REPORT

Rickman's Green Village

Environmental Statement

Client: Artemis Land and Agriculture Ltd.

Reference: PC3820-RHD-ZZ-XX-RP-Z-0001

Status: Final/00

Date: 29 November 2022

Royal HaskoningDHV
Enhancing Society Together

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Document title:	Rickman's Green Village
Subtitle:	Environmental Statement
Reference:	PC3820-RHD-ZZ-XX-RP-Z-0001
Status:	00/Final
Date:	29 November 2022
Project name:	
Project number:	PC3820
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Date:	13/11/2022
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Date:	28/11/2022

Classification
Project related

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Abbreviations

Abbreviation	Description
AQAL	Air Quality Assessment Level
AQPSPG	Air Quality Partnership Supplementary Planning Guidance
BGS	British Geological Survey
BRE	British Research Establishment
CDC	Chichester District Council
CDM	Construction Design Management
CEMP	Construction Environmental Management Plan
CLR11	Contaminated Land Report 11
COSHH	Control of Substances Hazardous to Health
CSM	Conceptual Site Model
DMRB	Design Manual for Roads and Bridges
EA	Environment Agency
EIA	Environmental Impact Assessment
EP UK	Environmental Protection UK
FRA	Flood Risk Assessment
ERP	Emergency Response Plan
GEART	Guidelines for the Environmental Assessment of Road Traffic
GPCL	Guiding Principles for Contaminated Land
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
JNCC	Joint Nature Conservation Committee
LAQM	Local Air Quality Management
LNR	Local Nature Reserve
LVIA	Landscape and Visual Impact Assessment
MAGIC	Multi Agency Government Information for the Countryside
MCA	Mineral Consultation Area
MPS1	Minerals Policy Statement 1
MSA	Mineral Safeguarding Area
NPPF	National Planning Policy Framework
NSN	National Site Network
NVSR	Noise and Vibration Sensitive Receptor
NVZ	Nitrate Vulnerable Zone
OS	Ordnance Survey

PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCOC	Potential Contaminants Of Concern
PPE	Personal Protective Equipment
PPG	Pollution Prevention Guidance
PRA	Preliminary Risk Assessment
ProPG	Professional Practice Guidance on Planning and Noise
PRoW	Public Right of Way
SAC	Special Area of Conservation
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SVOC	Semi-Volatile Organic Compounds
TA	Transport Assessment
TPH	Total Petroleum Hydrocarbons
UKWIR	United Kingdom Water Industry Research
VOC	Volatile Organic Compounds
WFD	Water Framework Directive
ZTV	Zone of Theoretical Visibility

1 Introduction

1.1 Background

Chichester District Council (CDC) is currently undertaking a Local Plan review which will shape where new development will go in the Chichester District up to 2035. The Preferred Approach version of the plan was consulted on in February 2019. This version set out to provide for at least 12,350 dwellings to be delivered in the period 2016-2035. In February and March 2019, Artemis Land and Agriculture Ltd. made representations to CDC's Regulation 18 Consultation of its emerging Local Plan for the allocation of Crouchlands Farm. This representation proposed the Farm as being suitable for a range of employment and leisure uses, and the development of housing. The Council's Housing and Economic Land Availability Assessment, published September 2020 and revised in March 2021, confirmed that Crouchlands Farm is suitable, achievable and available to provide a comprehensive allocation for the delivery of commercial and tourism uses, in addition to 600 dwellings, in the north of the District.

In light of this, Artemis Land and Agriculture Ltd. is proposing the development of Rickman's Green Village, a new rural settlement, proportionate to its environment and set in the landscape, that focuses on encouraging and actively accommodating different types of walkers, cyclists and equestrians in and around the site whilst also enabling necessary car use and public transport for connections to and from the site. Up to 180 homes will be sold or rented at lower than market value for young local people, professionals and key workers, helping them to get on to the housing ladder. The Rickman's Green Village forms a small part of Crouchlands Farm, situated within CDC in the vicinity of the villages of Plaistow, Ifold and Loxwood (see **Figure 1-1**).

