVEL in the West, Glaciofluvial Sheet Deposits – SAND & GRAVEL in the East, Alluvium – SAND, SILT, CLAY and GRAVEL in the North all within the superficial deposits.

10.4.4 The bedrock geology is indicated as Pennine Lower Coal Measures Formation and Pennine Middle Coal Measures Formation – MUDSTONE, SILTSTONE, SANDSTONE in the Southwest, East, Centre and Etruria Formation – MUDSTONE in the West, Centre.

Hydrogeology

10.4.5 The hydrogeology of the Site is characterised by the presence of an Undifferentiated aquifer overlying a secondary A aquifer (bedrock Geology).

10.4.6 Three historical groundwater abstraction wells are recorded 796–869 m northeast at Carlsberg Tetley Brewing Ltd for process water. No potable groundwater abstractions are identified within a 1 km radius of the Site.

Surface Waters

10.4.7 Two drainage ditches are recorded on site. It is understood from the local flood risk mapping that where the ditch enters and leaves the site it is prone to flooding from rivers and falls into flood zone 2.

10.4.8 The nearest main river is Afon Clywedog located 20-150m from the southern site boundary. Due to the local topography, any shallow groundwater if present will likely flow in a southerly direction towards Afon Clywedog.

Made Ground

10.4.9 Based on the GroundSolve Ltd Report, dated August 2013, it is considered likely that the Made Ground near to the western site boundary is associated with the material derived from excavations from the construction of the adjacent road. Given the natural origins, the Made Ground appears as reworked natural soils.

Human Health

10.4.10 As a result of the Tier 2 assessment, no elevated concentrations of contaminants have been identified that would prejudice human health.

10.4.11 Out of the ten samples analysed for asbestos in the form of chrysotile, no asbestos was detected potentially associated with the absence of Made Ground and historical development onsite.

10.4.12 The human health risk at the Site is likely to remain local due to the exposure pathways associated with dermal contact, ingestion of soils, and inhalation of particulates. Where impacted materials are removed from the site and moved to landfill sites there is a low potential for a district impact during the transport of the impacted soils this would increase the risk at the local area of deposition once placed, though the subject site would be reduced.

Controlled Waters

10.4.13 The Afon Clywedog is considered to be a local to regional receptor as any impact to this controlled waters feature has the potential for significant dispersion and migration away from the immediate Ruthin Road area towards the River Dee. Contamination would be required to significantly migrate laterally both through and overground to impact this receptor.

10.4.14 The River Dee is designated as an SAC and includes three separate Sites of Special Scientific Interest (SSSI)[1]. For this reason, the River Dee has been assessed to have a Very High sensitivity.

10.4.15 The secondary A aquifer is considered as local to neighbourhood receptor, as any impact mobilised from the near-surface has the potential to disperse through groundwater fractures/fissures but will be limited by the continuity of the aquifer. No immediate groundwater abstractions are in the immediate area however should impact migrate this could extend over the local area to the extent of the bedrock aquifer.

Receptor Sensitivity

10.4.16 The following table sets out the levels of sensitivity attributed to the receptors in the local area that could be affected by the development. These levels of sensitivity have been used as the

[1] Dee Management Catchment Summary. Accessed Online: https://naturalresources.wales/media/3225/dee-management-catchment.pdf

basis for assessing the significance of impacts associated with contamination risks later in this chapter.

Table 10.7: Receptor Sensitivity

Designation / Sensitivity	Receptors
Very High	Controlled Waters - River Dee (SAC) (Lateral Migration of Contamination)
High	Human Health (Contaminated Land – Dermal contact, Ingestion of soils, Inhalation of particulates)
Medium	Controlled Waters - Afon Clywedog (Lateral Migration of Contamination)
Low	Controlled Waters - Secondary A Aquifer (Vertical Migration of Contamination)
Negligible	Geological and Geomorphological

Minerals

10.4.17 The Welsh BGS mapping provides a number of plans that show relevant Mineral Safeguarding Areas. These maps are reproduced in Figure 10.1 and Figure 10.2 and show that the proposed development is located within both a tertiary shallow coal, brick clay and other sandstone and SAND and GRAVEL mineral safeguarding area.

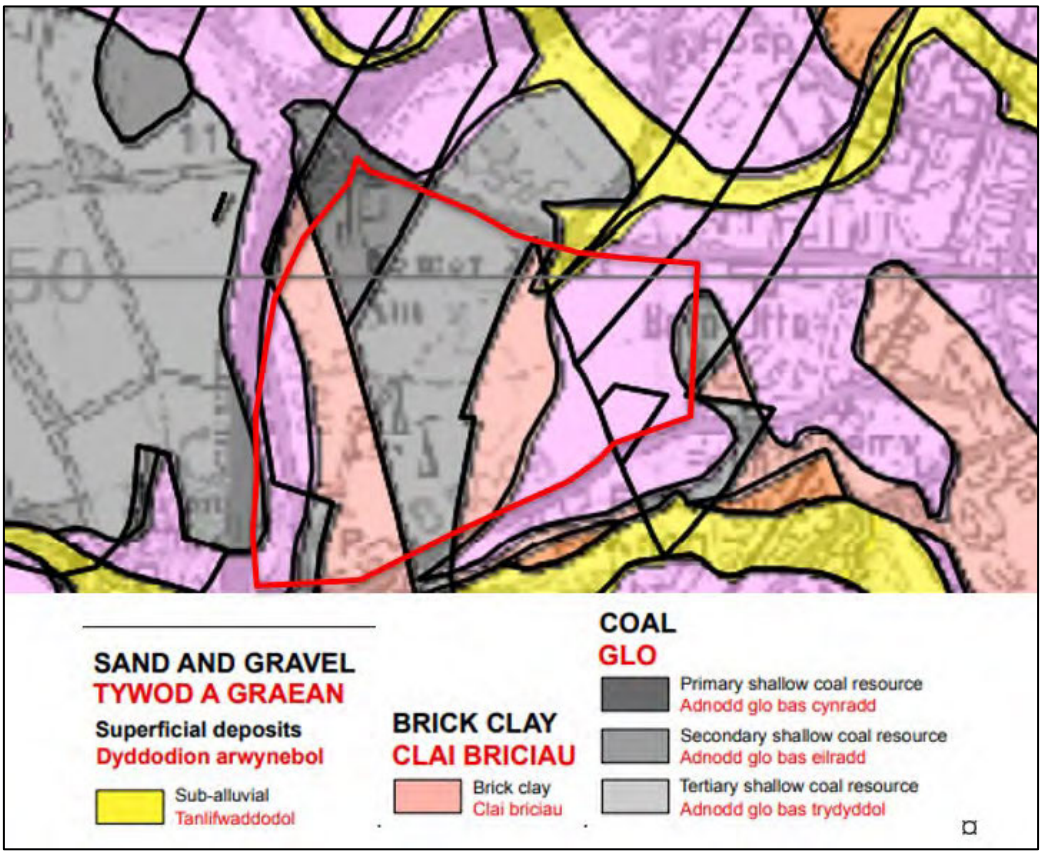


Figure 10.1: Wales BGS Mineral Safeguard Zone

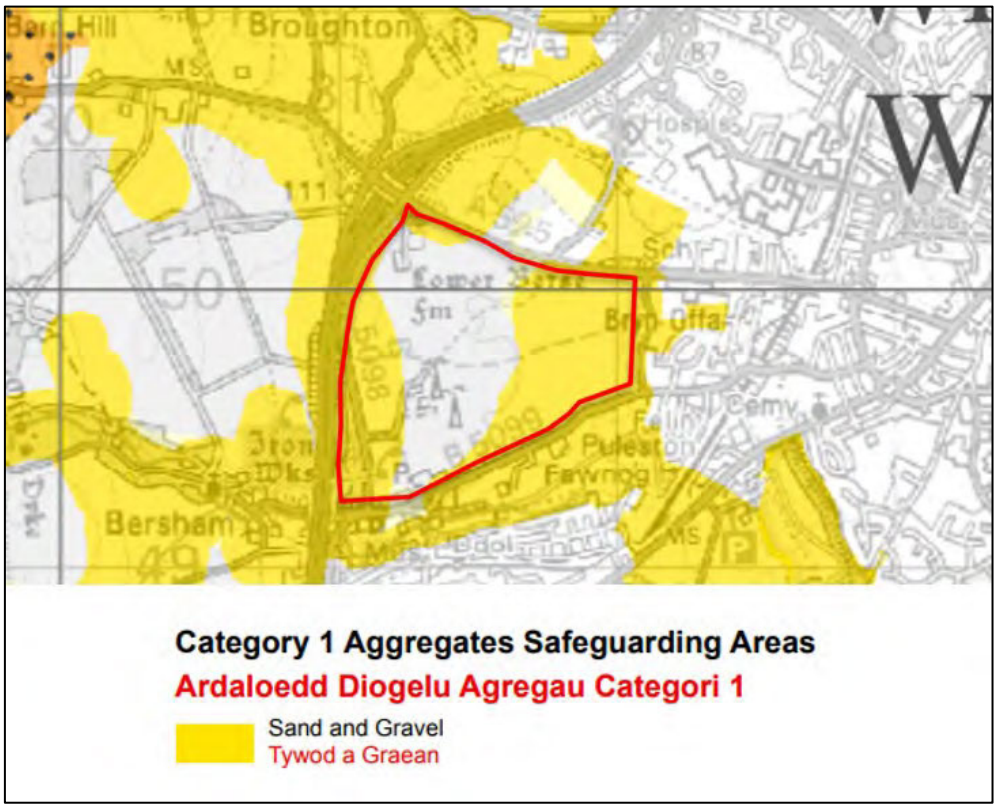


Figure 10.2: Wales BGS Mineral Safeguard Zone (Sand and Gravel)

10.4.18 Based on the IEMA Guidance, <40ha of the site is classified as having High sensitivity due to the presence of mineral safeguarding areas. It is considered likely that the development of 72.85ha of land in the region would potentially sterilise mineral resources within a very small area of the overall resource (likely to be over 1000s hectares).

Soils

10.4.19 The Agricultural Land Classification Report prepared by ADAS confirms that the site comprises a large proportion of Best and Most Versatile (BMV) land (Grade 1, Grade 2 and Subgrade 3a), as illustrated on Figure 10.3, below. The report shows that the around 81% of the site is made up of BMV land. In terms of the IEMA Guidance, this means that 81% of the site is classified as having Very High sensitivity, with 8% (Subgrade 3b) having Medium sensitivty, 2% (Grade 4) having low sensitivity and 9% (non-agricultural) having negligible sensitivity.

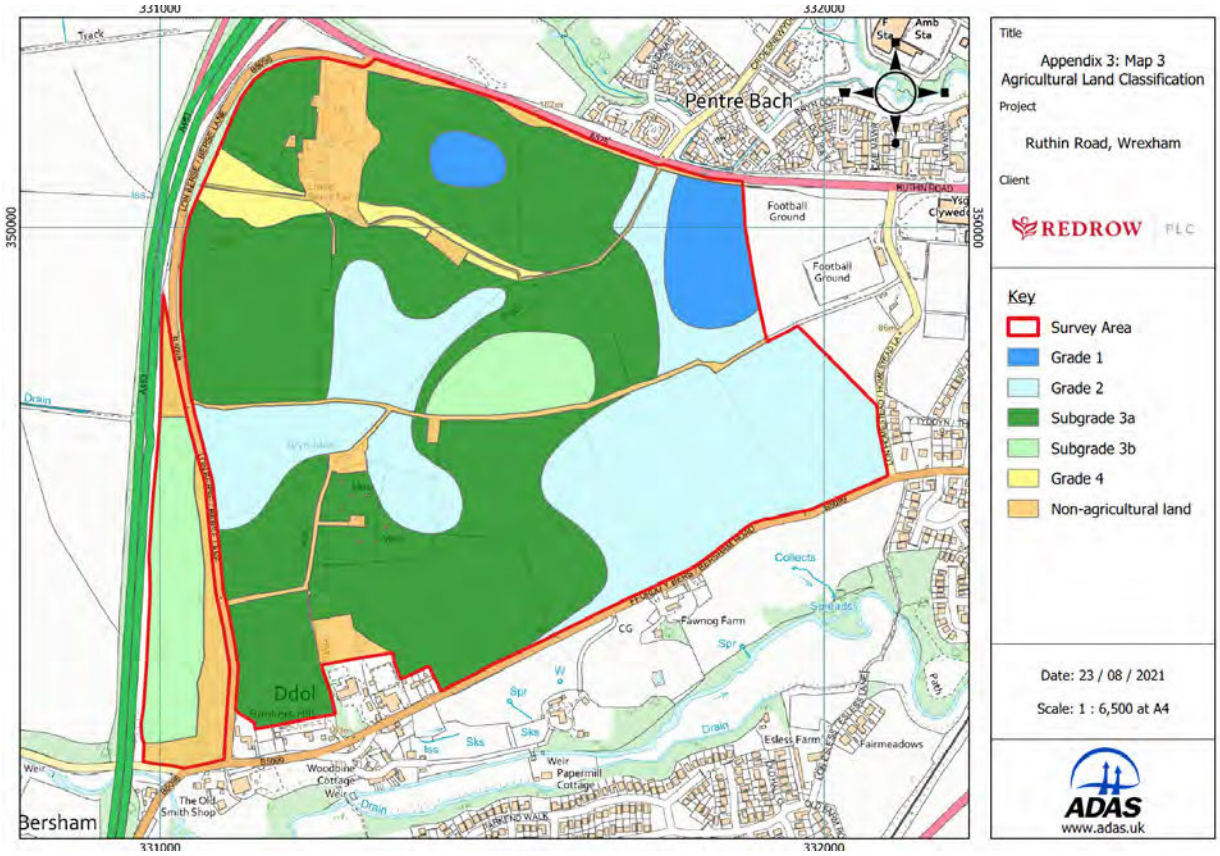


Figure 10.3: Agricultural Land Classification

10.5 Embedded Mitigation

10.5.1 With relevance to ground conditions and minerals, it is considered that any potential issue identified in the detailed site assessment would be conditioned at planning and resolved in subsequent reporting and earthworks/site works during the early stages of construction.

10.5.2 The exception in part would be where a ground gas risk is identified as this would fall into a redesign in the substructure design of the affected plots as well as condition either at planning or warranty provider to ensure the robust construction of the measures.

10.6 Potential Effects

10.6.1 This section sets out the potential effects of the development on the basis of the assessment parameters plans and assumes the inclusion of embedded mitigation as set out in the preceding section. The assessment is based based on the findings of the Phase I and Phase 2 Geoenvironmental Site Assessments (see Appendix 10.1 and 10.2) the potential effects during the construction phase and the operational phase of development have been evaluated.

Demolition and Construction

10.6.2 Works that could affect land or controlled waters during the demolition, enabling works and construction phase of the development are outlined below:

10.6.3 To facilitate the Proposed Development, site enabling and infrastructure works will be required. The potential effects of these are summarised and then analysed below:

- Demolition/refurbishment of existing buildings and grubbing out of below ground structures (Receptor – Construction workers, third party users)
- Fuel storage and refuelling activities and spillages (Receptor – Underlying aquifer, construction worker contact with impacted soils)
- Contact with potentially contaminated ground, particularly asbestos (Receptor – Inhalation Construction workers/site users, third party)
- Import and Export of Materials (Receptor – River Clywedog, construction workers, site users, third parties)
- Excavation of contaminated soils (Receptor – Underlying Aquifer, construction workers, site users)
- Excavations, earthworks and installation of foundation structures (Receptor – underlying aquifers, site workers)

Controlled Waters and Human Health

10.6.4 During the construction works process, there will be a requirement to prepare the ground for subsequent development. This will include the clearance of all surface furniture, demolition of those existing structures identified for demolition, and excavation of Made Ground or natural strata to remove any obstructions. Subsequent actions will include the processing of Made Ground and removal of any geotechnically unsuitable material such as timber, metal or organic soils. Concrete obstructions (where present) that are excavated will be processed on-site under a WRAP (Waste Recycling Action Plan) protocol and turned into construction aggregate for subsequent re-use on-site as part of the Proposed Development. Any remaining chemically and geotechnically suitable material will either be re-used or require off-site disposal. These works are likely to be completed as part of the initial phase of construction only and any potential effects are likely to be short-term and beneficial in the long-term for the site.

10.6.5 During the enabling and construction works, there will be a requirement for construction workers to be present on-site and potentially be in direct contact with any contaminated soils based on the activities carried out, therefore, human health is of high sensitivity (receptor–ground workers) however, again exposure is considered to be short term and small magnitude.

10.6.6 Impacts are likely to be limited to dermal contact and inhalation of dust by groundworkers and surrounding land users during earthworks, movement of soils and civil works. Dust generation is likely to be limited to dry and windy periods. Importation/export of material will increase traffic

movements and potentially provide a source of dust during these activities, although these will be restricted to construction traffic routes (receptor – groundworkers/third party users).

10.6.7 Desk-based research has not identified any significant on-site sources of contamination associated with historical site activities that may pose a risk to human health, groundwater or surface water. Therefore, completion of the enabling/construction works are considered to have minor negative effect to human health and controlled waters.

10.6.8 During the construction works it is likely that excavators, crushers and tipper trucks will be required to move and process arisings and subsequently replace arisings with recycled engineering aggregates. The use of plant is likely to require the storage and use of fuel. The storage of fuel is likely to be a requirement of the construction works and therefore any potential effects are likely to be short-term.

10.6.9 The geological strata beneath the proposed development site comprise Devensian till – CLAY, Glaciofluvial sheet deposits – SAND AND GRAVEL and ALLUVIUM deposits overlying Pennine Lower/Middle Coal Measures Member. These strata are classified as undifferentiated and secondary A aquifers respectively (receptor–drift and bedrock aquifers/controlled waters). No potable groundwater abstractions have been identified within a 1 km radius of the Proposed Development site. The drift deposits are likely to be low permeability and afford protection to the underlying bedrock from any vertical contaminant migration.

10.6.10 Based on the nature of the activity, the storage of fuel is considered to potentially have a medium-magnitude of effect however, given the sensitivity of the receptors referred to above, spillage of fuel is likely to have a minor negative effect on the local underlying aquifers given the minor scale of any spillage anticipated. This is likely to be an effect throughout the construction phase of works.

10.6.11 Exposed soils or stockpiles of material imported or awaiting processing or export may be exposed to precipitation which could induce run-off into adjacent watercourses (receptor – controlled waters). Furthermore, the export of excess soils will increase traffic movements which could provide a source of dust generation. While the soils are not likely to contain contaminants, they could cause a physical impact on sensitive ecological receptors, while any dust generated could create a nuisance to adjacent properties (receptor – construction workers, third party). The storage of soils is likely to be undertaken during the initial phases of groundworks and pre-construction only and therefore any effects are likely to be short-term and the generation of dust is limited to periods of windy, dry weather.

10.6.12 Based on the absence of any significant contaminant source this activity is also likely to have a minor negative effect on identified receptors. However, the removal of Made Ground from the site may have a beneficial effect on the local soils at the site by removing low-level contaminant sources; however, given the low levels of contamination, this is likely to be of negligible significance.