Artemis Land and Agriculture Ltd. has also prepared an application to rejuvenate the existing farm buildings on Crouchlands Farm and to expand its offering through the development of the 'Whole Farm Plan'. This exemplary development will become the Rickman's Green Village hub with rural food and retail opportunities, education facilities and the development of a range of premium leisure uses, including a cookery school. This will be achieved through improvements to the existing farm hub for high welfare, low impact and low intensity farming activity, the creation of a Rural Enterprise and Educational Centre, Rural Food and Retail Centre, Equestrian Centre, and glamping facilities. The 'Whole Farm Plan' will provide a ready-made centre for Rickman's Green Village, providing a range of employment and leisure facilities.

1.2 Rickman's Green Village

Rickman's Green Village covers an area of 33.5 ha and will be a high-quality, well-planned, sustainable form of development. Rickman's Green Village will provide up to 600 homes (including 30% affordable homes) to the east and west of Rickman's Lane, focused around a new village hub, including the opportunity for education provision. The homes will be built to a traditional style, comprising a range of different sizes and tenures, including affordable homes. The layout of the settlement will maximise opportunities for sustainable travel by actively accommodating pedestrian, cyclist and equestrian movements. The settlement will also be laid out to ensure any potential harm to the built and buried heritage, landscape and ecology impacts are greatly minimised. The settlement will also include a two-form entry primary school and special educational needs provision.