10.6.13 Given the proposed structures it may be necessary to utilise piled foundations onto the underlying mudstone bedrock with within glacial drift. The formation of piles through any Made Ground and drift strata may result in the creation of preferential pathways (Receptor – Controlled

Waters). However, based on desk study research no potentially significant on-site sources of contamination are anticipated. This is likely to only take effect during certain processes during the construction phase of works and cease on completion of major earthworks.

10.6.14 As discussed previously, the geological strata beneath the Proposed Development Site comprises Devensian till - CLAY deposits overlying Pennine Lower/Middle Coal Measures. These strata are classified as undifferentiated and secondary A aquifers. No potable groundwater abstractions have been identified within a 1km radius of the Proposed Development site. The drift deposits are likely to be low permeability and afford protection to the underlying bedrock from any vertical contaminant migration.

10.6.15 As no significant sources of on-site contamination have been identified, the provision of a piled foundation is considered to have a low magnitude of effect as it is unlikely to pose a significant risk to controlled waters receptors. Therefore, the provision of foundation structures is likely to have a negligible effect on identified receptors. There is an initial risk associated directly with the works and application of the pile; however, a secondary risk extends to the operational phase as a preferential pathway may be open throughout the lifetime of the pile though the hardstanding surface cover in the Proposed Development will result in minor effect to receptors long term.

Minerals and Soils

10.6.16 The development would result in development within a mineral safeguarding area, which could result in <40ha of land being sterilised for future extraction. Based on the IEMA guidance, this loss represents a Major magnitude of effect upon mineral reserves.

10.6.17 The development of the site would result in the loss of around 61.5ha of BMV agricultural land. According to the IEMA Guidance, this represents an impact of major magnitude on a receptor of very high sensitivity. However, it should be noted that this site is earmarked for development and, therefore, Wrexham CBC has already considered the implication of this loss of arable land through the allocation process. The Agricultural Land Classification (ALC) system principally considers the land from its potential for biomas (food, fibre and fuel) production. Soil provides a wide range of functions which benefit the environment, society and economy in addition to biomass production that is increasingly being recognised. These include ecological habitat and a platform for soft infrastructure (i.e. green infrastructure), interactions with the atmosphere (as a component of the carbon and nitrogen cycles) and interactions between land and the atmosphere as a component of the hydrological cycle (e.g. absorbing rainfall reducing run-off and flooding risk). These other benefits can be delivered by soils on non-agricultural land. The masterplan of the development site shows that strategic open space covers about a third of the site, with soil that can perform these functions. In addition there are likely to be landscaped areas and gardens (assuming they are not paved) of the properties built that can perform some of the other functions. The potential environmental impacts and the significance of effects on the construction phase summarised above are set out in Table 10.8.

Table 10.8: Significance of Effect - Construction Phase

Nature of Impact	Receptor	Receptor Sensitivity	Impact Magnitude	Significance of Effect
Demolition and Ground Works associated with Construction Phase	Human Health	High	Minor (adverse)	Slight
Fuel Storage	Controlled Waters – Underlying Aquifer	Low	Minor (adverse)	Slight
	Human Health	High	Minor (adverse)	Slight
Contact with Contaminated Soils	Controlled Waters – Underlying Aquifer	Low	Moderate (adverse)	Slight
	Human Health	High	Major (adverse)	Large
Export Materials from Site	Human Health (during excavation and transport)	High	Minor (adverse)	Slight
	Human Health (long term on site)	High	Negligible	Neutral
Import of Materials / Stockpiles	Human Health	High	Minor (adverse)	Slight
	Controlled Waters – River Clywedog	Medium	Minor (adverse)	Slight
Excavations, Earthworks and Installation of Foundation Structures	Controlled Waters – Underlying Aquifer	Low	Moderate (adverse)	Slight
	Human Health	High	Minor (adverse)	Slight - Moderate
Minerals Sterilisation	Sand and Gravel resource (up to 40ha)	High	Major (adverse)	Large
Soil loss	ALC Grade 1 (3.4ha)	Very High	Minor (adverse)	Large
	Grade 2 (22.5 ha)	Very High	Major (adverse)	Very Large
	Subgrade 3a (37.1 ha)	High	Major (adverse)	Large

	Subgrade 3b (6.1 ha)	Medium	Moderate (adverse)	Moderate
	Grade 4 (1.6 ha)	Low	Minor (adverse)	Slight
	Non-agricultural (6.8 ha)	Negligible	Moderate (Adverse)	Neutral

Operational Development

10.6.18 No significant on-site sources of contamination have been identified based on desk-based research and given that the site will largely comprise hard standings and buildings there are unlikely to be contaminant pathways to the sub-surface with infiltration and subsequent leachate unlikely to be a significant long-term issue.

10.6.19 A potential ground gas source has been identified but has not been investigated to date. Ground gas may migrate through the sub-surface and accumulate within foundation structures and buildings. There is likely to be some inherent localised mitigation in that the proposed structures could require substantial engineering of ground and floor slabs which will reduce the potential for migration pathways. The duration of effects for the operational phase is long-term.

10.6.20 Given the proposed end use of the site, significant on-site storage of potentially hazardous material is unlikely, though where present, contained to areas specifically designed for chemical/product storage. The specification, construction, maintenance and monitoring of pollution prevention equipment at the Site will be a specific requirement of the site's Environmental Permit Issued under the Environmental Permitting (England and Wales) (Amendment) Regulations 2018. As such, should any spillages occur, these will be to areas of hardstanding and controlled via the site drainage networks and would therefore not impact upon existing ground conditions or controlled waters receptors.

10.6.21 During the operational phase, human health as a receptor is considered to be of low to medium sensitivity due to a possible ground gas inhalation pathway. No dermal contact or ingestion pathways are considered likely to be present.

10.6.22 Controlled water receptors within the underlying Secondary A aquifer are considered to be low sensitivity due to the presence of low permeability drift.

10.6.23 As no potentially significant sources of contamination have been identified the magnitude of the effect associated with the operation phase is considered to be low. Therefore, given the sensitivity of the identified receptors, potential effects during operation are considered to have a negligible effect.

10.6.24 As only a low risk of ground gas migration is identified, the magnitude of effect associated with the operation phase is considered to be low. Therefore, given the sensitivity of the identified receptors, potential effects during operation are considered to be slight adverse.

10.6.25 Chemical storage facilities are unlikely, and if required will be within dedicated areas of the Site that are constructed within impermeable areas and where necessary bunded in accordance with regulations and/or permit conditions. There is considered to be a negligible effect.

10.6.26 The potential environmental impacts and significance of effects on the operational Phase summarised above are set out in Table 10.9.

Table 10.9: Significance of Effect - Operational Phase

Nature of Impact	Receptor	Environmental Impact	Significance of Effect
Exposure to sub-surface surface contamination	Local (Human Health)	Negligible	Negligible
Ingress of ground gas	Local (Human Health)	Minor (negative)	Slight Adverse
Storage of chemicals	Local (Human Health, Controlled Waters)	Negligible	Negligible

10.7 Mitigation

10.7.1 This section outlines the proposed environmental impact mitigation measures in the construction and operational phases to address the limited adverse impacts and their effects previously identified in an earlier section of this paper.

10.7.2 The ground conditions assessment completed to date has identified the potential for contamination that can be managed during remediation works and mitigation measures installed during the build phase where necessary. The majority of significant effects would be mitigated through the implementation of inherent design procedures.

10.7.3 In order to further understand the likely effecs to critical receptors a detailed risk assessment of the soils and groundwater beneath the subject Site should be completed through a programme of site investigation. A Remediation Strategy should be informed by the site investigations and be secured by planning conditions. The resulting report should be approved by Wrexham County Borough Council before the commencement of the relevant phase of development. Remedial measures will be implemented before above-ground construction works.

10.7.4 Gas monitoring should be completed throughout the site and the results reported to and accepted by Wrexham County Borough Council. Mitigation requirements of any effects of ground gas migration is to be agreed in the Remediation Strategy to be secured by planning conditions and approved by Wrexham County Borough Council prior to the commencement of the relevant phase of development. Remedial measures will be implemented prior to above ground construction works.

10.7.5 Implementation of any hardcover or clean topsoil will be implemented on completion of development and landscaping works and approved with submission of a Verification Report to be submitted prior to occupation.

Demolition and Construction

10.7.6 The following details the mitigation that will be put in place during the construction phase.

10.7.7 A detailed Site Investigation should be undertaken in order to determine fully the existing baseline conditions. These works will supply factual information on the ground conditions and the nature/extent of any contamination at the site. Should future site investigations find elevated concentrations of certain contaminants, appropriate remediation strategies will be required. Any mitigation measures required will have a specific design and installation process and will be clearly defined within the site remediation and enabling works strategy. If contaminants are localised within a certain area of a site, a hotspot removal process should be considered. A hotspot removal should be undertaken where the area of soils may be chemically validated to assess chemical suitability for retention on-site in an area of no future sensitivity.

10.7.8 Should asbestos containing material be identified onsite in future site investigations, impacted soils should be managed according to an asbestos risk mitigation conceptual site model to remove any future risk. An Options Appraisal and detailed Remediation & Enabling Works Strategy will be compiled specifying the mitigation measures designed to break the identified pollutant linkages. A summary of the remediation measures are presented below:

10.7.9 The mitigation measures to be presented in the Remediation and enabling works generally include:

- Prepare overview of contaminated land remediation requirements;
- Evaluate feasible remedial technologies;
- Assess the most-appropriate earthworks solution to ensure the delivery of the optimum development platform;
- Outline appropriate methodology to control the movement of materials within the site
- Outline measures to control dust and impacted soils
- Define validation criteria to demonstrate the successful implementation of a site remediation and enabling works plan;
- Outline requirements to mitigate potential effects of ground gas migration and the validation of implemented measures thereof
- Specify geotechnical engineering performance requirements; and
- Ensure the safe, cost-effective and regulatory compliant redevelopment of the site.

10.7.10 Prior to construction works commencing on site the Remediation Strategy will be submitted to the Local Authority and Environment Agency for approval.

10.7.11 In addition a CL:AIRE Declaration of Waste Code of Practise (DoWCoP) Materials Management Plan (MMP) will be completed to control the regulatory compliant movement of soils to the site and reuse of materials on site.

Measures for Inclusion in the CEMP

10.7.12 A Construction phase Environmental Management Plan (CEMP) will be prepared which will set out the methods contractors will be required to adopt as a minimum.

10.7.13 The CEMP will include quality control procedures to be employed by contractors for the import and export of materials to and from the site. Methods for controlling surface water run-off and dust and measures to remove contaminated materials off-site to licensed treatment or disposal sites, will also be detailed.

10.7.14 Such measures will include the location of and protection of stockpiles, setting of speed limits for construction traffic and the damping down of haul roads and stockpiles during dry weather.

10.7.15 Should the presence of previously unidentified contaminated material be identified during excavation works, work will cease until the material has been characterised and appropriate measures to treat or dispose of contaminated materials have been identified.

10.7.16 Measures will be undertaken to reduce the amount of water entering excavations so as to minimise dewatering activities. Should de-watering be required, the Environment Agency will be consulted and appropriate abstraction and discharge licenses will be obtained if necessary. Prior to disposal to surface water bodies, water will be treated to ensure it meets appropriate water quality standards.

10.7.17 During the works, the risk associated with construction workers can be managed through good hygiene and personal protective equipment (PPE) provision.

10.7.18 Where soils are exposed at the surface and if contaminated soils are encountered (albeit unlikely) then it may be necessary for site operatives to utilise PPE should as gloves and overall to prevent dermal contact.

10.7.19 If asbestos fibres are identified within any Made Ground deposits during the works then additional dust control measures, such as burying impacted soil at depth, may be required to prevent asbestos fibres being generated. These types of control measures as specified within CIRIA 733 Asbestos in soil and made ground: a guide to understanding and managing risks (Ref 10.13). Additional measures such as boundary dust monitoring may be completed to demonstrate that dust/fibres have not been released or that additional dust suppression is required.

10.7.20 Where any ground gas risk is confirmed the structural design will be modified to include mitigation measures as outlined in the Remediation Strategy. The Remediation Strategy should outline the validation protocol to confirm the mitigaton measures have been suitably installed during the works.

10.7.21 Fuel storage requirements would also be addressed within the CEMP. The storage of fuels is controlled by the Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref 10.14) which requires all fuel storage facilities over 250ltrs to be provided with adequate bunding in

order to prevent spillages. Furthermore, it will be necessary to ensure that all fuel storage facilities are located away from the on-site watercourse.

10.7.22 The CEMP would also specify the circumstances in which it would be necessary to employ the use of an on-site wheel cleaner or off-site road sweeper to remove debris.

Minerals

10.7.23 In relation to minerals, any cut/fill works required to establish design levels will utilise the benefits of sand and gravels. Where any oversized gravels (not conforming to regulatory grading) can be segregated, crushed down if required to maximise the optimal use of all materials encountered during the works.

10.7.24 Where found in excess and where suitable sands can be used in the construction process as a building material. Where excess soils are generated from the development these can be recovered and transferred to a permitted facility that can provide to the industry as suitable materials on a large scale where appropriate to do so.

Soil Resources and Management Plan

10.7.25 The residual effect of the land loss of land for housing development cannot be mitigated. However, some soil functions can be maintained on vegetated open space set aside for recreation use and reinstated soil used for landscaped areas and gardens. Excess soil can be exported for beneficial use (e.g. for landscaping, land restoration) soil function of the exported soil can also be maintained and provide a betterment elsewhere.

10.7.26 A Materials Management Plan (MMP) will be secured by planning conditions and approved by Wrexham County Borough Council and CL:AIRE prior to the commencement of construction. The EA will also be consulted to confirm compliance with their requirements. The MMP will be implemented during construction and will include a Soil Resource and Management Plan (SRMP). Guidance in Defra, (2009), Construction Code of Practice for the Sustainable Use of Soils on Construction Sites should be followed. This includes prior to construction commencing the SRMP being produced by a suitably qualified person to quantify the soil resources, particularly the sand, gravel and topsoil resource on the site and compare this with the quantity required for landscaping areas of the site. Every effort should be made to find off-site uses for excess soil, particularly excess topsoil, sand and gravel, identified in the SRP. Off-site uses can include in landscaping or in restoration of land for agricultural, forestry or amenity use if there is a deficit of soil on the site. The SRMP will identify soil units and grade (1, 2 3a and 3b) from which soil should be managed separately and specify stripping depths for topsoil and any subsoil requiring stripping along with soil stripping, storage and reinstatement methodologies to minimise loss of soil function. Prior to soil stripping the area should be soil sampled and analysed for plant nutrient content. Low nutrient content topsoils have a use for e.g. on areas where establishing species rich meadows is proposed.

10.7.27 Prior to commencement on site a cut/fill drawing should be produced by a competent person to minimise the over excavation or creation of any unnecassary excess or sand and gravel during the works. A spoil management plan to accompany this drawing would quantify the materials generated as part of each process during the build phase and provide an overall figure for estimated shortfall/excess to better manage the soils use on site.

Operational Development

10.7.28 The likely hardcover development will provide sufficient mitigation against direct dermal contact or ingestion of impacted soils without the need for additional mitigation. Within the landscaped areas a cover system of clean sub-soil and topsoil should be provided to prevent exposure of any impacted soils at the surface.

10.7.29 The desk based Report (Appendix 10.1) has identified that ground gas may be present and that this may pose a risk to the Proposed Development. Ground Gas Monitoring will need to be completed throughout the site as part of the detailed design to inform the requirements for gas protection measures. Currently, a potential risk has been identified during desk based assessment. Should intrusive investigation identify a risk then mitigation measures will be defined in the remediation strategy to prevent gas migration as specified within BS 8485:2015 Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.

10.8 Residual Effects

Construction Phase

10.8.1 The following tables show the residual environmental effects from the construction phases.

Table 10.10: Summary of Residual Effects – Construction Phase

Nature of Impact	Receptor	Sensitivity	Impact Magnitude	Significance of Effect	Mitigation	Residual Significance of Effect
Demolition and Ground Works associated with Construction Phase	Human Health	High	Minor (adverse)	Slight	Asbestos survey / monitoring / PPE / CEMP / Control measures in Remediation Strategy	Negligible
Fuel Storage	Controlled Waters – Underlying Aquifer	Low	Minor (adverse)	Slight	Storage as per measures in CEMP / Remediation strategy	Negligible

	Human Health	High	Minor (adverse)	Slight		
Contact with contaminated Soils	Controlled Waters – Underlying Aquifer	Low	Moderate (adverse)	Slight	Removal from Site / Remediation strategy	Negligible
	Human Health	High	Major (adverse)	Large	Hardstanding / soft standing cover system / Remediation Strategy / removal from site	Negligible
Export Materials from Site	Human Health (during excavation and transport)	High	Minor (adverse)	Slight	Waste legislation / CL:AIRE DoWCoP MMP/ CEMP	Negligible
	Human Health (long term on site)	High	Negligible	Neutral		Negligible
Import of Materials / Stockpiles	Human Health	High	Minor (adverse)	Slight	Waste legislation / CL:AIRE DoWCoP MMP / CEMP	Negligible
	Controlled Waters – River Clywedog	Medium	Minor (adverse)	Slight		
Excavations, Earthworks and Installation of Foundation Structures	Controlled Waters – Underlying Aquifer	Low	Moderate (adverse)	Slight	CEMP / Remediation strategy	Negligible
	Human Health	High	Minor (adverse)	Slight - Moderate		Negligible
Minerals Sterilisation	Sand and Gravel Resource (up to 40 ha)	High	Major (adverse)	Large	MMP/SRMP Potential re-use on site as building material or transferred for use off-site.	Large
Soil loss	Soil ALC Grade 1 (3.4ha) loss	Very High	Minor (adverse)	Large	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration.	Moderate

	Grade 2 (22.5 ha)	Very High	Major (adverse)	Very Large	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration. Some of an area identified for Strategic Open Use is likely to be Grade 2 land. Soil not likely to be stripped from this area and land quality maintained.	Large
	Subgrade 3a (37.1 ha)	High	Major (adverse)	Very Large	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration. Some Subgrade 3a land in the SW of the site is identified for Public Open Use. Soil not likely to be stripped from this area and land quality maintained.	Large
	Subgrade 3b (6.1 ha)	Medium	Moderate (adverse)	Moderate	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration.	Slight
	Grade 4 (1.6 ha)	Low	Minor (adverse)	Slight	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration.	Slight

	Non-agricultural (6.8 ha)	Negligible	Negligible	Neutral	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration.	Neutral

10.8.2 Following mitigation in accordance with the E3P Remediation Strategy (to be completed), CL:AIRE DoWCoP, Construction Phase Environmental Plan the residual risk from ground condition issues will be negligible.

Operational Phase

10.8.3 The overall impact of the proposal in terms of ground conditions issues during the operational phase is highlighted in the table below:

Table 10.11: Residual Significance of Effect - Operation Phase

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Mitigation	Residual Significance of Effect
Exposure to sub-surface surface contamination	Human Health	Negligible	Negligible	Hardstanding / soft standing cover system,	Negligible
Ingress of ground gas/radon	Human Health	Minor (negative)	Minor Adverse	Completion of ground gas monitoring throughout the site (Mitigation measures where identified)	Negligible
Storage of chemicals	Human Health	Negligible	Negligible	Storage in line with legislation	Negligible
	Controlled Waters	Negligible	Negligible		Negligible

10.9 Summary

10.9.1 In respect to ground conditions and minerals, it is not considered that development at the subject Site would contribute to a significant effect in the surrounding area.

10.9.2 Currently there is a limited potential for significant pollutant sources at the site and ultimately the short and long terms risks can be managed in the event that low level impact is identified

in localised areas of the site. The potential for gross contamination and significant effects is therefore considered low.

10.9.3 In the application of a development at the site there will some unavoidable loss in terms of soil quality and minerals that would be covered over (sterilised); however, their loss should be considered in the local context, in which mineral reserves and BMV agricultural land are abundant and the need for the development has been determined by Wrexham CBC to outweigh the importance of the land through the draft allocation of the site.

10.9.4 It is expected that the potential isues can be managed in accordance with remediation strategy, CEMP, MMP, SRMP and generally good practice on site.

11 Drainage and Water Quality

11.1 Introduction

11.1.1 This chapter reports the outcome of the assessment of likely significant effects arising from the proposed development at Lower Berse Farm (Ruthin Road), upon the water environment. The focus is on the likely significant environmental effects on flood risk, drainage and water quality during construction and operation with an emphasis on the construction phase flood risk and impact of the development on nutrient neutrality. It must be noted that flood risk during the operational phase of the site is scoped out and will not be considered within this chapter.

11.1.2 This chapter describes the assessment methodology and the baseline conditions relevant to the assessment. Furthermore, it presents a summary of the likely significant effects leading to the additional mitigation measures required to avoid, prevent, reduce or, if possible, offset any likely significant adverse effects, and the likely residual effects and any required monitoring after these measures have been employed. Opportunities for environmental enhancement, where such opportunities exist, are also discussed.

11.1.3 This chapter should be read in conjunction with the following technical appendices:

- Appendix 11.1: Flood Consequences Assessment (FCA) and Surface Water Drainage Strategy prepared by Waterco, and
- Appendix 11.2: Nutrient Neutrality Assessment prepared by WSP.

11.1.4 This chapter has been prepared by WSP, who have extensive experience in preparing environmental statement chapters for the water environment, for a range of scenarios, including residential developments..

11.2 Planning Policy Context

Planning Policy Wales

11.2.1 Planning Policy Wales[1] sets out the land use planning policies of the Welsh Government and is supplemented by a series of Technical Advice Notes. Planning Policy Wales encourages local planning authorities to take a holistic approach in managing flood risk within a catchment. This should be achieved through the precautionary approach of steering new developments away from areas of high risk of flooding to low risk areas. Development proposals should therefore seek to reduce, and not increase, flood risk arising either from fluvial and/or tidal flooding or from surface water flooding.

11.2.2 Planning Policy Wales also recognises that not all development can be sited in low flood risk areas and sets out the agenda for development proposals in areas defined as being of high flood hazard. Appropriate mitigation measures should be considered to reduce the flood risk to the development and to other neighbouring developments. Section 6.6 of Planning Policy Wales relates to water and flood risk and is summarised beneath:

Flood Risk

11.2.3 Planning authorities should adopt a precautionary approach of avoidance of development in areas at risk of flooding from the sea or rivers, and surface water flooding will affect choice of location and design. Furthermore, the risk of all types of flooding should take into account possible future climate change.

11.2.4 Developments should in no circumstance increase flooding from rivers or sea and should aim to reduce risk. In areas where the floodplain is currently undeveloped and unobstructed only essential transport and utilities infrastructure is permitted.

11.2.5 A development should not cause an increase in run-off, which can be achieved by the use of Sustainable Drainage Systems (SuDS). However, in areas of shallow groundwater or where flooding may be caused by combined surface and groundwater processes, direct infiltration SuDS may not be appropriate.

Drainage and Sewerage

11.2.6 New developments of more than one dwelling or where the area covered by construction work exceeds 100m^2 require approval from the SuDS Approval Body (SAB).

11.2.7 Developments in sewered areas must connect foul drainage to the main sewer and sewers should be built to Welsh government standards. Lack of capacity or plans to improve capacity in the sewer is not a valid reason for a sewerage undertaker to refuse connection under Section

[1] Planning Policy Wales (2024). Accessed online: Planning Policy Wales - Edition 12 (gov.wales)

106 of the Water Industry Act 1991 and Natural Resources Wales (NRW) may refuse to issue an environmental permit for private treatment in such circumstances. Furthermore, NRW may refuse an environmental permit for private treatment[2].

11.2.8 Developments proposing the use of non-mains drainage schemes will only be considered acceptable where connection to the main sewer is not feasible, which is set out in the Welsh Government Circular 008/2018: Planning requirement in respect of the use of private sewerage in new development, incorporating septic tanks and minor sewage treatment plants.

Water Supply

11.2.9 New development should be located and implemented with sustainable provision of water services in mind, using design approaches and techniques which improve water efficiency and minimise adverse impacts on water resources, including the ecology of rivers, wetlands and groundwater and thereby contributing towards ecological resilience.

Technical Advice Note 15: Development and Flood Risk

11.2.10 Technical Advice Note 15 (TAN15)[3] provides technical guidance which supplements Planning Policy Wales in relation to development and flood risk. Specifically, it provides a precautionary framework within which risks arising from both fluvial and tidal flooding, and from additional runoff from development in any location, can be assessed. The overarching aim of the precautionary framework is, to direct new development away from those areas which are at high risk of flooding.

11.2.11 Where development has to be considered in high risk areas (Zone C) only those developments which satisfy the Justification Test are to be located within such areas.

11.2.12 TAN15 is supported by Development Advice Maps (DAMs). These maps are broadly based on the NRW's flood outline and the British Geological Survey (BGS) drift data, showing the different designated flood zones according to the flood risk associated with them. The different flood zones are summarised in Table 11.1 below:

Table 11.1: TAN15 DAM Flood Zones

Description	Zone	Suitable Use
Considered to be at little or no risk of fluvial or tidal/coastal flooding.	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.

[2] Planning Policy Wales, Development in Sewered Areas, Paragraph 6.6.20. Accessed Online: https://gov.wales/sites/default/files/publications/2021-02/planning-policy-wales-edition-11_0.pdf

[3] Technical Advice Note, 15: Development and Flood Risk. Accessed Online: https://gov.wales/sites/default/files/publications/2018-09/tan15-development-flood-risk.pdf

Areas known to have been flooded in the past evidenced by sedimentary deposits	B	Used as part of a precautionary approach to indicate where site levels should be checked against extreme (0.1%) flood level. If site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider flood risk further.
Based on Environmental Agency extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)	C	Used to indicate that flooding issues should be considered as an integral part of decision by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.
Areas of the floodplain without significant flood defence infrastructure.	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

11.2.13 TAN15 recognises that flooding consequences may not be acceptable for particular types of development. A precautionary framework is promoted that considers different types of development in terms of their vulnerability as summarised in Table 11.2 below.

Table 11.2: TAN15 Vulnerability Classifications

Category	Type
Emergency services	Hospitals, ambulance stations, fire stations, police stations, coastguard stations, command centres, emergency depots and buildings used to provide emergency shelter in time of flood.
Highly vulnerable development	All residential premises (including hotels and caravan parks), public buildings (e.g., schools, libraries, leisure centres), especially vulnerable industrial development (e.g., power stations, chemical plants, incinerators), and waste disposal sites.
Less vulnerable development	General industrial, employment, commercial and retail development, transport and utilities infrastructure, car parks, mineral extraction sites and associated processing facilities, excluding waste disposal sites.

11.2.14 Section 6 of TAN15 states that new development should be directed away from DAM Zone C and towards suitable land in Zone A, otherwise to Zone B; and that new development should only be permitted within Zones C1 and C2 if determined by the local planning authority to be justified in that location. However, TAN15 also recognises that much urban development in Wales has taken place in areas that are at risk of fluvial and tidal flooding and that it is therefore inevitable, despite the overall aim to avoid flood risk areas, that some existing development will be vulnerable to flooding and fall within Zone C. It states that some flexibility is therefore necessary to enable the risks of flooding to be addressed whilst recognising the negative economic and social consequences if policy were to preclude investment in existing urban areas, and the benefits of reusing previously developed land.

11.2.15 Section 6 of TAN15 therefore states that:

"Development, including transport infrastructure, will only be justified if it can be demonstrated that:

- *Its location in Zone C is necessary to assist, or be part of, a local authority regeneration initiative or a local authority strategy required to sustain an existing settlement; or,*
- *Its location in Zone C is necessary to contribute to key employment objectives supported by the local authority, and other key partners, to sustain an existing settlement or region;*

and,

- *It concurs with the aims of Planning Policy Wales and meets the definition of previously developed land; and,*
- *The potential consequences of a flooding event for the particular type of development have been considered, and in terms of the criteria contained in Sections 5 and 7 and Appendix 1 [of TAN15] found to be acceptable."*

11.2.16 Section 8 of TAN15 states that surface water drainage from developments can, if not properly controlled, significantly increase the frequency and size of floods associated with watercourses that receive surface water drainage, as well as risks directly associated with overland flow. TAN15 promotes the use of Sustainable Drainage Systems (SuDS) as a means of managing surface water from developments and states that these should be implemented where possible.

Wrexham Local Development Plan 2013 – 2028

11.2.17 Relevant key issues which have informed the plan and future policies are listed below:

1. Make provision to increase housing delivery after a period of under-delivery and meet requirements for a 5 year land supply;
2. Provide accessible housing to meet the identified needs of the local population including the needs of an ageing population, providing affordable and market housing and gypsy and traveller accommodation;
3. Balance housing and economic development while maintaining and enhancing local biodiversity /geodiversity, landscape and tree conservation interests; and
4. Dealing with the impact of climate change through adaptive planning e.g. locating new development away from areas of known flood risk.

Policy SP18: Climate change

11.2.18 To mitigate against the effects of climate change and adapt to its impacts, development proposals will need to demonstrate that they have taken into account the following:

6. Avoiding areas susceptible to flood risk in the first instance in accordance with the sequential approach set out in national guidance. Highly vulnerable development, as defined in TAN15: Development and Flood Risk, should not be located within zone C2;
7. Preventing development that increases flood risk; and
8. Assesses the potential effects of climate change when preparing a Flood Consequence Assessment for the site.

Policy DM1: Development Management Considerations

11.2.19 Development proposals, where relevant, must:

3. Safeguard the environment from the adverse effects of pollution of water, land, light or air, or land instability, arising from development;
8. Not increase the risk of flooding but make adequate provision for sustainably dealing with foul and surface water drainage and not result in an unacceptable impact upon the water environment.

Policy NE6: Waste Water Treatment and River Water Quality

11.2.20 All new development will only be supported where there is no adverse impact on the integrity of the River Dee and Bala Lake SAC, in particular through the treatment of wastewater.

11.2.21 To ensure no adverse effect on the integrity of the River Dee and Bala Lake SAC, development creating waste water discharges will be required to demonstrate there is no increase in phosphorus levels in the SAC.

11.2.22 This can be achieved through implementation of mitigation measures and associated supplementary planning guidance. Mitigation will involve, either: i. Delivery of measures specified in the Dee Catchment Phosphorus Reduction Strategy (DCPRS), which will require: a) Developer contributions/community infrastructure levy funds to deliver measures identified within the DCPRS to reduce phosphorus levels within the catchment; b) Phasing of development to meet the delivery milestones within the DCPRS, and delaying development if milestones have not been met; OR ii. Using alternative mitigation approaches to those mentioned in 1. above. Where further evidence demonstrates that adverse effects on the integrity of the River Dee and Bala Lake SAC can be avoided using alternative mitigation, these must be agreed with the Council, in consultation with Natural Resources Wales.

The Dee Catchment Phosphorus Reduction Strategy

11.2.23 The Dee Catchment Phosphorus Reduction Strategy[4] has been developed jointly by WCBC and Flintshire County Council in consultation with NRW. It notes that reliance on the existing total phosphorus (TP) permit limits at wastewater treatment works (WWTW) in the Dee catchment could not ensure that there would be no adverse effect to the integrity of the River Dee Special Area of Conservation (SAC) from new development proposed in the Wrexham and Flintshire Local Development Plans (LDPs).

11.2.24 The Councils subsequently developed the Dee Catchment Phosphorus Reduction Strategy (DCPRS) to outline how new development could be delivered whilst achieving no net increase in phosphorus impacts to the Dee catchment. The DCPRS requires that new developments must achieve phosphorus neutrality before planning approval can be granted.

Water Framework Directive Regulations

11.2.25 The overall objective of the Water Framework Directive (WFD) is to bring about the effective coordination of water environment policy and regulation across Europe.

11.2.26 The WFD is underpinned by the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 [5] and the Groundwater (Water Framework Directive) (Wales) Directions 2016[6].

11.2.27 The main aims of the legislation are to ensure that all surface water and groundwater reaches 'good' status (in terms of ecological and chemical quality and water quantity, as appropriate), promote sustainable water use, reduce pollution and contribute to the mitigation of flood and droughts.

11.3 Approach

Assessment Methodology

11.3.1 An EIA Scoping Report was submitted in 2022. This section explains how the scope of the assessment has developed, based on the following methodology:

- Desk study and inspections of the site and its surroundings to establish baseline conditions, including the determination of the sensitivity of these conditions.

[4] Dee Catchment Phosphorus Reduction Strategy (2021). Accessed online: https://www.flintshire.gov.uk/en/PDFFiles/Planning/Examination-Library-Documents/FCC/FCC031-Phosphate-Strategy.pdf

[5] The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 . Access online: https://www.legislation.gov.uk/uksi/2017/407/contents/made

[6] The Groundwater (Water Framework Directive) (Wales) Directions 2016. Access online: https://gov.wales/groundwater-water-framework-directive-wales-directions-2016

- Analysing the hydrological features surrounding the redline boundary to determine the extent that this chapter of the environmental statement considers.
- Evaluation of the potential effects of the proposed development and the effect these could have on the water resources and flood risk baseline conditions;
- Evaluation of the significance of these effects through consideration of the sensitivity of conditions and determine the magnitude of the effects (adverse and beneficial);
- Identification of possible measures to help avoid and mitigate against any potential adverse effects resulting from the Proposed Development; and
- Identification of residual effects following the implementation of mitigation measures

Significance Criteria

11.3.2 The significance level attributed to each effect has been assessed based on the sensitivity of the affected receptor(s) and the magnitude of impacts arising from the proposed site.

11.3.3 Magnitude of change and the sensitivity of the affected receptor/receiving environment have been assessed by adapting the relevant tables within the Design Manual for Roads and Bridges (DMRB) Road Drainage and the Water Environment (LA 113 Revision 1). The DMRB provides guidance for appraising significance on potential effects that road projects may have on the water environment; Table 11.3 below describes the different importance of receptors.

Table 11.3: Sensitivity of receptors

Sensitivity of Receptor	Typical Criteria	Typical Examples
Very High	Nationally significant attribute of high importance	• Water Framework Directive (WFD) 'High' status. • Site protected / designated under EU or UK habitat legislation (Special Area of Conservation, Special Protection Area, Site of Special Scientific Interest, Ramsar site, salmonid water), or species protected by EC Legislation Ecology and Nature Conservation. • Source Protection Zone (SPZ) 1 (Inner Protection Zone) is defined as an area with a radius of over 50m and a travel time of 50 days or less from any point at or below the water table. • Groundwater supports a Groundwater Dependent Terrestrial Ecosystem. • Principal aquifer providing a regionally important resource and/or supporting a site protected under EC and UK Legislation protected site. • Emergency services or highly vulnerable development according to Planning Policy Wales development category. • Existing water supply or wastewater network with no availability / capacity

Sensitivity of Receptor	Typical Criteria	Typical Examples
High	Locally significant attribute of high importance	• WFD classification of 'Good'. • Species protected under EC or UK Legislation Ecology and Nature Conservation. • SPZ 2 (Outer Protection Zone) is defined as having a minimum radius of 250 or 500m, depending on the size of the abstraction. The defined travel time for SPZ 2 is 400 days from a point below the water table. • Groundwater supports a Groundwater Dependent Terrestrial Ecosystem. • Principal aquifer providing locally important resource or supporting a river ecosystem. • Highly vulnerable development according to Planning Policy Wales. • Existing water supply or wastewater network with very limited availability capacity
Medium	Moderate quality and rarity	• WFD classification of less than 'Good'. • Aquifer providing water for agricultural or industrial use with limited connection to surface water. • SPZ 3 (Total Catchment) is defined as the total area needed to support the abstraction or discharge from the protected groundwater source. • Less vulnerable development according to Planning Policy Wales. • Existing water supply or wastewater network with limited availability capacity
Low	Lower quality	• WFD classification less than 'Good' or not classified under WFD. • Unproductive strata (ground water). • Less vulnerable development according to Planning Policy Wales. • Existing water supply or wastewater network with availability / capacity.

Magnitude of Impact

11.3.4 The criteria used for determining the magnitude of impact are presented in Table 11.4.

11.3.5 For flood risk in relation to construction workers and future users / residents of the development, magnitude of effect rather than change is considered as those receptors are currently not affected and therefore 'change' is not applicable.

Table 11.4: Magnitude of change / impact on water receptors.

Level of Magnitude	Definition of Magnitude	Typical Examples
Major Adverse	Results in loss of attribute and/or quality and integrity of the attribute.	• Loss or extensive change to a fishery; • Loss or extensive change to a designated nature conservation site; • Loss of regionally important water supply; • Reduction in WFD classification; • High likelihood of pollution from solubles and sedimentation; • Loss of, or extensive change to, an aquifer; • Potential high risk of pollution to groundwater from routine runoff; • Loss or significant damage to major structures through subsidence or similar effects; and • Increase in peak flood level (>100mm).
Moderate Adverse	Results in effect on integrity of attribute, or loss of part of attribute.	• Partial loss in productivity of a fishery; • Degradation of regionally important public water supply or loss of major commercial/industrial/agricultural supplies; • Contribution to reduction in WFD classification; • Moderate likelihood of pollution from solubles and sedimentation; • Partial loss or change to an aquifer; • Potential medium risk of pollution to groundwater from routine runoff; • Damage to major structures through subsidence or similar effects or loss of minor structures; and • Increase in peak flood level (>50mm).
Minor Adverse	Results in some measurable change in attribute's quality or vulnerability	• Moderate likelihood of pollution from either solubles or sedimentation; • Minor effects on surface water supplies; • Potential low risk of pollution to groundwater from routine runoff; • Increase in peak flood level (>10mm)
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk	• Reduction in baseline pollution from either solubles or sedimentation; • Reduction of groundwater hazards to existing structures; • Reductions in waterlogging and groundwater flooding; and

Level of Magnitude	Definition of Magnitude	Typical Examples
	of negative effect occurring	• Creation of flood storage and decrease in peak flood level (>10mm).
Moderate Beneficial	Results in moderate improvement of attribute quality	• Reduction in baseline pollution from both solubles and sedimentation; • Contribution to improvement in WFD classification; • Improvement in water body catchment abstraction management strategy classification; • Creation of flood storage and decrease in peak flood level (>50mm).
Major Beneficial	Results in major improvement of attribute quality	• Removal of existing pollution from solubles and sedimentations; • Improvement in WFD classification; • Recharge of an aquifer; and • Creation of flood storage and decrease in peak flood level (>100mm).
Negligible / None	Very little change from baseline conditions. Change is barely distinguishable, approximating to a 'no change' situation.	• The proposed project is unlikely to affect the integrity of the water environment; • No change to water quality from solubles or sedimentation; • No measurable impact upon an aquifer and/or groundwater; and • Negligible change to peak flood levels (< +/- 10mm).