Rickman's Green Village would be delivered by two planning applications, as follows:

- full planning application for 108 homes (Use Class C3) (henceforth referred to as Phase 1 of the masterplan) and associated access and street network, footpaths, open spaces, plant, landscaping and site infrastructure (8.76 ha, **Figure 1-2**); and
- outline planning application (henceforth referred to as Phase 2 of the masterplan) (**Figure 1-3**) with two options:
  - o Option A - up to 412 homes (Use Class C3) and education provision including primary school (Use Class F1) and associated access, footpaths, open spaces, landscaping and site infrastructure (26.45 ha,); or
  - o Option B - up to 492 homes (Use Class C3) with associated access, footpaths, open spaces, landscaping and site infrastructure (26.45 ha).

1.3 Requirement for Environmental Impact Assessment

The requirement for Environmental Impact Assessment (EIA) comes from the Town and Country Planning (EIA) Regulations 2017 (referred to as 'the EIA Regulations'). The EIA Regulations include two schedules of development:

- Schedule 1 Development: Development of this type requires that an EIA is undertaken.
- Schedule 2 Development: Development of this type may require that an EIA is undertaken depending on the scale of the development, its characteristics, and the sensitivity of the environment in which the development will take place.

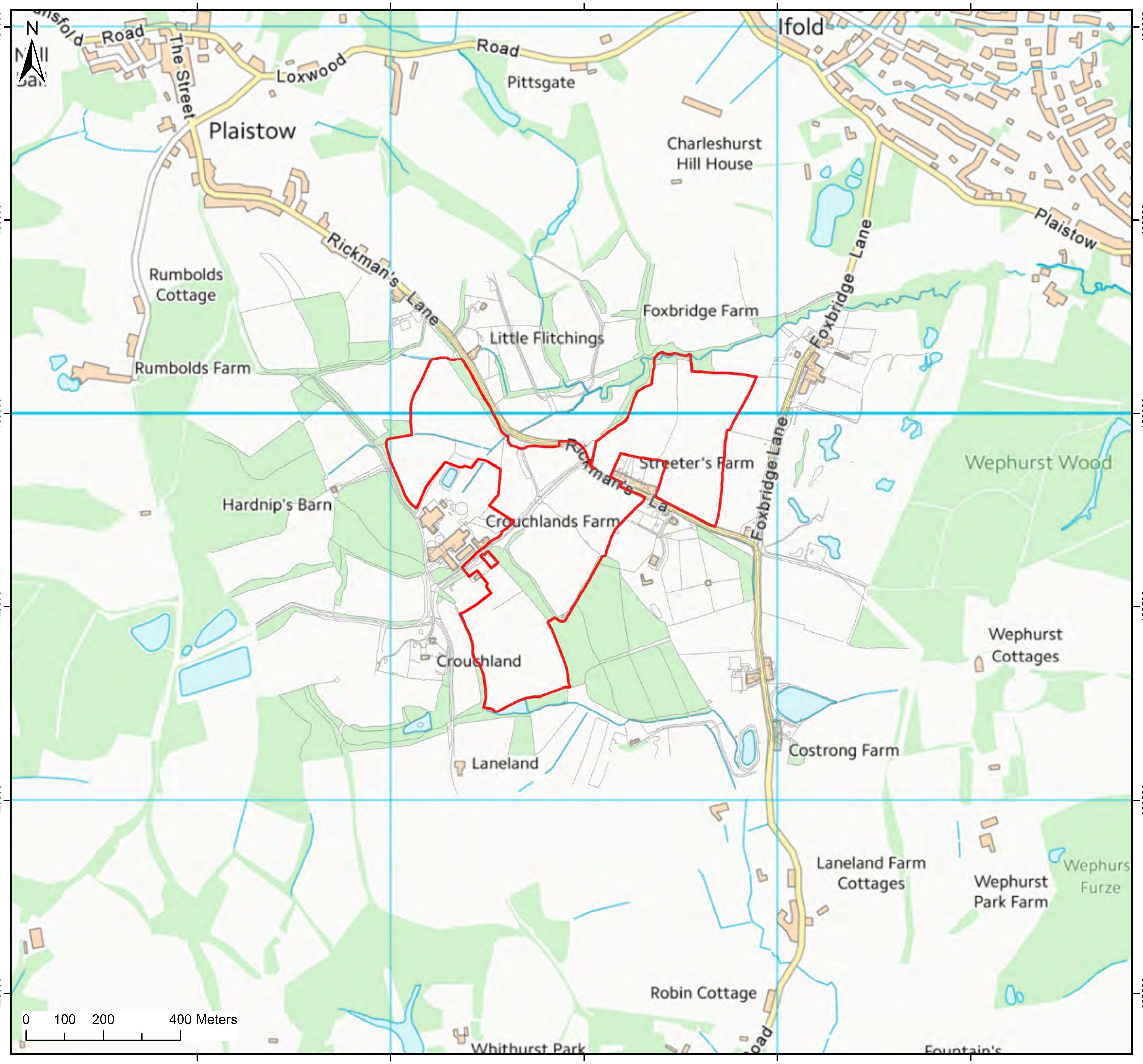
Rickman's Green Village does not fall under Schedule 1 of the EIA Regulations; however, it does qualify as a Schedule 2 development as:

10(b) *Urban development projects, including construction of shopping centres and car parks, sports stadiums, leisure centres and multiplex cinemas:*

ii The development includes more than 150 dwellings; or
iii *The overall area of the development exceeds 5 hectares.*

Given the scale of Rickman's Green Village and the character of the surrounding environment, it is considered that it does constitute an EIA Development and a request for a formal EIA Screening Opinion has not been submitted to CDC.

Therefore, this Environmental Statement (ES) has been produced to support both planning applications.



Legend:

Rickman's Green Village Combined Application Boundary

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Client:	Project:
Artemis Land and Agriculture Ltd.	Rickman's Green

Title:

Rickman's Green Village Combined Location Plan

Figure:	1.1	Drawing No:	PC3820-RHD-ZZ-XX-DR-GS-0004		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
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Co-ordinate system: British National Grid

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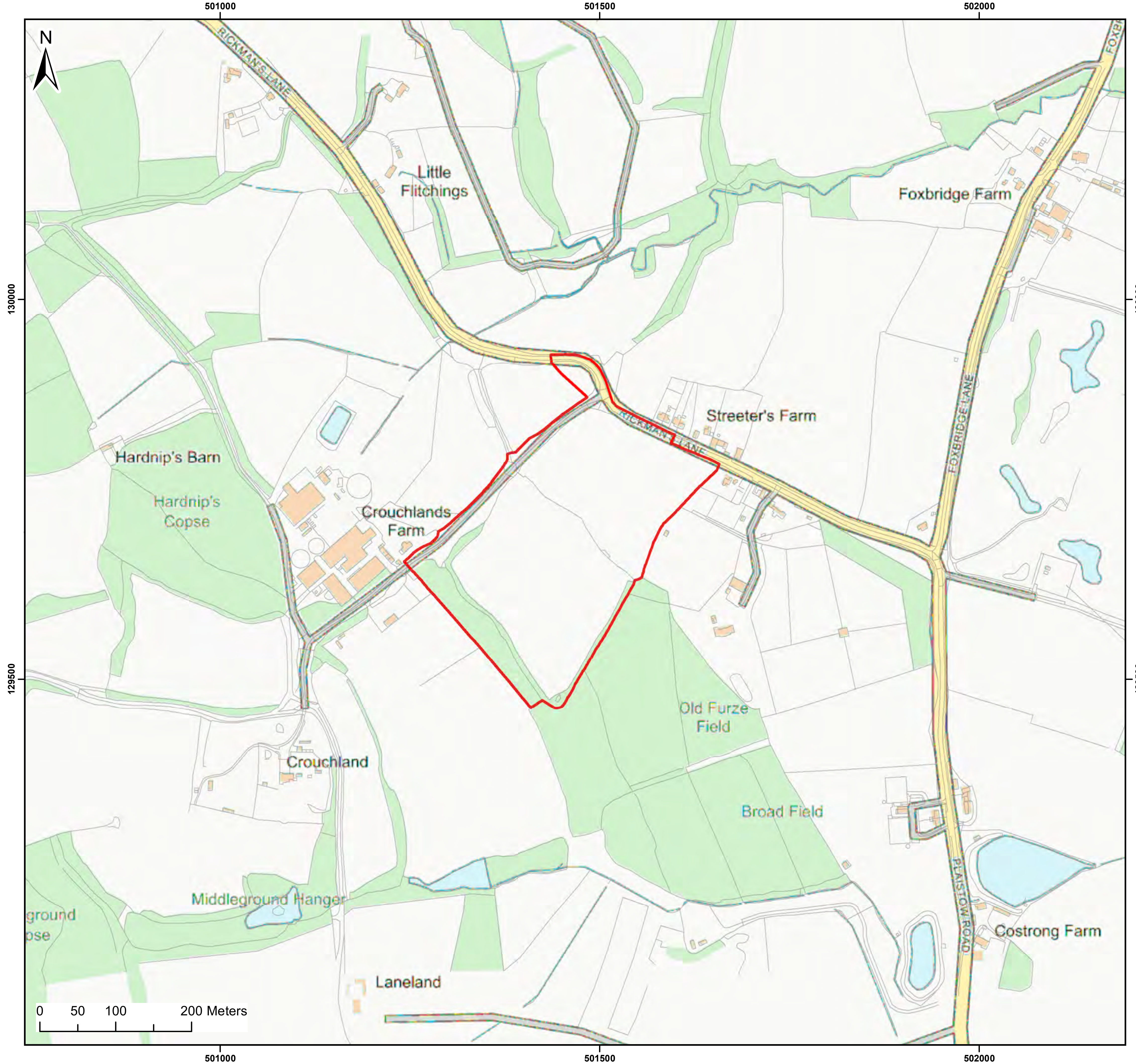

Legend:

Rickman's Green Village Phase 1 Application Boundary

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Title:

Rickman's Green Village
Phase 1 Application Location Plan

Figure:	1.2	Drawing No:	PC3820-RHD-ZZ-XX-DR-GS-0001		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
00	22/06/2022	JR	AG	A3	1:5,000