Significance of Effect

11.3.6 The combination of receptor sensitivity and magnitude of impact has been used to determine the significance of each effect by using the matrix in Table 11.5.

Table 11.5: Significance of Effects

Sensitivity of Receptor	Magnitude of Impact			
	Major	**Moderate**	**Minor**	**Negligible**
Very High	Major	Major	Moderate	Minor
High	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Minor	Negligible

Low	Minor	Negligible	Negligible	Negligible

11.3.7 Effects / changes that are described as ‘major’, or ‘moderate’ are determined to be significant; and effects that are described as ‘minor’ or ‘negligible’ are determined to be not significant.

Assumptions and Limitations

11.3.8 This assessment is limited to available desk-based information, with no Ground Investigation specific to the site having been undertaken to date.

11.3.9

11.4 Baseline Conditions

Watercourses

11.4.1 A review of Ordnance Survey mapping indicates that the proposed site has an unnamed ordinary watercourse that flows through the site. It enters the site via a culvert on the west of the site, flowing west to east before changing to a northerly direction and being culverted under the A525 at the boundary of the site, before flowing through Wrexham and into the River Dee.

11.4.2 The designation “main river” has legally been designated by NRW and they are normally the larger streams and rivers, to which the greatest risk of flooding of urban areas is associated. The nearest main river to the site is the River Clywedog, a tributary of the River Dee. It flows on average approximately 150m south from the southern boundary of the site from west to east. At its closest point to the site, it is approximately 20m away from its southwest corner. The River Clywedog has been given moderate status from NRW in the WFD Cycle 3 2021[7].

11.4.3 The site and both watercourses in its vicinity are within the Dee catchment, with the Dee designated as a Special Area of Conservation (SAC) due to its ecology, coastal and terrestrial features. The Dee catchment as a whole has been given an overall ‘moderate’ status by NRW in the WFD Cycle 3 2021[7]. The boundary of the River Dee freshwater catchment, which is designated as being of phosphorus sensitivity is outlined in the Dee Catchment phosphorus reduction strategy[6] and this includes the River Clywedog and the unnamed ordinary watercourse.

11.4.4 The River Clywedog is a main tributary to the River Dee and is located within the designated phosphorus sensitive SAC catchment. Due to it having a WFD status of ‘Moderate’ the River Clywedog is considered to have a **Medium** sensitivity.

11.4.5 The unnamed watercourse which runs through the site has been modified, with it being culverted under two roads in the vicinity of the site and then flowing through a heavily urbanised area. Due to this it has been assessed as having a **Low** sensitivity.

[7] Water Watch Wales Map. Accessed online: https://waterwatchwales.naturalresourceswales.gov.uk/en/

11.4.6 The River Dee catchment sustains abstractions for public and industrial water supply, supplying water for over 3 million people in Wales and northwest England. The Dee catchment is designated as a phosphorus sensitive SAC freshwater catchment and there are three separate Sites of Special Scientific Interest (SSSI)[8] within the catchment. Due to these reasons the Dee catchment has been assessed to have a **Very High** sensitivity.

Water Quality & Nutrient Neutrality

11.4.7 The site is within the Dee Water Protection Zone which requires consent for using or storing controlled substances within the zone. The Dee catchment has a known issue with high levels of phosphorus; the Dee Catchment Phosphorus Reduction Strategy outlines that 14 watercourses within the catchment do not achieve 'good' ecological status under the WFD because of phosphorus levels.

11.4.8 Phosphorus standards are used in managing the risk of adverse ecological impacts and where a new discharge is proposed, phosphorus standards can indicate whether or not the river is likely to be able to accommodate the additional inputs without significant risk of adverse ecological effects.

11.4.9 The current pre-development total phosphorus load for the site (based on existing land uses) has been calculated as 47.83 kgTP/yr.

11.4.10 Water quality in the River Clywedog and the Dee catchment as a whole underpins the River Dee's designation as an SAC and so the Dee catchment and the River Clywedog have been assessed as having a **Very High** sensitivity to Nutrient Neutrality.

Drainage and Sewer Infrastructure

11.4.11 The majority of the site is used for agricultural purposes and there is no record of a formalised drainage system at the site. The Dŵr Cymru Welsh Water (DCWW) sewer plan shows that a combined sewer runs from the north to the southeast of the proposed site before passing beneath Homestead Lane. There is a farm in the northwest corner of the site boundary; however, based on the DCWW plans it does not appear that this property is connected to the public sewer system.

11.4.12 The area around the site is served by the Five Fords Wastewater Treatment Works (WWTW) and the scoping opinion states that this has the capacity and associated phosphorus stripping facility to accommodate additional wastewater within the existing discharge consent, for development to come forward up until 2028. Based on this the sensitivity of the sewerage infrastructure is considered to be **Low.**

11.4.13 It is noted in the scoping opinion response that DCWW advised that connecting the development to Five Fords WWTW may cause an increase in phosphorus levels in the River Dee which has

[8] Dee Management Catchment Summary. Accessed Online: https://naturalresources.wales/media/3225/dee-management-catchment.pdf

the potential to significantly impact on the SAC. This is due to the WWTW only being currently capable of reducing phosphorous levels to 1mg/l. However, in August 2023, a DCWW policy statement confirmed that the existing phosphorus consent limit of 1mg/l requires tightening to 0.7mg/l by 31st March 2030, superseded the scoping opinion advise.

11.4.14 The impact of phosphorus levels on the SAC is addressed in the nutrient neutrality section of this chapter and the DCWW policy statement is included in Appendix 11.2 (the Nutrient Neutrality Assessment prepared by WSP).

Potable Water

11.4.15 The site is within the Alwen Dee Water Resource Zone (WRZ) which is supplied by two water treatment works, Alwen and Bretton. The Alwen Dee WRZ is projected to operate with a 2.1 Ml/d surplus in a dry year from 2025 to 2050, including approximately 5Ml/d for uncertainty[9].

11.4.16 Due to the large surplus the Alwen Dee Resource Zone has, potable water for the site is being assessed to have a **Low** sensitivity.

Flood Risk

11.4.17 NRW's flood map for planning indicates that the majority of the site is not at risk from fluvial flooding. A minor portion of the site is at medium and high risk to fluvial flooding. This is due to the flood risk relating to the ordinary watercourse which flows throughout the site[10].

11.4.18 According to NRW's flood map for planning there are small areas at high and medium risk to surface water flooding are distributed sporadically throughout the site.

11.4.19 The site is at an approximate elevation of 90mAOD situated around 9km away from the tidally influenced River Dee. Due to distance and the elevation, the site is most likely not at risk from tidal-influenced flooding.

11.4.20 The site is not within the NRW flood risk from reservoirs extent so has negligible risk of flooding from reservoirs.

11.4.21 BGS data indicate that the groundwater vulnerability of the bedrock and the superficial deposits found at the site are classified as medium. Furthermore, there is no record of groundwater flooding within the Dee Preliminary Flood Risk Assessment[11].

[9] Final Resources Management Plan (2019). Accessed online: https://www.dwrcymru.com/-/media/Project/Files/Page-Documents/Corporate/Environment/Water-Resources/Final-Water-Resources-Management-Plan-2019/Final-Water-Resources-Management-Plan-2019---Main-Technical-Report.ashx

[10] Flood Risk Assessment Wales Map. Accessed online: https://naturalresources.wales/flooding/check-your-flood-risk-on-a-map-flood-risk-assessment-wales-map/?lang=en

[11] Dee Preliminary Flood Risk Assessment. Accessed online: https://cdn.cyfoethnaturiol.cymru/media/689107/dee-pfra.pdf

Flood Risk Sensitivity

11.4.22 During the construction phase of the development the receptors will be construction workers which have been assessed as having a **Medium** sensitivity to flood risk. Local residents in the vicinity to the site are also receptors, they are assessed of having a **High** sensitivity to flood risk due to the lack of health and safety training compared to construction workers.

Geology and Hydrogeology

11.4.23 British Geological Survey GeoIndex data[12] indicate that the superficial deposits of the site are glacial till in its west and Glaciofluvial in its east. Nearby BGS boreholes agree with the GeoIndex dataset. The geology of the site is a mixture of the Pennine Lower Coal Measures Formation and the Etruria mudstone formation.

11.4.24 DEFRA's MAGIC Map Application[13] designates the bedrock formation of the site as a secondary A aquifer and the superficial deposits found at site as secondary undifferentiated.

11.4.25 The aquifers underlying the site are considered to be part of the Dee Carboniferous Coal Measures Groundwater waterbody under the WFD (GB41102G204800). Based on the Cycle 3 (2021) assessment, this waterbody has an overall status of Poor.

11.4.26 The site does not fall within a SPZ and based on the WFD classification of poor, the secondary aquifers underlying the site are considered to have a **Low Sensitivity.**

Baseline sensitivity summary

11.4.27 Table 11.6 shows the sensitivities of the receptors.

Table 11.6: Summaries of receptors and sensitivities.

Feature	Receptor	Sensitivity	Summary Reason
Surface Water Quality	River Clywedog	Medium	The Clywedog has an overall WFD status of 'Moderate'.
	Unnamed Watercourse	Low	This watercourse is not classified under the WFD.
Nutrient Neutrality	Dee Catchment	Very High	The River Dee is designated as a SAC and has known issues with phosphorus enrichment.
Groundwater quality	Secondary Aquifer underlying the site	Low	The bedrock and superficial deposits underlying the site are classified as secondary aquifers but are within a groundwater waterbody with a poor WFD status.
Water Infrastructure	Potable Water Supply	Low	There is currently a surplus of supply in the Alwen Dee Water Resource Zone.

[12] British Geological Survey Geoindex Onshore. Accessed online: https://mapapps2.bgs.ac.uk/geoindex/home.html

[13] DEFRA MAGIC Map Application. Accessed online: https://magic.defra.gov.uk/magicmap.aspx

Water Infrastructure	Sewerage Infrastructure	Low	The Five Fords WWTW has capacity within its discharge consent limit.
Flood Risk	Residents and users of local area	High	Residents/users of the surrounding areas might have limited or no awareness of flood risk; sensitivity of residents is the highest due to their presence overnight (sleeping accommodation).
	Construction workers	Medium	Flooding may affect construction workers, but their sensitivity is lowered as a result of a level of competence attained by construction workers through measures such as Health and Safety training and presence only during working hours in teams and the deployment of safe working practises.

Matters Scoped Out

11.4.28 The scoping opinion response from WCBC, which includes input from DCWW, NRW and the Welsh Government, advised what matters could be scoped out of the Environmental Statement.

11.4.29 Regarding impacts of the proposed development on flooding, the scoping opinion response states that:

> "*NRW have confirmed they agree the scoping proposal that flood risk, drainage and SuDS can be dealt with by detail assessment.*
>
> *"A relatively minor part of the site is located within Zone C2 therefore this will need to be given further consideration when preparing submissions to accompany a formal application. NRW have provided specific comments on this matter that the applicants may wish to take into account.*
>
> *"Given the limited extent of the site situated within the C2 zone it is reasonable to conclude that there is more than sufficient scope to ensure that residential development is located outside of that area. Indeed, dwellings would need to be situated outside of the C2 zone to comply with Technical Advice Note 15.*
>
> *Taking the above into account, it is considered unlikely that the proposals will give rise to significant environmental impacts associated with flood risk and as such this matter should not fall within the scope of the Environmental Statement".*

11.4.30 Consider this scoping opinion response, impacts on flood risk during the operational phase of the proposed development will not be considered in this chapter of the ES. Appendix 11.1 presents a Flood Consequence Assessment (FCA) for the proposed development, which addresses how the proposed development will comply with flood risk regulations and demonstrates that there will not be changes in flood risk.

11.4.31 The scoping opinion response also stated that "*surface water drainage considerations are not considered to be significant in EIA terms, with potential impacts being either at site level or the immediate locality*." Therefore, impacts of the development on the existing surface water drainage infrastructure have been scoped out.

11.4.32 Regarding hydrogeology, as the proposed development site is not located within a source protection zone, no significant effects on public water supplies are anticipated and will not be considered further within the ES.

11.5 Embedded Mitigation

11.5.1 This section describes those mitigation measures which have been 'embedded' into the development through an interactive process of assessment and redesign. In particular, this section reflects measures that have been incorporated into the parameters plans or other assessment parameters that will be automatically incorporated into any forthcoming planning permission by way of the approval of submitted plans. Embedded mitigation does not include any measures that must be secured through planning conditions/obligations, management plans or further survey.

Demolition and Construction

11.5.2 The early provisioning of temporary and the permanent SuDS infrastructure during the construction of each phase of the project will serve as mitigation function within the demolition and construction phase. SuDS will slow the transportation and store surface water in high intensity rainfall events. SuDS will also improve runoff water quality by reducing contaminants through settlement or biological breakdown of pollutants, improving surface water quality discharged to watercourses in the vicinity of the site.

Operational

Flood Risk

11.5.3 The flood risks to the site are considered in the FCA (Appendix 11.1), which assesses all forms of flood risk to the site and details the surface water drainage strategy which has been developed based upon SuDS principles. It has been assumed for the purposes of this assessment that these drainage principles will be adhered to during the detailed design process.

11.5.4 The FCA demonstrates compliance with the planning policies in that all forms of flood risk to the site and the surrounding catchment do not increase as a result of the scheme. The FCA details

the mitigation techniques required for the Scheme, which include situating residential dwellings outside of Flood Zone C2 to comply with TAN15. These measures will ensure that there is no risk of flooding to the development or any increases in risk to the wider catchment.

SuDS

11.5.5 Infiltration is variable across the site, dictating where and which SuDS will be installed. Appropriate SuDS will be provided for a modelled 1 in 100 year plus 40% climate change rainfall event with preference being attenuation ponds which will be distributed across the site. Other forms of SuDS including permeable paving on private driveways and swales will also be utilised as appropriate. Although the drainage strategy is submitted in outline and the precise drainage details are to be determined at the reserved matters stage, compliance with the above objectives for surface water attenuation has been assumed in this assessment.

Surface Water Flow Paths

11.5.6 Where feasible, infiltration techniques will be used in the form of individual property soakaways and permeable paving on private driveways. Where infiltration techniques are not viable due to ground conditions, surface water runoff will discharge to the unnamed watercourse crossing the site and the River Clywedog.

Water Quality

11.5.7 The drainage strategy proposes that runoff from roofs and roads will be directed to swales and attenuation ponds to provide two stage SuDS treatment. The use of swales and ponds in series will improve runoff water quality by reducing contaminants through settlement or biological breakdown of pollutants.

Foul Drainage and Nutrient Reduction

11.5.8 A combined sewer runs from the north to the southeast of the proposed site before passing beneath Homestead Lane. Foul sewerage would discharge to this sewer and be conveyed to Five Fords WWTW. Five Fords WWTW currently has a total phosphorus discharge limit of 1.0mg/l.

11.5.9 A policy statement from DCWW in August 2023 confirmed that the existing phosphorus consent limit of 1mg/l requires tightening to 0.7mg/l by 31st March 2030. This policy statement is included in Appendix 11.2 (the Nutrient Neutrality Assessment prepared by WSP).

11.6 Potential Effects

11.6.1 This section sets out the potential effects of the development on the basis of the assessment parameters plans and assumes the inclusion of embedded mitigation as set out in the preceding section.

Construction Phase

Flood Risk – On-Site

11.6.2 Surface water and fluvial flooding, especially after extreme rainfall events, present a potential risk to workers onsite. This is particularly relevant for works within the floodplain, excavations which have the potential to fill with water and for areas that are at high risk of surface water or fluvial flooding. In addition, construction of the proposed development will lead to the introduction of impervious surfaces, compaction of ground and a potential reduction in permeable area through the temporary siting of the contractor's compound and storage areas. This would temporarily reduce infiltration, increase surface water runoff, and potentially increase flood risk across the development site and in the surrounding area.

11.6.3 The topography of the site will change during site preparation, earthworks, and construction. The re-profiling of the land has the potential to change the rate and direction of surface water flows within the site area. Existing overland flow paths could be diverted, terminated and new flow paths could be created during construction. The placement or stockpiling of materials may also influence where surface water collects and flows. This has the potential to alter the rate and volume of water entering local watercourses and surface water features.

11.6.4 The early provisioning of temporary and the permanent SuDS infrastructure during each construction phase will be ensured so it can serve as an embedded mitigation function within the demolition and construction phase. SuDS will slow the transportation of and store surface water in high intensity rainfall events.

11.6.5 The sensitivity of construction workers is considered to be **Medium,** and the magnitude of the effect prior to actionable mitigation, is considered to be **Moderate Adverse.**

11.6.6 The change in risk of flooding at the site is considered **Local**, **Unlikely** to occur and the magnitude of impact is considered to be **Negligible**.

11.6.7 As this possible effect will only occur during the duration of the construction phase it has been classified as **Short Term** and **Temporary.**

Flood Risk – Off-Site

11.6.8 Existing overland flow paths could be diverted, terminated and new flow paths could be created during construction. The placement or stockpiling of materials may also influence where surface water collects and flows. This has the potential to alter the rate and volume of water entering local watercourses and surface water features offsite.

11.6.9 The residents and users of the surrounding areas are further away from the site than the construction workers and would therefore experience a lesser magnitude of effect compared to the construction workers.

11.6.10 The sensitivity of residents and users is considered to be **High**, and the magnitude of the effect prior to actionable mitigation, is considered to be **Minor Adverse**. This is a lower magnitude than the construction workers would experience, due to the increased distance of these receptors from the site.

11.6.11 The change in the risk of flooding to the areas surround the site is considered **Local**, **Unlikely** to occur and the magnitude if impact is assessed to be **Negligible**.

11.6.12 As this possible effect will only occur during the duration of the construction phase it has been classified as **Short Term** and **Temporary**.

Surface Water Runoff

11.6.13 There will be a number of activities during the construction phase that will disturb the ground and potentially result in increased sediment and pollutants in surface water runoff and subsequently the water environment.