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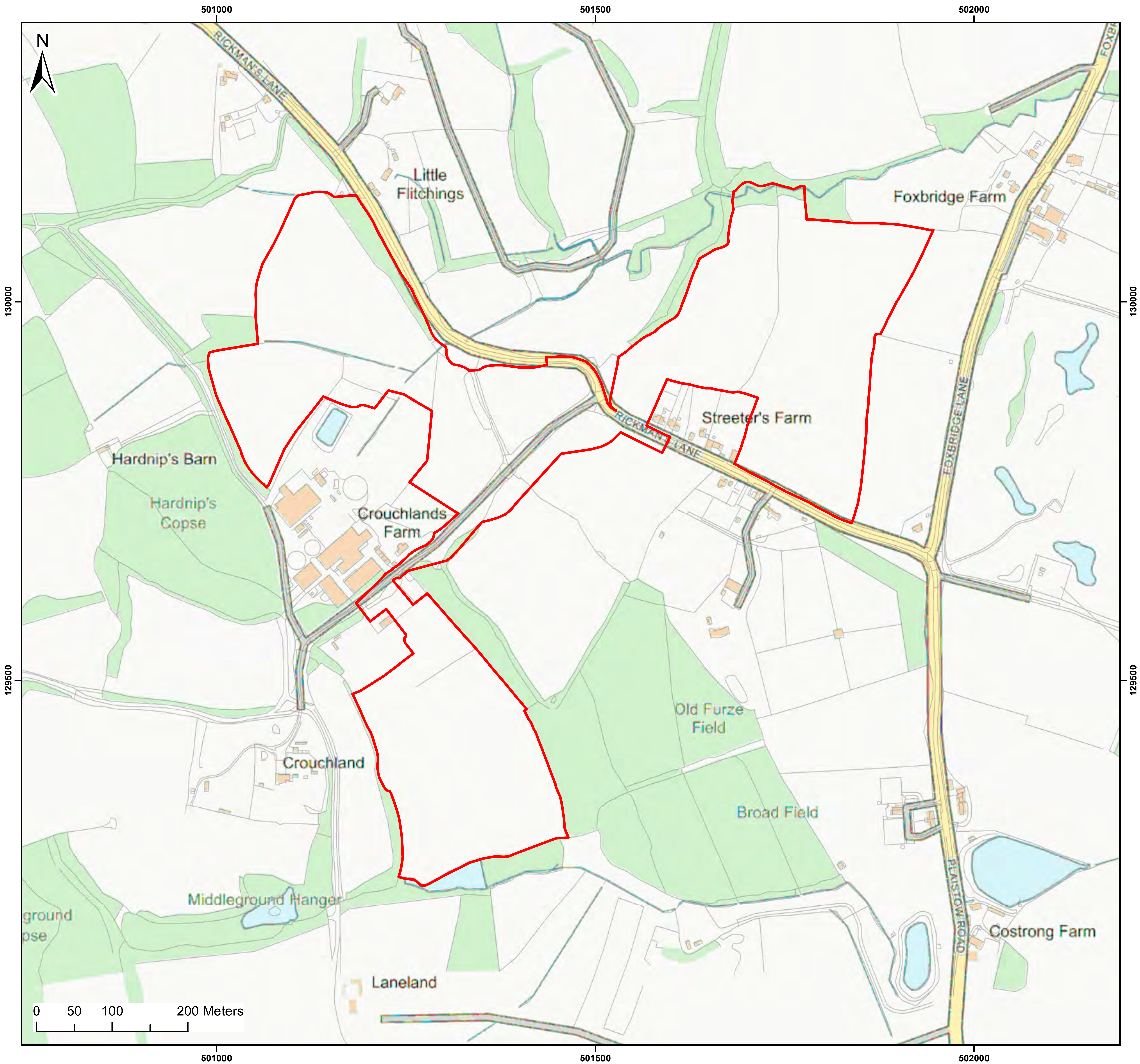

Legend:

Rickman's Green Village Outline Application Boundary

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Artemis Land and Agriculture Ltd.	Rickman's Green

Title:

Rickman's Green Village
Outline Planning Application (Phase 2)
Location Plan

Figure:	1.3	Drawing No:	PC3820-RHD-ZZ-XX-DR-GS-0003		
Revision:	**Date:**	**Drawn:**	**Checked:**	**Size:**	**Scale:**
00	22/06/2022	JR	AG	A3	1:5,000

Co-ordinate system: British National Grid

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1.4 Production of the Environmental Statement

The EIA Regulations require an ES to be prepared by competent persons. This report was compiled by Royal HaskoningDHV, a company which is a corporate member of the Institute of Environmental Management & Assessment (IEMA) (number 0001189) and also a Corporate Registered Assessor for EIA under IEMA's voluntary EIA Quality Mark scheme, through which EIA activity is independently reviewed, on an annual basis, to ensure it delivers excellence in areas including EIA management, team capabilities, regulatory compliance, content, presentation, and improving practice. The technical chapters in this ES were prepared by the authors set out in **Table 1-1**.

Table 1-1 Competence of authors of technical chapters contained in this ES.

Chapter	Author
Chapter 7 Land Quality and Hydrogeology	Royal HaskoningDHV
Chapter 8 Transport and Access	Royal HaskoningDHV
Chapter 9 Air Quality	Royal HaskoningDHV
Chapter 10 Noise and Vibration	Royal HaskoningDHV
Chapter 11 Nature Conservation and Biodiversity	Ecology Co-op
Chapter 12 Cultural Heritage and Archaeology	DLBP Ltd
Chapter 13 Landscape and Visual Setting	Sheils Flynn

1.5 Purpose of this Report

This document constitutes the ES for Rickman's Green Village and presents the findings of the EIA process. This ES was prepared in accordance with the EIA Regulations to support the two planning applications (as described in **Section 1.2** above) for Rickman's Green Village. The specific objectives of this report are to:

- define and describe the study area (i.e. physical, biological, human and built environment), the Rickman's Green Village and alternatives considered;
- identify the baseline conditions of the Rickman's Green Village site;
- identify likely significant environmental effects of Rickman's Green Village on the environment; and
- assess potential cumulative effects of Rickman's Green Village with other plans and projects.