11.6.14 These activities include:

- Movement and use of static and mobile plant/construction vehicles such as excavators, dumper trucks, hydraulic breakers and haulage trucks;
- Materials handling, storage, stockpiling, spillage and disposal;
- Bulk earthworks to ground formation levels;
- Construction of drainage features; and
- Installation of infrastructure, roads and haul routes.

11.6.15 These construction activities, in particular vehicle movements within the site, will lead to the disturbance and mobilisation of physical contaminants, which may result in increased suspended sediment loads in surface waters, especially during periods of heavy rainfall. During periods of dry, windy weather, wind-blown dusts generated by ground excavation and earthworks may indirectly enter surface water bodies on and offsite. Elevated suspended sediment loads in surface waters could potentially lead to effects, such as increased turbidity and a reduction in dissolved oxygen, and subsequently a degradation in water quality.

11.6.16 Additionally, surface water runoff from the construction site could potentially carry elevated concentrations of soluble contaminants and any accidental spillage of fuel, cement / concrete products or chemicals that could enter surface waters within or nearby the study area.

11.6.17 During the construction phase there is also the potential for pollutants to impact the secondary aquifers underlying the site if foundation piling or temporary excavations extend below the groundwater table and provide a pathway for pollutants into the aquifers.

11.6.18 The early provisioning of temporary and the permanent SuDS infrastructure during each construction phase will be ensured so it can serve as an embedded mitigation function to increase the quality of runoff.

11.6.19 There are multiple receptors in the vicinity of the site. Firstly, an unnamed watercourse which has been assessed as having a **Low** sensitivity to a change in water quality due to its size and because it is heavily modified. Due to the unnamed watercourse flowing through the site the magnitude of the effect has been assessed to be **Moderate**.

11.6.20 Secondly, the River Clywedog which is classified as a main river by NRW flows outside the site boundary but at its closest only 20m away from the southern site boundary. Due to this the magnitude of the effect has been assessed as being **Moderate.** The River Clywedog is assessed as having a **Medium** sensitivity to a change in water quality due to its current natural state and its WFD classification of 'Moderate'.

11.6.21 The secondary aquifers underlying the site are considered to have a **Low** sensitivity to changes in water quality as they form part of the Dee Carboniferous Coal Measures groundwater body which had an overall WFD status of poor. The magnitude of impact on the underlying secondary aquifers is considered to be **Moderate**.

11.6.22 The risk to both watercourses and the underlying secondary aquifers is considered **Local** and **Likely** to occur.

11.6.23 As this possible effect will only occur during the duration of the construction phase it has been classified as **Short Term** and **Temporary**.

11.6.24 Due to the reasons stated above, the significance of the environmental effect on the unnamed watercourse and the secondary aquifers is assessed to be **Negligible** and for the River Clywedog it has been assessed to be **Moderate.**

Operational Phase

Surface Water Runoff

11.6.25 There will be an increase in the impermeable area in the operational phase of the site compared to the pre-construction or construction phase. This will reduce overall infiltration and increase the amount of runoff. Furthermore, regular vehicle use for accessing the properties at the site will increase pollutants found in runoff.

11.6.26 Swales, depending on the ground conditions, will drain into attenuation ponds (providing two stage SuDS treatment), improving runoff water quality by reducing contaminants through settlement or biological breakdown of pollutants.

11.6.27 As described in the construction phase effects, there are two watercourses in the local area, the River Clywedog which has been assessed as having a **High** sensitivity and an unnamed watercourse which is assessed as having a **Low** sensitivity to a change in water quality from surface water and are both considered to be **Local**.

11.6.28 Magnitude for both surface water receptors (the River Clywedog and the unnamed watercourse) is assessed to be **Negligible** due to the embedded mitigation that will be present in the surface water drainage strategy such as the inclusion of SuDS features.

11.6.29 The secondary aquifers underlying the site are assessed as having a **Low** sensitivity to changes in water quality as they are part of Dee Carboniferous Coal Measures groundwater body which had an overall WFD status of poor.

11.6.30 The proposed use of infiltration and soakaways to manage surface water runoff from the development could impact the water quality of the underlying secondary aquifers. Considering the embedded mitigation of the SuDS strategy, which proposes two stages of treatment, the magnitude of effect for changes in water quality impacting the aquifers is assessed to be **Minor.**

11.6.31 Due to the lifetime of the development, effects on both watercourses and the underling aquifer have been assessed to be **Medium Term** and **Permanent**. Due to the embedded mitigation, the effects on both watercourses and the underlying aquifers are considered **Unlikely** to occur and have a slight adverse effect on the environment.

11.6.32 Due to the reasons stated above, the significance of impact on the River Clywedog, the unnamed watercourse and the underlying aquifer is assessed to be **Negligible**.

Foul Sewerage and Nutrients

11.6.33 The proposed development would discharge foul flows into the existing DCWW system, with a connection to the local WWTW at Five Fords. This WWTW discharges treated effluent into the River Clywedog downstream of the proposed development, which thereafter drains into the River Dee.

11.6.34 The treated effluent discharged from the site via Five Fords WWTW into the River Clywedog will lead to an increase in the phosphorus load generated by the site compared to the baseline scenario. Whilst the current phosphorus consent limit at Five Fords WWTW is 1mg/l, DCWW has confirmed that this requires tightening to 0.7mg/l by 31st March 2030.

11.6.35 As the proposed development will connect to Five Fords WWTW, the total phosphorus load from the development will be +78.66 kg/year, compared to the existing (undeveloped) state of the site.

11.6.36 However, in an August 2023 letter (see Appendix 11.2, Appendix B), DCWW outlined that Five Fords WWTW has the capacity to treat the foul flows from the planning application development sites currently being held in abeyance by WCBC, whilst maintaining compliance with both the existing and the proposed phosphorus consent limits.

11.6.37 Therefore, the development site will be able to discharge foul flows to DCWW's WWTW at Five Fords and be in compliance with nutrient neutrality requirements.

11.6.38 As there will be no net increase in phosphorus discharged into the Dee as a result of the development, there will be **No Impact** on the environment.

Water Supply

11.6.39 The site is within the Alwen Dee Water Resource Zone (WRZ). Alwen Dee WRZ is projected to operate with a 2.1 Ml/d surplus in a dry year from 2025 to 2050, including approximately 5Ml/d for uncertainty.

11.6.40 WSP have estimated the proposed development will increase water consumption by 0.4Ml/d, far below the surplus and uncertainty amount.

11.6.41 The sensitivity of the existing potable water network is assessed to be **Low** and the magnitude of change considering the inherent mitigation is assessed to be **Minor adverse**.

11.6.42 The Alwen Dee WRZ is considered to be **Local** with the effect from the development being **Highly Likely** to occur on a **Permanent, Medium Term** scale.

11.6.43 Due to the reasons stated above, the significance of the effect on the potable water supply is assessed to be **Negligible**.

Summary of potential effects

11.6.44 A summary of the potential effects of the development on the water environment during the construction and operational phases, considering embedded mitigation, are presented in Table 11.7.

Table 11.7: Summary of potential effects and receptors.

Potential effect	Receptor	Sensitivity of receptor	Magnitude	Environmental effect	Temporal extent	Likelihood	Permanence	Spatial extent	Significance
Construction and Demolition Phase									
Changes in the risk of Flooding	Construction workers	Medium	Moderate	Adverse	Short Term	Unlikely	Temporary	Local	Minor
	Residents and users	High	Minor	Adverse	Short Term	Unlikely	Temporary	Local	Negligible
Changes in water quality	Unnamed Watercourse	Low	Minor	Adverse	Short Term	Likely	Temporary	Local	Negligible
	River Clywedog	Medium	Moderate	Adverse	Short Term	Likely	Temporary	Local	Moderate
	Underlying secondary aquifers	Low	Moderate	Adverse	Short Term	Likely	Temporary	Low	Negligible
Operational Phase									
Change in water quality from surface water discharged from the site	Unnamed Watercourse	Low	Negligible	Adverse	Medium Term	Unlikely	Permanent	Local	Negligible
	River Clywedog	Medium	Negligible	Adverse	Medium Term	Unlikely	Permanent	Local	Negligible
	Underlying secondary aquifers	Low	Minor	Adverse	Medium Term	Unlikely	Permanent	Local	Negligible
Change in nutrient neutrality	Dee Catchment SAC	Very High	No Impact	N/A	N/A	N/A	N/A	N/A	No Impact
Water Supply	Alwen Dee WRZ	Low	Minor	Adverse	Medium Term	Highly Likely	Permanent	Local	Negligible

11.7 Mitigation and Monitoring

11.7.1 This section describes the measures which are proposed to mitigate any significant environmental effects. It is anticipated that the delivery of these measures will be secured by way of appropriate planning conditions or obligations.

Demolition and Construction Phase

11.7.2 A Construction Environment Management Plan (CEMP) will be prepared before the start of works to ensure that best practice is employed, and the environment safeguarded. The CEMP would include method statements for the proposed works, details of materials to be taken from and to the proposed site, and a pollution control and contingency plan.

Flood Risk

11.7.3 Some small areas of the proposed site are located in areas at risk of surface water flooding. Areas at risk to surface water flooding are distributed sporadically throughout the site. Works in these areas, such as stockpiling or storing materials could increase risk elsewhere. Furthermore, compaction of the ground at the site due to construction will decrease infiltration and increase surface water flood risk, most likely transporting surface water to areas which are already at high risk to surface water flooding.

11.7.4 Areas in the north of the site are within the NRW flood zones B and C2, indicating a risk of fluvial flooding. These zones are predominantly located in the northeast and northwest of the site and are related to the unnamed watercourse flowing through the site. Works in these areas, such as stockpiling or storing materials could increase risk elsewhere within the site or downstream of the site.

11.7.5 Adoption of measures in the CEMP would minimise the likelihood of potential effects to an acceptable level. Early provisioning of the temporary and permanent SuDS infrastructure during each construction phase will be ensured so it can serve as an operational mitigation function for the management of surface water runoff in terms of both quantity and quality.

11.7.6 The CEMP will ensure that there are no stockpiles, storage areas or welfare facilities located in areas that have been identified as being at risk from surface water flooding or in flood zones B and C2 and not in the path of significant overland flow routes. The CEMP will also ensure that the contractor has an emergency flood management plan for any works that are to be undertaken within areas at risk to surface water flooding or in flood zones B and C2.

Water Quality

11.7.7 The current and proposed drainage arrangements of the Site mean that any entrainment of sediment and other pollutants in overland flow during the construction phase could enter the

existing drainage system, within the unnamed watercourse onsite or the River Clywedog, south of the site boundary.

11.7.8 The CEMP will include sediment control measures to prevent sediments from being washed off site during heavy rainfall events, this will be complemented by the working practices which will ensure that areas of open or cleared ground are minimised and once cleared they will be re-vegetated at the earliest opportunity.

11.7.9 Measures in the CEMP will be complemented by the early provisioning of the permanent SuDS infrastructure (considered embedded mitigation) which will also be ensured so it can serve as an operational mitigation function. This could affect water quality and hydromorphological quality of both watercourses, which in turn may temporarily affect the ecological and chemical quality of the watercourses.

Operational Phase

11.7.10 No mitigation required.

11.8 Residual Effects

11.8.1 Table 11.8 summarises the significance of the anticipated residual environmental effects, which are those that remain after all proposed mitigation measures are implemented.

Table 11.8: Summary of Residual Effects

Potential Effect	Sensitivity of receptor	Mitigation	Significance (following mitigation)	Residual Effect
Construction and Demolition				
Flood Risk Onsite impacting construction workers	Construction workers: Medium	CEMP	Negligible	Low risk for the design event, noting that exceedance events may occur.
Flood Risk Offsite impacting residents and users of the surrounding area	Residents and users: High		Negligible	
Changes in Water Quality due to surface water runoff	Unnamed watercourse: Low	CEMP	Negligible	Accidental spills and contamination onsite may still occur which may impact water quality.
	River Clywedog: High	CEMP	Minor Adverse	
	Secondary aquifers: Low	CEMP	Negligible	
Operational phase				
Change in Water Quality due to surface water discharged from the development.	Unnamed watercourse: Low	Embedded mitigation including SuDS	Negligible	N/A
	River Clywedog: Medium			
	Secondary aquifers: Low			
Increasing potable water demand	DCWW Network: Low	NA	Low	Reduced surplus.

11.9 Summary

11.9.1 A range of potential effects on the water environment have been considered, including changes in flood risk (onsite and off-site) during the construction and demolition phase, changes in the quality of water within the catchment and local watercourses and the impact of the development on the local water supply network.

11.9.2 Considering embedded and standard mitigation included in the FCA and drainage strategy there will be no increases in flood risk at the site or in the surrounding area. Furthermore, DCWW have confirmed that Five Fords WWTW can treat the foul flows from the site, whilst maintaining compliance with phosphorus consent limits, so the development will be compliant with nutrient neutrality requirements.

11.9.3 Lastly, the proposed development will have a negligible effect on water supply for the area due to the current large surplus.

11.9.4 Overall, the proposed development will have a minor adverse effect on the water environment.

12 Cumulative Effects

12.1 Introduction

12.1.1 The requirement for a cumulative effects assessment is set out in Schedule 4, Part 5 of the EIA Regulations, which states that an ES should include:

> *'A description of the likely significant effects of the development on the environment … resulting from the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources'*

12.1.2 This chapter provides an assessment of the potential cumulative effects of the proposed development in conjunction with effects arising from other developments in the surrounding area. It also provides an assessment of the potential combination of some or all of the effects identified in the EIA on a particular receptor.

12.2 Approach

12.2.1 Cumulative effects come in two forms. The first relate to the impacts of the proposed development in conjunction with other developments in the area. These developments should be existing, consented or reasonably foreseeable in terms of delivery and should be located within a realistic geographical scope where environmental effects could combine to create a more significant effect on a particular sensitive receptor. These are hereafter referred to as cumulative effects.

12.2.2 The second type of cumulative effect is that of the combination of the various types of impacts from the proposed development. These are hereafter referred to as synergistic effects.

Cumulative Effects

12.2.3 A cumulative effects scoping exercise has been undertaken to identify any potential developments within the vicinity of the site which are likely to result in cumulative or synergistic effects.

12.2.4 This chapter sets out for each technical discipline included in the EIA where the residual effects identified within each technical chapter have been altered by an interaction with a cumulative development. The potential effects are broken down into construction and operational phases of development, where relevant.

12.2.5 Cumulative effects can be generated at the construction stage if the sites are in close proximity and construction periods are likely to overlap. However, most construction projects employ regulatory controls and good practice to minimise impacts occurring outside the site boundary.

It is assumed that standard best practice measures have been or will be employed on each cumulative development site.

12.2.6 The effects of cumulative operational impacts can be varied and will depend on the scale, nature and processes / activities of the proposed development, the location of sensitive receptors, the surrounding developments and the immediate environs. The cumulative assessment assumes that the mitigation measures proposed throughout this ES will be or have been implemented.

12.2.7 Where possible, quantification of effects has been presented but where quantification has not been possible, the assessments have been made using professional opinion. Where detailed information about the additional schemes was uncertain or unavailable, reasonable but cautious assumptions have been made.

Synergistic Effects

12.2.8 The second category is concerned with the combination of some or all of the effects predicted by the EIA affecting a particular receptor which may collectively cause a change of greater significance than individually. These are referred to as synergistic effects and have been assessed by professional opinion.

12.3 Cumulative Developments

12.3.1 A review of planning permissions in the local area was undertaken to identify any sites with the potential to generate cumulative effects in conjunction with the proposed development. The long list was also consulted on with the Local Planning Authority to ensure all relevant development were identified.

12.3.2 Once the long list was compiled, each site was reviewed to determine whether there was a likelihood of cumulative effects. Sites were scoped in where there was a visual or other environmental connection to the application site, or where a particular sensitive receptor could be affected by multiple development sites. Where no such connections exist, where construction periods would not overlap, where adequate environmental information was not available or where delivery was not reasonably foreseeable, the cumulative sites were scoped out.

12.3.3 The sites that were ‘scoped in’ to the cumulative effects assessment were then considered by the technical consultants, and impacts have been identified where relevant. For some topic areas, no cumulative effects were considered likely due to the site-limited nature of the effects and in other cases, the assumption that regulatory requirements for site management would be followed led to the conclusion that no cumulative effects would arise. Where this is the case, it is stated in this chapter.

12.3.4 The following table presents a summary of the identified sites and the reasons for their inclusion or exclusion in the cumulative effects assessment.

Table 12.1: Potential Cumulative Sites Appraisal

Planning Reference	Site Location	Description	Status	Scoped In/ Out	Justification
n/a	A483 Junction 4, Rutin Road, Wrexham	Large diameter roundabout junction to the A483, with link road through Lower Berse Farm connecting to Ruthin Road	Pre-planning	Out	Development is at a very early stage and there is no published evidence on which to base a meaningful assessment. There is significant uncertainty over delivery, given its selection as a preferred option in 2022, withdrawal under the Roads Review in 2023 and now potential revival under the National Transport Delivery Plan in 2024. The Land at Lower Berse Farm application has, however, included a safeguarded corridor for this potential future development and set out design principles for noise/air quality mitigation for the residential properties located adjacent to the road corridor. It should be noted that the proposed residential development can proceed completely independently of the Junction 4 scheme and is not in any way reliant upon it for delivery. The cumulative effects of the Junction 4 scheme would therefore be considered as part of any future planning application for that development.
P/2022/0725	The Racecourse, Mold Road, Wrexham, LL11 2AH	The Racecourse Development for 5,500 spectator seats, inclusive of a 500 capacity hospitality area, with a 600 capacity non-match day exhibition space, new public realm and associated works	Approved 12/01/2023	In	1.25km to the north-east with limited intervisibility but height of proposed stand could affect intervening sites. Resolution to grant suggests it will progress.

Planning Reference	Site Location	Description	Status	Scoped In/ Out	Justification
P/2022/0668	Land Opposite Wilkinson Business Park, Clywedog Road South, Wrexham Industrial Estate, Wrexham, Ll13 9X3 (The same site as P/2018/1087)	Full application for the erection of a storage and distribution warehouse (class B8)	Approved 27/02/2024	Out	Development is 5km to the east of the site within an established business park, with intervening urban development and no visual or environmental linkage.
P/2021/0955	Land North Of, Gatewen Road, New Broughton, Wrexham, LL11 6YA	Reserved matters pursuant to outline planning permission P/2018/0674 for a residential development of up to 112 dwellings.	Approved 03/10/2022	In	1km north of the site with some limited potential for visual connection to the site. Greenfield site with potential for protected habitats/species. Recent RM permission further to 2018 outline suggested project likely to progress.
P/2021/0545	Site Of Old Fire Station And Former Chapel, Bronywaun, Colliery Road, Chirk, Wrexham, LL14 5PR	Outline application (all matters reserved) for up to 8 dwellings.	Approved 27/09/2023	Out	<10 units – not major development
P/2021/0255	Land East Of Heritage Way, Tan Y Fron, Wrexham, LL11 5SW	Application for reserved matters (access, layout, scale, appearance and landscaping) pursuant to outline planning permission P/2012/0817 for the construction of 70 dwellings.	Approved 05/07/2021	In	Approved development with visual linkage to the site.
P/2021/1057	Land Opposite Of St Peters Close, Llay New Road, Rhosrobin, Wrexham, LL11 4RB	Application for the erection of 92 dwellings including provision of roundabout on llay new road	Pending	In	Large development 3km north-east of the site. No intervisibility but a greenfield site with potentially sensitive receptors and available environmental information. Identified for housing in the emerging LDP. Located adjacent to the contested project listed immediately below.

Planning Reference	Site Location	Description	Status	Scoped In/ Out	Justification
P/2021/0135	Tan Y Bont, Main Road, Old Rhosrobin, Rhosrobin, Wrexham, LL11 4RL	Reserved matters pursuant to outline application P/2016/0189 for a residential development of up to 189 dwellings.	Approved 15/11/2021	In	2.75km north-east of the site with significant urban development in between, which limits intervisibility. However, development is underway and on a significant scale. Closely related to the application listed immediately above.
P/2021/0094	Wrexham Plas Coch, Mold Road, Wrexham, LL11 2AW	Reserved matters approval for 90 dwellings pursuant to P/2018/0671	Approved 30/04/2021	In	Development is currently under construction. Location is 1.5km to the north-east, with no visual connection but some potential for cumulative effects on intervening receptors. Part of wider development proposal; see below.
P/2020/0881	Land Off, North Road, Ponciau, Wrexham, LL14 1HF	Outline application for 10 dwellings and construction of new estate road.	Withdrawn	Out	Small application now withdrawn.
P/2020/0787	Site Of Wrights Garage And Adjoining Land, Hall Street, Penycae, Wrexham, LL14 2RU	Outline application (all matters reserved) for up to 8 dwellings with associated parking, access and gardens.	Approved 23/03/2020	Out	<10 dwellings – not major development
P/2019/0923	Land Either Side Of, Chain Road, Stansty, Wrexham, LL11 4YF	Outline application for residential development of up to 455 residential dwellings and detailed means of access with all other matters reserved.	Approved 16/05/2024	In	A major application with accessible environmental information approximately 1.5km north of the site. Greenfield site with potential for environmental constraints.

Planning Reference	Site Location	Description	Status	Scoped In/ Out	Justification
P/2019/0546	Former Brymbo Steel Works, Kent Road, Brymbo, Wrexham, LL11 5FS	Outline planning permission for up to 450 dwellings (class c3 use), provision of a primary school (2-form entry), small district centre comprising up to 1,395 sq. M of class a1 retail, up to 372 sq. M of class a3 restaurant / public house, up to 465 sq. M of Class D1 use, multi-functional green infrastructure. All matters reserved except for vehicular access from Brymbo Road.	Appeal pending	In	3km north of the site and not yet decided, but a large scale development, with available environmental information. Some visual linkages to the site and potential ecological constraints.
P/2019/0005	Land South Of, Holt Road, Wrexham, LL13 9SA	Outline application for the construction of up to 600 dwellings, with associated landscaping, public open space and on-site infrastructure, with all matters reserved except from the northern site access	Appeal pending	In	Not yet decided and 4.5km north-east of the site, but a large EIA application on a greenfield site.
P/2018/1087	Wilkinson Business Park, Clywedog Road South, Wrexham Industrial Estate, Wrexham, LL13 9AE	Outline application for development of site for b1 light industrial units and b2 / b8 industrial unit including means of access, scale of building and ecological mitigation zone with indicative details provided in relation to appearance, layout and landscaping.	Approved 18/12/2020	Out	Development is 5km to the east of the site within an established business park, with intervening urban development and no visual linkage. Unlikely to be delivered given new application P/2022/0668 proposes a new design.
P/2018/0674	Land North Of, Gatewen Road, New Broughton, Wrexham, LL11 6YA	Outline application for residential development, up to 112 dwellings together with vehicular / pedestrian access from Gatewen road, open space, landscaping, sustainable drainage and other related infrastructure.	Approved 15/02/2021	In	1km north of the site with some limited potential for visual connection to the site. Greenfield site with potential for protected habitats/species.

Planning Reference	Site Location	Description	Status	Scoped In/ Out	Justification
P/2018/0673	Land North Of, Holt Road, Wrexham, LL13 9EH	Outline application for up to 74 dwellings together with vehicular / pedestrian access from holt road, open space which can be used with adjoining land to the west to create a formal sports pitch, site landscaping, sustainable drainage and other related infrastructure.	Appeal Allowed 21/06/2021	Out	Development is 3.5km from the site and separated by the city centre. No visual linkages and habitats are of limited value.
P/2018/0672	Land West Of, Crispin Lane, Mold Road, Wrexham, LL11 2HT	Outline application for student accommodation facility of up to 197 bed spaces, parking and landscaping.	Approved 01/07/2019	In	Development is of a moderate scale and around 1.5km to the north-east. No visual connection the site but development is 8 storeys and there may be some potential for cumulative effects on intervening receptors.
P/2018/0671	Glyndwr University, Wrexham Plas Coch, Mold Road, Wrexham, LL11 2BW	Demolition of redundant student halls and outline application for up to 410 residential units with access off B5101 together with car parking, landscaping and associated infrastructure on surplus land within the overall Plas Coch Academi.	Approved 07/05/2020	In	Development is currently under construction and is of a substantial scale. Location is 1.5km to the north-east, with no visual connection but some potential for cumulative effects on intervening receptors.
P/2018/0588	120 Rhosnesni Lane, Rhosnesni, Wrexham, LL12 7NE	Demolition of existing shop and storage unit and outline application for residential development (13 dwellings).	Approved 17/07/2019	Out	Small scale development located within the town centre over 3km north-east of the site. No visual or other links to the site and no sensitive receptors that would be affected by both projects combined.

12.4 Cumulative Sites Assessments

Landscape and Visual

12.4.1 This section on cumulative effects considers the additional changes caused by the Development in conjunction with other similar developments. Cumulative effects are the combined effects of several development schemes (in conjunction with the Development) which may, on an individual basis be insignificant but, cumulatively, have a greater effect.

12.4.2 The following definitions are set out in GLVIA3:

- Cumulative Landscape Effects may arise from adding new types of change or from increasing or extending the effects of the main project. The concern is with the accumulation of effects upon landscape character and the components that contribute to it; and
- Cumulative Visual Effects are the effects on views and visual amenity enjoyed by people, which result from adding the effects of the project being assessed to the effects of other projects on the baseline conditions. This may result from changes in the content and character of the views experienced in particular places.

12.4.3 In both instances the emphasis is on the likely significant effects.

12.4.4 The method for the assessment of cumulative landscape and visual effects is presented in more detail in **Appendix 7.1**.

Study Area and Cumulative Sites

12.4.5 The study area for the assessment of cumulative landscape and visual effects has been identified as the Zone of Theoretical Visibility (ZTV) of the Development plus any predicted overlapping visual envelopes for the other relevant projects. This has been determined by a desktop review of relevant plans and information included with other development projects, planning application documents such as ES Chapters and/or from existing baseline studies in conjunction with fieldwork.

12.4.6 Sites screened as part of the cumulative assessment are described earlier in this chapter. Of those, Table 12.2 identifies those that are considered in the assessment of cumulative landscape and visual effects.

Table 12.2: Sites included in the Cumulative Assessment

Reference	Site Name	Approximate distance/direction from the site	Landscape Character Area
A	Land East of Heritage Way, Tan Y Fron, Wrexham – 70 dwellings	2.6km to the north-west if the Site	7d – West Wrexham Ridges and Valleys
B	Former Brymbo Steel Works, Kent Road, Brymbo, Wrexham – up to 450 dwellings	3.2km to the north-west of the Site	7d – West Wrexham Ridges and Valleys

12.4.7 Development sites which have not been included within the cumulative assessment above are either considered to be outside of the Study area and therefore too far away to have any landscape or visual effect or a lack of intervisibility prevents the potential for significant landscape or visual effects.

12.4.8 In assessing the likely significant cumulative effects of development sites, a desk based review of available information (including OS mapping, aerial images and available planning documents) has been completed, in conjunction with field survey.

12.4.9 The significant operational cumulative effects on sensitive landscape and visual receptors are summarised below.

Cumulative Site A – Land East of Heritage Way

12.4.10 The consented development for the construction of 70 dwellings (Wrexham County Borough Planning Application Reference: P/2021/0255) is 2.6km to the north-west of the Site at its closest point to the east of Heritage Way and north-west of Brymbo Sports & Social Complex.

Cumulative Landscape Effects

12.4.11 The Proposed Development, in addition to the Cumulative Site B, would increase the extent and influence of residential development on this part of the LCA 7d: West Wrexham Ridges and Valleys.

12.4.12 The Proposed Development, in addition to Cumulative Site B, would result in a greater adverse effect on landscape character, although the significance of the cumulative effect on the West Wrexham Ridges and Valleys LCA, likely would be no greater than that reported for the Proposed Development alone on completion (moderate adverse at Year 1 and minor adverse at Year 15).

12.4.13 There will be no cumulative effects on the Wrexham and Deeside NCLA as Cumulative Site A falls in NCLA 12 Clwydian Range, and no cumulative effects on LCA 9a Clywedog Valley Plas Power and Bersham, LCA 10 Wrexham Town and LCA 13a Welsh Maelor.

Cumulative Visual Effects

12.4.14 If Cumulative Site B and the Proposed Development were constructed and operational, there would be combined and or sequential views of both developments from:

- PRoW Footpath BER/1; and
- PRoW and local minor roads to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range.

12.4.15 Due to distance and screening from intervening vegetation and built form, the significance of the cumulative effect on all other views, would be no greater than that reported for the Proposed Development alone on completion.

Cumulative Site B – Former Brymbo Steel Works, Kent Road

12.4.16 Cumulative Site C lies approximately 3.2km to the north-west of the Site at the former Brymbo Steel Works to the west of Kent Road, and to the north and north-west of Cumulative Site B. Outline planning permission for up to 450 dwellings, provision of a primary school, small district centre, 456 sq. M of restaurant/public house and multi-functional green infrastructure, is currently pending an appeal (Wrexham County Borough Planning Application Reference: P/2019/0546).

Cumulative Landscape Effects

12.4.17 The Proposed Development, in addition to Cumulative Site C, would increase the extent and influence of residential development on this part the LCA 7d: West Wrexham Ridges and Valleys.

12.4.18 The Proposed Development, in addition to Cumulative Site C, would result in a greater adverse effect on landscape character, although the significance of the cumulative effect on the West Wrexham Ridges and Valleys LCA, likely would be no greater than that reported for the Proposed Development alone on completion (moderate adverse at Year 1 and minor adverse at Year 15).

12.4.19 There will be no cumulative effects on the Wrexham and Deeside NCLA as Cumulative Site C falls in NCLA 12 Clwydian Range, and no cumulative effects on LCA 9a Clywedog Valley Plas Power and Bersham, LCA 10 Wrexham Town and LCA 13a Welsh Maelor.

Cumulative Visual Effects

12.4.20 If Cumulative Site C and the Proposed Development were constructed and operational, there would be combined and or sequential views of both developments from:

- PRoW Footpath BER/1; and
- PRoW and local minor roads to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range.

12.4.21 Given the physical separation between the sites and screening provided by existing vegetation and built-form, the cumulative effects of the two developments will be no greater in significance than the assessment for the Proposed Development alone.

Ecology

12.4.22 The following table sets out the assessment of potential cumulative effects in relation to ecology.

Table 12.3: Cumulative Ecological Impacts				
Planning Reference	**Site Location**	**Description**	**Scoped In/ Out**	**Justification**
n/a	A483 Junction 4, Ruthin Road	Large diameter roundabout junction to the A483, with link road through Lower Berse Farm connecting to Ruthin Road	Out	The baseline conditions of this site, where it overlaps with the proposed development at Lower Berse Farm, have been presented in this ES. There is currently insufficient evidence on the proposed development or certainty over its delivery to carry out an assessment of its impacts at this time.
P/2022/0725	The Racecourse, Mold Road, Wrexham, LL11 2AH	The Racecourse Development for 5,500 spectator seats, inclusive of a 500-capacity hospitality area, with a 600 capacity non-match day exhibition space, new public realm and associated works	In	The EcIA identified the site as being of low suitability for bats, but the development is not likely to be detrimental to the maintenance of the populations of species favourable conservation status. Trees will be removed using PWMs under supervision of an EcCoW. There will be loss of a habitat important at the County level and a Welsh Priority Habitat (Open Mosaic Habitat on Previously Developed Land) with mitigation proposed by installation of a brown roof. Assuming that the above measures are implemented, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.
P/2022/0668	Land Opposite Wilkinson Business Park, Clywedog Road South, Wrexham Industrial Estate, Wrexham, Ll13 9X3 (The same site as P/2018/1087)	Full application for the erection of a storage and distribution warehouse (class b8)	Out	GCN were recorded within 250 m of the site, though unlikely to be present within the site due to existing developments representing a partial barrier to dispersal. There will be construction of two new ponds to support amphibian populations. PWMs and EcCoW support to be implemented in regard to GCN, badger, nesting birds, bats and light spill and a LEMP is to be produced to support habitat mitigation and enhancements.

Table 12.3: Cumulative Ecological Impacts				
Planning Reference	**Site Location**	**Description**	**Scoped In/ Out**	**Justification**
P/2021/0955	Land North Of, Gatewen Road, New Broughton, Wrexham, LL11 6YA	Reserved matters pursuant to outline planning permission P/2018/0674 for a residential development of up to 112 dwellings.	In	The site consists of a mosaic of predominantly poor semi-improved grassland, broad leaf copse, ruderal and scrub habitat types bounded by fences and hedgerows. Some trees occur on the boundary of the site; the trees vary in health, with some offering bat foraging habitat though the development was not identified as being detrimental to the maintenance of the favourable conservation status of any local bat populations. There are three ponds within proximity, but only one of them is within 100 m of the site boundary to the west. These were subjected to eDNA surveys in 2018, all ponds returned a negative result. The development considers the openness of adjacent Green Barrier areas. No badger activity was noted on site; however, preconstruction checks are recommended. Any vegetation clearance and felling works should be undertaken outside of the bird-nesting season. PWMs and EcCoW support to be implemented in regard to amphibians, badger, reptiles, nesting birds, bats and light spill. General habitat enhancements recommended. Waste produced during the construction phase will be dealt with via a CEMP and surface water drainage managed through SuDS. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.
P/2021/0545	Site Of Old Fire Station and Former Chapel, Bronywaun, Colliery Road, Chirk, Wrexham, LL14 5PR	Outline application (all matters reserved) for up to 8 dwellings.	Out	Protected species surveys were carried out. There is not considered to be any impact on birds as long as no nesting birds are disturbed. There is not considered to be any impact on bats. There is not considered to be any risk of harm to GCN. No evidence was found of any other protected species on the site or within 30 m of it.

Table 12.3: Cumulative Ecological Impacts				
Planning Reference	**Site Location**	**Description**	**Scoped In/ Out**	**Justification**
P/2021/0255	Land East of Heritage Way, Tan Y Fron, Wrexham, LL11 5SW	Application for reserved matters (access, layout, scale, appearance and landscaping) pursuant to outline planning permission P/2012/0817 for the construction of 70 dwellings.	In	It is not anticipated that any designated wildlife sites would be impacted by the proposed development. The site consists of modified neutral grassland with areas of young semi-natural broad-leaved woodland, scattered scrub, bare ground, hard standing and amenity grassland. Non-native invasive species (WCA9) Japanese knotweed *Reynoutria japonica*, cotoneaster species Cotoneaster sp. and montbretia Crocosmia x crocosmiiflora are present within woodland at the site. There are no waterbodies suitable for breeding amphibians at the site, though terrestrial habitats are suitable for foraging, commuting and hibernating amphibians. The site and adjacent land contain suitable habitat for foraging and commuting badgers and limited suitability for sett excavation. All trees at the site are of negligible suitability for roosting bats. There is moderate suitability for foraging and commuting bats along the site's eastern boundary. The habitats at the site are suitable for a range of bird species. The site contains suitable habitat for foraging, commuting and hibernating reptiles and hedgehogs. PWMs and EcCoW support to be implemented in regard to amphibians, badger, hedgehog, reptiles, nesting birds, bats and light spill and management of invasive, non-native plant species to be undertaken. General habitat enhancements recommended. The applicant was required to review potential for increased wastewater and phosphorous concentrations within wastewater being discharged from the site which may impact the River Dee and Bala Lake SAC. The development has been designed with a SuDS attenuation basin and associated pump house to mitigate drainage issues. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.

Table 12.3: Cumulative Ecological Impacts				
Planning Reference	**Site Location**	**Description**	**Scoped In/ Out**	**Justification**
P/2021/1057	Land Opposite of St Peters Close, Llay New Road, Rhosrobin, Wrexham, LL11 4RB	Application for the erection of 92 dwellings including provision of roundabout on llay new road	In	Predominantly the main area of development is on semi-improved grassland. Three mature oak trees are recorded within the development area, one with bat roost habitat suitability. A GCN breeding site is recorded within 270 m of the north-western boundary of the site, however connectivity is compromised by 'B' Class highways. No major adverse impacts on species or habitats have been identified. No invasive non-native species have been identified within the development boundary. As a precautionary measure to prevent injury to GCN during the development process exclusion fencing is to be installed along the northern boundaries of the site. PWMs and EcCoW support to be implemented in regard to amphibians, badger, hedgehog, reptiles, nesting birds and bats and light spill. General habitat and biodiversity enhancement to be incorporated. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.
P/2021/0135	Tan Y Bont, Main Road, Old Rhosrobin, Rhosrobin, Wrexham, LL11 4RL	Reserved matters pursuant to outline application P/2016/0189 for a residential development of up to 189 dwellings.	In	There are no statutorily protected sites within 1 km of the Rhosrobin site. The closest statutory site is the Gatewen Marsh SSSI, located over 1.5 km from the site. The closest non statutory sites are the Bryn Alyn & Wormswood and the Woodlands & Fishpond Wood Wildlife sites, located at 493 m and 865 m respectively, away from the site. Given the distance of the development from the LWSs, it is unlikely that development will have any direct effect on them. The native hawthorn dominated hedgerows are a habitat of principal conservation importance in Wales, as listed on S7. Hedgerows also serve to create connectivity across the site. A number of protected species are known to be present within 1 km of the site, some of which are also listed on S7 as species of principal conservation importance in Wales. Trees with bat roost habitat suitability. PWMs and EcCoW support to be implemented in regard to amphibians, badger, hedgehog, reptiles, nesting birds and roosting bats and sensitive lighting strategy to be implemented. General habitat and biodiversity enhancement to be incorporated. Development to adhere to a Site Waste Management Plan (SWMP) and drainage scheme. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.

Table 12.3: Cumulative Ecological Impacts				
Planning Reference	**Site Location**	**Description**	**Scoped In/ Out**	**Justification**
P/2021/0094	Wrexham Plas Coch, Mold Road, Wrexham, LL11 2AW	Reserved matters approval for 90 dwellings pursuant to P/2018/0671	In	Presence of one or more larger species of bat at the application site. Proposed development is likely to harm or disturb roosting bats or their breeding sites and resting places at this site and avoidance and mitigation measures are required under a protected species mitigation licence issued by NRW. External lighting/internal light spillage assessment undertaken to avoid impacts on bats. PWMs and EcCoW support to be implemented during works impacting bats and appropriate mitigation and compensation incorporated into the development. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.
P/2020/0881	Land Off, North Road, Ponciau, Wrexham, LL14 1HF	Outline application for 10 dwellings and construction of new estate road.	Out	Small and undetermined application. 2.5km south-west from the site. Potential for visual link but limited ecological effects identified. Impacts on bats and birds should be low as long as no disturbance takes place. Trees should not be felled in nesting season. No rare or threatened plants or animals were found on or near the site.
P/2020/0787	Site Of Wrights Garage and Adjoining Land, Hall Street, Penycae, Wrexham, LL14 2RU	Outline application (all matters reserved) for up to 8 dwellings with associated parking, access and gardens.	Out	No rare or threatened species of plants or animals were found on site or near the site. Impacts during the development should be low with respect to birds and bats if disturbance is avoided. Trees should not be felled during nesting season. PWMs should be taken with regard to nesting birds, reptiles and amphibians.
P/2019/0923	Land Either Side Of, Chain Road, Stansty, Wrexham, LL11 4YF	Outline application for residential development of up to 455 residential dwellings and detailed means of access with all other matters reserved.	In	The site predominantly comprises improved grassland with mature trees, hedgerows and ditches. The majority of trees across the site are being retained under the development proposals. Hedgerows are being retained within development proposals where feasible. A habitat buffer will be provided adjacent to retained hedgerows alongside a sensitive lighting scheme for the development. Replacement hedgerow planting is recommended. A population of GCN lies within 500 m of the site, but the site lies only within distant ranging habitat of the breeding ponds (>250m), therefore a GCN mitigation licence from NRW is not proposed. All land falling between 250m and 500m of the GCN ponds will be cleared using a PWMMS and EcCoW supervision. The trees with bat roost habitat suitability will be retained and protected. A sensitive lighting strategy with regard to bats is to be produced. A Biosecurity Risk Assessment is to be produced to include measures to control, remove or for the long-term management of non-native, invasive species. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.

Table 12.3: Cumulative Ecological Impacts				
Planning Reference	**Site Location**	**Description**	**Scoped In/ Out**	**Justification**
P/2019/0546	Former Brymbo Steel Works, Kent Road, Brymbo, Wrexham, LL11 5FS	Outline planning permission for up to 450 dwellings (class c3 use), provision of a primary school (2-form entry), small district centre comprising up to 1,395 sq. M of class a1 retail, up to 372 sq. M of class a3 restaurant / public house, up to 465 sq. M of Class D1 use, multi-functional green infrastructure. All matters reserved except for vehicular access from Brymbo Road.	In	Priority and notable habitats of native hedgerows and plantation woodland were recorded and should be retained, as far as possible, within development proposals, particularly the species-rich lengths of hedgerows. Where small lengths need to be removed for access, compensatory lengths will be provided elsewhere within the site. Protected/ notable species which could potentially be affected by development proposals are bats, badger, GCN, reptiles and breeding birds. Development will require a GCN mitigation licence from NRW including provision of a Specific Compensation Area for GCN and amphibian friendly surface water management systems. SuDS incorporated within the development. Appropriate mitigation measures, PWMs and EcCoW support and additional surveys/assessments will be undertaken to ensure ecological features identified are not adversely affected by the development. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.
P/2019/0005	Land South Of, Holt Road, Wrexham, LL13 9SA	Outline application for the construction of up to 600 dwellings, with associated landscaping, public open space and on-site infrastructure, with all matters reserved except from the northern site access	In	There are four European designated statutory sites within 10 km of the site, and six local wildlife sites within 2 km of the site. Development proposals will mainly affect arable land which is of negligible ecological importance. However, small areas of broad-leaved/plantation woodland and defunct hedgerows with field margins, scattered trees, scattered scrub, and ruderal will be affected. It is anticipated any losses would be mitigated through the planting of woodland as well as native trees and shrubs which will form the landscaping of the new development. GCN surveys conducted in 2018 identified a medium population of GCN in an offsite pond, approximately 100 m from the site boundary. The development has been designed to retain opportunities for these species and compensate for the loss of habitats involved. Development will require a GCN mitigation licence from NRW including provision of a Specific Compensation Area for GCN. Low levels of bat foraging activity have been recorded along the interior and exterior field boundaries. The majority of the woodland, hedge and trees on site is being retained, and new planting and SuDS pond creation in retained areas will enhance foraging opportunities for bats on site. A sensitive lighting design shall be incorporated, to reduce the impacts to foraging bats. Trees and hedgerows affected by development should be checked for nesting birds. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.

Table 12.3: Cumulative Ecological Impacts				
Planning Reference	**Site Location**	**Description**	**Scoped In/ Out**	**Justification**
P/2018/1087	Wilkinson Business Park, Clywedog Road South, Wrexham Industrial Estate, Wrexham, LL13 9AE	Outline application for development of site for b1 light industrial units and b2 / b8 industrial unit including means of access, scale of building and ecological mitigation zone with indicative details provided in relation to appearance, layout and landscaping.	Out	The site principally comprises of a range of successional habitats that have developed on an area of unmanaged grassland. These habitats are of relatively low botanical interest and are commonly occurring throughout the UK. No field signs indicative of any protected species were found during ecological surveys. However, the woodland and scrub habitats are considered to offer suitable habitat for roosting and foraging bats, suitable sett habitat for badgers and suitable nesting and foraging habitat for breeding birds. The grassland/tall herb habitat is considered to offer some suitable habitat for common reptiles and for notable butterfly species. PWMs should be taken with regard to nesting birds, reptiles and amphibians.
P/2018/0674	Land North Of, Gatewen Road, New Broughton, Wrexham, LL11 6YA	Outline application for residential development, up to 112 dwellings together with vehicular / pedestrian access from Gatewen road, open space, landscaping, sustainable drainage and other related infrastructure.	In	The statutory and non-statutory sites identified within the search parameters are considered to be sufficiently distant to avoid any indirect impacts as a result of the proposed development. Possible bat roosts present in bat boxes installed adjacent to the northern site boundary; nocturnal surveys are recommended to establish presence/likely absence of roosting bats in addition to activity transect surveys. The site was assessed as providing moderate habitat suitability for foraging and commuting bats. The development is not likely to be detrimental to the maintenance of the favourable conservation status of any local populations of bat. It is considered that badgers and other mammals may use the site for commuting purposes. PWMs and EcCoW support to be implemented in regard to amphibians, badger, hedgehog, nesting birds and roosting bats and sensitive lighting strategy to be implemented. General habitat and biodiversity enhancement to be incorporated. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.
P/2018/0673	Land North Of, Holt Road, Wrexham, LL13 9EH	Outline application for up to 74 dwellings together with vehicular / pedestrian access from holt road, open space which can be used with adjoining land to the west to create a formal sports pitch, site landscaping, sustainable drainage and other related infrastructure.	Out	No notable habitats were recorded within the site, and it was largely dominated by species-poor amenity grassland, considered to offer very little ecological value for the majority of the protected species. A small area of Japanese knotweed was recorded within the site. There is the potential for roosting and foraging bats, a 10 m buffer will be required around all boundary trees. To avoid disturbing nesting birds, all site clearance must be conducted outside of nesting season, or an ecologist should inspect areas where this is not possible. There is the potential for badgers to cross the site during construction phase and PWMs will be required.

Table 12.3: Cumulative Ecological Impacts				
Planning Reference	**Site Location**	**Description**	**Scoped In/ Out**	**Justification**
P/2018/0672	Land West Of, Crispin Lane, Mold Road, Wrexham, LL11 2HT	Outline application for student accommodation facility of up to 197 bed spaces, parking and landscaping.	In	No notable habitats were recorded in the site but the buildings, trees, hedgerows and shrub/scrub vegetation across the site were considered to provide potential habitat for roosting bats and nesting birds. Mitigation recommended to avoid disturbance to roosting and foraging bats, nesting birds and badgers. PWMs and EcCoW support to be implemented in regard to badger, nesting birds and roosting bats and sensitive lighting strategy to be implemented. General habitat and biodiversity enhancement to be incorporated. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.
P/2018/0671	Glyndwr University, Wrexham Plas Coch, Mold Road, Wrexham, LL11 2BW	Demolition of redundant student halls and outline application for up to 410 residential units with access off B5101 together with car parking, landscaping and associated infrastructure on surplus land within the overall Plas Coch Academi.	In	No notable habitats were recorded in the site but the buildings, trees, hedgerows and shrub/scrub vegetation across the site were considered to provide potential habitat for roosting bats and nesting birds. There is also the potential for foraging/commuting bats, sympathetic lighting will therefore need to be installed. There is potential for nesting birds to be encountered and disturbed during site clearance. PWMs and EcCoW support to be implemented in regard to badger, nesting birds and roosting bats and sensitive lighting strategy to be implemented. General habitat and biodiversity enhancement to be incorporated. Assuming that the above measures are implemented and providing measures outlined in this ES chapter are undertaken, it is not anticipated that these proposals would result in a cumulative effect on ecology when considered alongside the proposed development at Land at Ruthin Road.
P/2018/0588	120 Rhosnesni Lane, Rhosnesni, Wrexham, LL12 7NE	Demolition of existing shop and storage unit and outline application for residential development (13 dwellings).	Out	A bat survey was carried out, there was not considered to be any threat to the conservation status of bats, the building was not being used by roosting bats and bat activity on the site was very low. No ecological constraints to the development were identified.

Historic Environment

12.4.23 Cumulative effects on the historic environment can occur where one or more development footprint has a direct physical impact on a single historic asset, or a contiguous asset or series of closely associated assets. Also, cumulative effects can occur where multiple development proposals occur within the setting of a historic asset, affecting the contribution made by setting to the value of the asset.

12.4.24 None of the development proposals set out for the assessment of cumulative effects are in close enough proximity to the proposed development site to affect assets common to both developments, either as a result of direct physical impacts or development within the setting of an asset.

Ground Conditions

12.4.25 In respect to ground conditions and contamination, it is not considered that development at the Site would contribute to a cumulative effect in the surrounding area as risks are very low based on historic site uses.

12.4.26 Given the distance from the subject site and road network providing options for wagon movements, there is unlikely to be any interrelated effect associated with overlapping construction activities and the effects upon sensitive receptors.

12.4.27 The loss of best and most versatile agricultural soils has already been assessed as being of large or very large significance for the site in isolation. Therefore, it is expected that the development of the cumulative greenfield sites would result in the loss of further agricultural land but that the level of significance would not increase as it is already at a high level.

12.4.28 The various sites are likely to also be overlying mineral resource of a similar nature to those found at the site. As the effect upon mineral reserves have already been found to be large, the cumulative effect of further development in the local area could increase the significance to Very Large. However, most of the cumulative sites are located within or immediately surrounding residential areas, that would preclude their viability or feasibility for prior extraction. As such, whilst the potential impact of mineral sterilisation is recognised, the possibility of the cumulative sites being quarried is highly unlikely and therefore the impact on loss of minerals is theoretical in nature.

Drainage and Flood Risk

12.4.29 Given that to obtain planning permission there is to be no increase in risk to third parties as a result of any scheme, no other developments in isolation, or cumulatively, should change the baseline conditions in relation to flood risk.

12.4.30 Similarly, all developments within the Dee Catchment SAC will have to achieve nutrient neutrality to obtain planning permission or direct flows to a suitably equipped wastewater

treatment works, so no other developments in isolation, or cumulatively, should adversey affect the baseline conditions regarding phosphates entering the SAC.

12.5 Synergistic Effects

12.5.1 This section assesses the combination of some of the effects identified in the EIA on the sensitive receptors identified throughout the EIA process. As with any development, there is the potential for impacts on different components of the environment to interact, both within and outside of the immediate area of the development.

12.5.2 In terms of sensitive receptors, adjacent residential properties to the site are considered to have the potential to be affected by synergistic effects during construction, but these are notably low in number in the vicinity of the site.

12.5.3 Nearby residential properties have the potential to be affected by more than one impact at a time, due to the proximity to the site and construction works. It is possible that these properties could be exposed to visual effects, noise and occasional dust during the construction works for phases in closest proximity to them. The visual/noise/dust impacts would be mitigated to some extent through the retention and enhancement of trees and green spaces around the edges of these properties, but some residual effect is likely to remain. It is also the case that the prevailing wind is from the south-west and dust impacts would therefore be less likely for the nearest residents to the south and east than the properties to the north-east.

12.5.4 It is recommended that the Construction Environmental Management Plan (CEMP) focuses on measures to reduce the impacts on the sensitive residential receptors around the site. Means by which effects on these properties can be mitigated should be agreed in consultation with the occupants and Wrexham CBC and set out in the CEMP. This will include tree planting/hoarding to minimise visual intrusion, best practice on site with regards to noise and light and establishing a hotline/appointing a Community Liaison Officer for any neighbour to report concerns. It is also recommended that principal contractors should sign up to the Considerate Constructors Scheme and that all subcontractors should comply with the associated requirements.

12.5.5 Whilst the wellbeing of residents is of principal importance during the development process, it must also be recognised that construction inevitably generates some local disturbance, which would be of limited magnitude and duration and not of a level of significance that would make them unacceptable in planning terms.

12.5.6 Overall, the potential interaction of construction stage effects, whilst recognised by the applicant, are limited in significance due to the small number of sensitive receptors in the surrounding area and the best practice construction methods proposed. Accordingly, the temporary synergistic effect at the construction stage is considered to be of negligible significance.

12.6 Summary

12.6.1 This section of the ES has considered the cumulative effects of the proposals in combination with other local development projects. It is concluded that there are few significant potential

impacts beyond those identified within the technical assessments that form part of this ES due to the distance between the sites and the small scale of the majority of the other developments. However, there is likely to be a cumulative effect of multiple developments upon mineral reserves and agricultural soils, albeit that this is difficult to avoid entirely in an area with extensive areas of mineral safeguarding and higher grade agricultural soils.

12.6.2 The assessment also considered the potential for the interaction of environmental effects upon individual receptors. In this respect, it was concluded that the nearest residential properties could experience a combination of effects at the construction stage and that best practice during construction should be observed to minimise disturbance to these receptors.

13 Summary and Conclusions

13.1.1 This Environmental Statement is prepared on behalf of Redrow Homes Ltd in support of an outline planning application, with details of access, for a residential-led, mixed-use development on 72.85ha of land to the west of Wrexham. The scheme proposes up to 1,450 dwellings along with a local centre, a primary school and public open space and is fully in accordance with the adopted Local Development Plan.

13.1.2 A comprehensive assessment of the potential effects of the construction and operational phases of the proposed development has been undertaken as part of this EIA to establish the environmental effects associated with the development. The EIA and the design of the proposals have been conducted as an iterative process and, through this assessment process, many measures have been embedded into the design in order to avoid, reduce or offset negative effects.

13.1.3 Those effects which occur during the construction phase are largely temporary or reversible in nature. Construction activities will be controlled by a Construction Environmental Management Plan (CEMP) developed in conjunction with Wrexham CBC and relevant consultees. The CEMP will incorporate the mitigation measures set out in this ES and will outline how the effects of demolition and construction can be managed by good practice and environmental controls which are routinely and successfully applied on other similar development proposals.

13.1.4 The majority of the environmental impacts of the operational development are of negligible or minor significance and have been mitigated through good design or through the measures described above wherever possible. The limited number of impacts which are of greater than minor significance, such as the landscape impacts associated with the change from greenfield land to a developed site, are an unavoidable consequence of the type and scale of development proposed on currently undeveloped sites. Significant effects in relation to the loss of minerals and soils at the site have also been mitigated through a proposed materials management plan, and it has been accepted by Wrexham CBC in the site allocation process that the delivery of housing around Wrexham will inevitably lead to the loss of some areas of high-quality soils.

13.1.5 Overall, the proposed development complies with the Local Development Plan and national planning policies. It has been designed to avoid, minimise or offset its adverse environmental effects and will generate significant benefits for local people, particularly in relation to the delivery of a high-quality homes and greenspace, affordable housing, a school and new employment opportunities within the local centre. From the point of view of the predicted environmental effects, there is no reason why planning permission should not be granted.

13.1.6 A summary of the potential environmental effects, the proposed mitigation measures and any residual effects is presented the tables below.

Landscape and Visual

Receptor	Significance	Mitigation	Residual Effect
Construction and Demolition			
The Site and its immediate surroundings	Moderate adverse	Protection of all retained trees and hedgerows in accordance with BS5837:2012. The works will be subject to a CEMP which will outline working hours, lighting levels and methods of enclosure.	Moderate adverse
NLCA 13: Deeside and Wrexham	Negligible	N/A	Negligible
LCA 7d: West Wrexham Ridges and Valleys	Moderate adverse	Hoarding and other forms of fencing will protect site vegetation and partially screen the works. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
LCA 9a: Clywedog Valley Plas Power and Bersham	Minor adverse	Hoarding and other forms of fencing will protect site vegetation and partially screen the works. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
LCA 10: Wrexham Town	Negligible	N/A	Negligible
LCA 13a: Welsh Maelor	Negligible	N/A	Negligible
Users of PRoW Footpath BER/4	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Byway BER/4	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Bridleway BER/3 and Footpath WRE/21	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Footpath BER/1	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Footpaths ESC/5 and BER/2 (along River Clywedog)	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse

Users of PRoWs to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range	Minor adverse	N/A	Minor adverse
Users of Ruthin Road	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Users of Croesnewydd Road	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Users of Berse Lane	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Bersham Road	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of Homestead Lane	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Users of A483	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Users of minor roads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range	Minor adverse	N/A	Minor adverse
Residents of properties off Ruthin Road	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Residents of properties along Bersham Road	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Residents of properties along The Homestead	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Residents of property at Bryn-moel	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse

Residents of scattered residential properties and farmsteads to the west of the Site in the vicinity of Hafod Wenm, The Wern, Coedpoeth and the Clwydian Range	Minor adverse	N/A	Minor adverse
Visitors to Brickfield Rangers FC	Moderate adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Moderate adverse
Visitors to Ysgol Clywedog Secondary School	Minor adverse	Hoarding around Site to screen construction activity. Noise, and periods of activity will be set out in the CEMP.	Minor adverse
Completed Development			
The Site and its immediate surroundings	Moderate adverse	Retain and enhance existing levels of planting and use native species where appropriate as part of a comprehensive landscape scheme. Appropriate monitoring of vegetation and replacement of trees and shrubs for a minimum of five years.	Minor adverse
NLCA 13: Deeside and Wrexham	Negligible	N/A	Negligible
LCA 7d: West Wrexham Ridges and Valleys	Moderate adverse	Retain and enhance existing levels of planting and use native species where appropriate as part of a comprehensive landscape scheme. Appropriate monitoring of vegetation and replacement of trees and shrubs for a minimum of five years.	Minor adverse
LCA 9a: Clywedog Valley Plas Power and Bersham	Minor adverse	Retain and enhance existing levels of planting and use native species where appropriate as part of a comprehensive landscape scheme. Appropriate monitoring of vegetation and replacement of trees and shrubs for a minimum of five years.	Minor adverse
LCA 10: Wrexham Town	Negligible	N/A	Negligible
LCA 13a: Welsh Maelor	Negligible	N/A	Negligible

Users of PRoW Footpath BER/4	Major adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Major adverse
Users of Byway BER/4	Major adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Major adverse
Users of Bridleway BER/3 and Footpath WRE/21	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Users of Footpath BER/1	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Users of Footpaths ESC/5 and BER/2 (along River Clywedog)	Negligible	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Negligible
Users of PRoWs to the west of the Site in the vicinity of Hafod Wen, the Wern, Coedpoeth and the Clywdian Range	Minor adverse	N/A	Minor adverse
Users of Ruthin Road	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse

Users of Croesnewydd Road	Minor adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Users of Berse Lane	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Users of Bersham Road	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion. POS along the southern site boundary to Bersham Road.	Moderate adverse
Users of Homestead Lane	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Users of A483	Minor adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Users of minor roads to the west of the Site in the vicinity of Hafod Wen, The Wern, Coedpoeth and the Clwydian Range	Minor adverse	N/A	Minor adverse

Residents of properties off Ruthin Road	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Residents of properties along Bersham Road	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion or as advanced planting.	Moderate adverse
Residents of properties along The Homestead	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse
Residents of property at Bryn-moel	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting.	Moderate adverse
Residents of scattered residential properties and farmsteads to the west of the Site in the vicinity of Hafod Wenm, The Wern, Coedpoeth and the Clwydian Range	Minor adverse	N/A	Minor adverse
Visitors to Brickfield Rangers FC	Moderate adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Moderate adverse
Visitors to Ysgol Clywedog Secondary School	Minor adverse	Implementation of the Landscape and Ecological Management Plan (LEMP) for strategic planting. Planting introduced as soon as possible post completion.	Minor adverse

Ecology

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Demolition and Construction				
Semi-improved Neutral Grassland	Overall loss of this habitat, despite embedded retention in masterplan framework.	Negative significant effect at IZoI.	Strategically designed provision of diverse grassland habitat within areas of POS will provide higher quality grassland than that currently within the site.	Positive significant effect at IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
Hedgerows	Loss of this habitat, despite embedded retention of hedgerows where possible in masterplan framework.	Negative significant effect at the Local level.	Strategically designed provision of hedgerow habitat within areas of POS and through development parcels will maintain and enhance the hedgerow resource across the site and the condition of hedgerows.	Positive significant effect at IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at the Local level.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
Semi-natural Broad-leaved Woodland	Potential degradation through construction pollution events on ancient semi-natural broad-leaved woodland	Negative significant effect at IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Scattered Broad-leaved Trees	Masterplan has sought to retain as many trees as possible although some loss does occur.	Negative significant effect at the IZoI.	Landscape strategy will ensure diverse tree provision in areas of POS and through development parcels to maintain and enhance the tree resource across the site.	Positive significant effect within the IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at the IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
Standing Water and Flowing Brooks	Embedded retention and enhancement of pond P1 in draft landscape strategy.	Positive significant effect within the IZoI.	n/a	Positive significant effect within the IZoI.
	Potential degradation through accidental encroachment and construction pollution events.	Negative significant effect at IZoI.	Implementation of habitat protection measures and pollution prevention measures through the CEMP.	Not significant.
	Loss of sections of the central ditch/brook in three places to facilitate road access	Negative significant effect at IZoI.	Enhancement of retained sections of the watercourse to be of benefit for wildlife	Positive significant effect within the IZoI.
Native Bluebell	Loss of native bluebells due to site clearance.	Negative significant effect at IZoI.	Implementation of Bluebell Mitigation Method Statement.	Not significant.
Badger	Destruction of three badger setts including one main sett through accidental encroachment or due to development.	Negative significant effect at the Local level.	Preconstruction survey to determine need for detailed mitigation. Protection of retained setts adhering to 30 m buffer zones. NRW Mitigation Licence acquired for any sett if works are to cause impacts.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
	Reduction in the availability of foraging and commuting habitat within the site and restriction to dispersal from setts to the wider landscape.	Negative significant effect at the Local level.	Connectivity between setts and the surrounding landscape will be considered during construction when erecting protective fencing and within draft landscape strategy to ensure badger commuting routes around the site are maintained, fragmentation is avoided and minimised where necessary and access to foraging habitat in the south is provided.	Not significant.
	Potential to cause killing or injury of badgers should they get trapped within groundworks or range around the site during clearance, earthworks or construction.	Negative significant effect at the Local level.	Preconstruction survey to determine need for detailed mitigation. Implementation of PWMs.	Not significant.
Roosting Bats	Loss of trees with bat roost habitat suitability.	Negative significant effect at the Local level.	Installation of a range of bat boxes on suitable retained trees for mitigation and enhancement.	Positive significant effect within the IZoI.
	Potential for killing/ injury of roosting bats and/or damage/destruction of bat roosts during removal or pruning of trees with bat roost habitat suitability and of confirmed day roost at T172 (if removal is required).	Negative significant effect at the Local level.	Implementation of PWMs for soft felling/ pruning under supervision of licensed bat ecologist. NRW Mitigation Licence acquired for confirmed roost if works are to cause impacts.	Not significant.
	Potential for direct damage and disturbance of retained trees with bat roost suitability from construction activities.	Negative significant effect at the Local level.	Protection of trees with a buffer zone based on root protection area as a minimum.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Foraging and Commuting Bats	Loss of habitats of moderate value for supporting commuting and foraging bats.	Negative significant effect at the Local level.	Landscape strategy will deliver woodland, shrub, hedgerow and diverse grassland planting and retain key boundary habitats providing linear connectivity across the site.	Positive significant effect within the IZoI.
Breeding Birds	Site clearance will lead to the loss of a range of habitats which provide nesting opportunities for up to 37 species.	Negative significant effect at the Local level.	Installation of a range of bird boxes on suitable retained trees for mitigation prior to vegetation removal. Draft landscape strategy will deliver woodland, shrub and hedgerow planting creating new foraging and nesting habitat for birds.	Positive significant effect within the IZoI.
	Potential for killing and injury to nesting birds and their young.	Negative significant effect at the Local level.	Vegetation clearance outside bird nesting season or undertake nesting bird checks prior to vegetation removal.	Not significant.
Amphibians	Site clearance will lead to the loss of a range of terrestrial habitats which possibly provide refuge, foraging and commuting habitat for amphibians and may result in the killing or injury of common amphibians.	Negative significant effect at IZoI.	Implementation of PWMMS for vegetation clearance under supervision of an EcCoW.	Not significant.
Hedgehog	Site clearance will lead to the loss of a range habitats which possibly provide refuge, foraging and commuting habitat for hedgehogs and may result in their killing or injury.	Negative significant effect at IZoI.	Implementation of PWMMS for vegetation clearance under supervision of an EcCoW.	Not significant.
Polecat	Site clearance will lead to the loss of a range habitats which possibly provide refuge, foraging and commuting habitat for polecats and may result in their killing or injury.	Negative significant effect at IZoI.	Implementation of PWMMS for vegetation clearance under supervision of an EcCoW.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Completed Development				
Semi-improved Neutral Grassland	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at IZoI.	Implementation of LEMPs to manage and maintain habitats in good condition in the long-term.	Not significant.
Hedgerows	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at the Local level.	Implementation of LEMPs to manage and maintain habitats in good condition in the long-term.	Not significant.
Semi-natural Broad-leaved Woodland	Degradation of habitat due to increased resident recreational pressure.	Negative significant effect at the Local level.	Implementation of LEMPs to manage and maintain habitats in good condition in the long-term.	Not significant.
Scattered Broad-leaved Trees	Degradation of habitat due to poor management and maintenance.	Negative significant effect at IZoI.	Implementation of LEMPs to manage and maintain trees in good condition in the long-term.	Not significant.
Standing Water and Flowing Brooks	Degradation of habitat due to poor management and maintenance.	Negative significant effect at IZoI.	Implementation of LEMPs to manage and maintain pond P1 and ditches/brooks in good condition in the long-term.	Not significant.
Native Bluebell	Degradation of population due to increased resident recreational pressure.	Negative significant effect at IZoI.	Implementation of LEMPs to manage and maintain native bluebell population and other ancient woodland indicator flora in good condition in the long-term.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
Badger	Road infrastructure within the site fragmenting badger foraging habitat and commuting routes and increasing risk of injury and death associated with vehicle collision.	Negative significant effect at the Local level.	Implementation of LEMPs to assess badger collision rates and manage and maintain habitat strategically designed to provide connectivity around the site for badger in order to minimise road use.	Negative significant effect at the IZoI.
	Lighting disturbance of badger dispersal corridors within the site.	Negative significant effect at the Local level.	Implementation of a Sensitive Lighting Strategy.	Not significant.
Roosting Bats	Avoidance of potential roost sites in trees and installed boxes due to inappropriate lighting.	Negative significant effect at the Local level.	Implementation of a Sensitive Lighting Strategy.	Not significant.
	Buildings and trees incorporated into the proposed development may over time develop roosting habitat suitable for use by bats, which would provide habitat enhancements where previously arable habitat dominated.	Positive significant effect at the Local level.	N/A	Positive significant effect at the Local level.
Foraging and Commuting Bats	Poor management of trees and hedgerows where roads intersect features used by commuting and foraging bats could result in the erosion of bat commuting corridors causing displacement and exclusion from habitats within the site.	Negative significant effect at the Local level.	Implementation of LEMPs to manage and maintain habitat strategically designed to provide connectivity and hop-over featues around the site for bats in order to minimise erosion of commuting routes for more sensitive species.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
	Lighting disturbance of bats foraging and commuting within the site and locality causing displacement and exclusion from habitats within the site.	Negative significant effect at the Local level.	Implementation of a Sensitive Lighting Strategy	Not significant.
Breeding Birds	Predation of birds by increased cat population.	Negative significant effect at the Local level.	Offset by increase in suitable habitats for specific urban birds i.e., POS, gardens, hedgerows and scrub and inclusion of nest boxes.	Not significant.
	Lighting disturbance of breeding birds nesting habitat.	Negative significant effect at IZoI.	Implementation of a Sensitive Lighting Strategy	Not significant.
	Buildings, shrubs, hedgerows and trees incorporated into the proposed development will over time develop nesting habitat suitable for use by breeding birds, which would provide habitat enhancements where previously arable habitat dominated. Landscaping and enhancement of habitats retained within the site will also increase the foraging resource for breeding birds within the site.	Positive significant effect at IZoI.	N/A	Positive significant effect at IZoI.
Amphibians	Predation of amphibians by increased cat population.	Negative significant effect at the IZoI.	Offset by increase in suitable habitats for amphibian refuge i.e., POS, gardens, hedgerows and scrub.	Not significant.
	Road infrastructure within the site increasing risk of injury and death associated with vehicle collision.	Negative significant effect at the IZoI.	Implementation of Landscape and Ecological Management Plans (LEMPs) to manage and maintain habitat strategically designed to provide connectivity around the site for wildlife in order to minimise road use.	Not significant.

Important Ecological Feature	Potential Effect	Significance	Mitigation	Residual Effect
	Woodland, grassland, shrubs, hedgerows, swales and enhanced P1 habitat incorporated into the proposed development will increase the refuge and foraging resource for amphibians within the site.	Positive significant effect at the IZoI.	N/A	Positive significant effect at the IZoI.
Hedgehog	Road infrastructure within the site increasing risk of injury and death associated with vehicle collision.	Negative significant effect at the IZoI.	Implementation of Landscape and Ecological Management Plans (LEMPs) to manage and maintain habitat strategically designed to provide connectivity around the site for wildlife in order to minimise road use.	Not significant.
	Woodland, grassland, shrubs, hedgerows, swales and residential garden habitat incorporated into the proposed development will increase the refuge and foraging resource for hedgehogs within the site.	Positive significant effect at the IZoI.	N/A	Positive significant effect at the IZoI.

Archaeology and Heritage

Potential Effect	Significance	Mitigation	Residual Effect
Construction and Demolition			
Grade II* Listed Lower Berse Farmhouse (Asset ID LB1)	Moderate (adverse)	Provision of HIA and relevant design principles. Record of the building.	Minor (adverse)
Potential former moat at Lower Berse Farm (Asset ID A17)	Minor (adverse)	Archaeological programme of work (conditioned)	Negligible
Non-designated historic buildings at Lower Berse Farm (Asset ID A18)	Minor (adverse)	Record of the building and historic environment input to final design	Negligible

Former extent of parkland at Plas Power Park (Asset ID A110)	Negligible	None	Negligible
Stonework in bank of watercourse	Minor (adverse)	Archaeological programme of work (conditioned)	Negligible
Historic landscape features (public rights of way and field boundaries)	Minor (adverse)	Archaeological programme of work (conditioned)	Negligible
Completed Development			
Grade II* Listed Lower Berse Farmhouse (Asset ID LB1)	Minor (adverse)	Design principles	Minor (adverse)
Non-designated buildings at Lower Berse Farm (Asset ID A18)	Negligible	None	Negligible
Bersham Conservation Area (Asset ID CA1), and associated listed buildings (Bridge Cottages, LB20; Squire Cottage, LB21; and 9-10 Bunkers Hill, LB22)	Minor (adverse)	Design principles	Minor (adverse)
Non-designated Bersham Hall and gardens (Asset ID A68)	Negligible	None	Negligible
Bersham Ironworks (SM1) and associated grade II * listed buildings (Octagonal building, LB6; Single storeyed building, LB7) and grade II listed mill (LB35)	None	None	None
Grade II listed No1-3 Laurel Grove (Asset ID LB24)	None	None	None
Offa's Dyke (SM DE181,182)	None	None	None
Non-designated Fawnog (Asset ID A24)	Minor (adverse)	Design principles	Minor (adverse)
Bryn-moel - Pritchard's Tenement (Asset ID 109)	Minor (adverse)	Design principles	Minor (adverse)
Former extent of parkland at Plas Power Park (Asset ID 110)	Negligible	Design principles	Negligible

Ground Conditions, Minerals and Soils

Demolition and Construction Phase

Nature of Impact	Receptor	Sensitivity	Impact Magnitude	Significance of Effect	Mitigation	Residual Significance of Effect
Demolition and Ground Works associated with Construction Phase	Human Health	High	Minor (adverse)	Slight	Asbestos survey / monitoring / PPE / CEMP / Control measures in Remediation Strategy	Negligible
Fuel Storage	Controlled Waters – Underlying Aquifer	Low	Minor (adverse)	Slight	Storage as per measures in CEMP / Remediation strategy	Negligible
	Human Health	High	Minor (adverse)	Slight		
Contact with contaminated Soils	Controlled Waters – Underlying Aquifer	Low	Moderate (adverse)	Slight	Removal from Site / Remediation strategy	Negligible
	Human Health	High	Major (adverse)	Large	Hardstanding / soft standing cover system / Remediation Strategy / removal from site	Negligible

Export Materials from Site	Human Health (during excavation and transport)	High	Minor (adverse)	Slight	Waste legislation / CL:AIRE DoWCoP MMP/ CEMP	Negligible
	Human Health (long term on site)	High	Negligible	Neutral		Negligible
Import of Materials / Stockpiles	Human Health	High	Minor (adverse)	Slight	Waste legislation / CL:AIRE DoWCoP MMP / CEMP	Negligible
	Controlled Waters – River Clywedog	Medium	Minor (adverse)	Slight		
Excavations, Earthworks and Installation of Foundation Structures	Controlled Waters – Underlying Aquifer	Low	Moderate (adverse)	Slight	CEMP / Remediation strategy	Negligible
	Human Health	High	Minor (adverse)	Slight - Moderate		Negligible
Minerals Sterilisation	Sand and Gravel Resource (up to 40 ha)	High	Major (adverse)	Large	MMP/SRMP Potential re-use on site as building material or transferred for use off-site.	Large
Soil loss	Soil ALC Grade 1 (3.4ha) loss	Very High	Minor (adverse)	Large	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration.	Moderate

	Grade 2 (22.5 ha)	Very High	Major (adverse)	Very Large	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration. Some of an area identified for Strategic Open Use is likely to be Grade 2 land. Soil not likely to be stripped from this area and land quality maintained.	Large
	Subgrade 3a (37.1 ha)	High	Major (adverse)	Very Large	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration. Some Subgrade 3a land in the SW of the site is identified for Public Open Use. Soil not likely to be stripped from this area and land quality maintained.	Large
	Subgrade 3b (6.1 ha)	Medium	Moderate (adverse)	Moderate	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration.	Slight
	Grade 4 (1.6 ha)	Low	Minor (adverse)	Slight	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration.	Slight
	Non-agricultural (6.8 ha)	Negligible	Negligible	Neutral	MMP/SRMP Some re-use on site for landscaping/gardens. Export to sites with soil deficit for e.g. landscaping/restoration.	Neutral

Operational Phase

Nature of Impact	Receptor	Environmental Impact	Significance of Effect	Mitigation	Residual Significance of Effect
Exposure to sub-surface surface contamination	Human Health	Negligible	Negligible	Hardstanding / soft standing cover system,	Negligible
Ingress of ground gas/radon	Human Health	Minor (negative)	Minor Adverse	Completion of ground gas monitoring throughout the site (Mitigation measures where identified)	Negligible
Storage of chemicals	Human Health	Negligible	Negligible	Storage in line with legislation	Negligible
	Controlled Waters	Negligible	Negligible		Negligible

Drainage and Water Quality

Potential Effect	Sensitivity of receptor	Mitigation	Significance (following mitigation)	Residual Effect
Construction and Demolition				
Flood Risk Onsite impacting construction workers	Construction workers: Medium	CEMP	Negligible	Low risk for the design event, noting that exceedance events may occur.
Flood Risk Offsite impacting residents and users of the surrounding area	Residents and users: High		Negligible	
Changes in Water Quality due to surface water runoff	Unnamed watercourse: Low	CEMP	Negligible	Accidental spills and contamination onsite may still occur which may impact water quality.
	River Clywedog: High	CEMP	Minor Adverse	

	Secondary aquifers: Low	CEMP	Negligible	
Operational phase				
Change in Water Quality due to surface water discharged from the development.	Unnamed watercourse: Low River Clywedog: Medium Secondary aquifers: Low	Embedded mitigation including SuDS	Negligible	N/A
Increasing potable water demand	DCWW Network: Low	NA	Low	Reduced surplus.