1.6 Report Structure

Following this introductory chapter, the ES structure is as follows:

- **Chapter 2** describes the need for Rickman's Green Village;
- **Chapter 3** provides a description of Rickman's Green Village and alternatives considered;
- **Chapter 4** outlines the relevant legislation and policy taken into consideration for this EIA;
- **Chapter 5** sets out the approach to the EIA assessment methodology;
- **Chapter 6** outlines the consultation undertaken for Rickman's Green Village;
- **Chapters 7 – 13** set out the environmental assessment of Rickman's Green Village;
- **Chapter 14** presents the Cumulative Impact Assessment; and
- **Chapter 15** lists the references cited within this report.

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2 Need for the Rickman's Green Village

Rickman's Green Village will contribute to a wide range of needs including social, economic and environmental. The need for Rickman's Green Village is highlighted through the CDC local plan review, which sets out a housing need of over 12,000 dwellings to be delivered in the period 2016-2035. Multiple recent appeal decisions confirm that CDC cannot demonstrate a five year housing land supply (and this supply is reducing further with each decision).

Rickman's Green Village will contribute by providing up to 600 homes to help to meet the already established and identified need for housing in Chichester District.

To be clear, Rickman's Green Village is not being proposed to provide housing over and above the identified need in the District, but to help the District bridge the gap between current provision and identified housing need.

As part of the assessments involved with the production of the new Local Plan, a number of existing infrastructure problems have been discovered in the south of the District, relating to highways (specifically the A27) and wastewater treatment. The Council is therefore looking to the north of the District for new housing, where Crouchlands is located.

The allocation of Rickman's Green Village at Crouchlands Farm would therefore be entirely appropriate in spatial strategy terms, by seeking to utilise the whole of the District to meet the District's housing need and in particular addressing more localised housing need in this particular area of the District. The case is even more compelling in the absence of the A27 bypass being delivered.

In socio-economic terms, Rickman's Green Village will provide land for education facilities including 420 new primary school classroom places (two-form entry primary school) and special education needs provision, under the auspices of West Sussex County Council (or another appropriate body, such as an educational academy trust). This will be a significant benefit to the existing and future community. In addition, the provision of circular countryside walks will enhance recreational opportunities and will provide access for multiple users including walkers, joggers, cyclers and equestrian users, meeting leisure and recreational needs of residents of Rickman's Green Village and the wider area.

During the construction phase, Rickman's Green Village will generate a number of construction jobs. Once operational, the occupants will contribute to the economic prosperity of the local area and West Sussex more generally.

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3 Description of Rickman's Green Village

3.1 Description of the Construction Phase

Construction of Phase 1 of the masterplan (108 homes) is anticipated to begin in July 2025 with an estimated first home completion date of October 2025. Full occupation of all 108 homes is predicted to have occurred by August 2028.

Construction of Phase 2 of the masterplan (up to 412 homes + school or up to 492 homes) is anticipated to begin in May 2027 with the first home estimated completion date of September 2027. Full occupation is predicted to have occurred by October 2036. The primary school, if built, is anticipated to open with 60 pupils in September 2030, which would take seven years to reach full capacity (i.e. September 2037).

The main construction activities are anticipated to include:

- general earthworks, including topsoil stripping, excavations for foundations;
- reduced level excavations and formation;
- erection of hoardings;
- site establishment;
- infrastructure/service installation (including drainage);
- import/export of materials and plant;
- construction of new roads, parking areas and buildings; and
- landscaping.

The existing access road from Rickman's Lane will remain, and an additional access route will be created to serve the site. There will also be new routes within the red line boundary to access each of the elements of Rickman's Green Village. Heavy Goods Vehicles (HGVs) and plant servicing the construction phase, including delivery and / or removal of construction materials, would access the site from Rickman's Lane. All plant and materials would be contained within the site, or within parcels of land adjacent to the site (which is also in the applicant's ownership).

Normal working hours during construction would be Monday to Friday 07.30 - 17.30 and Saturdays 08.00 to 14.00. No works would take place on Sundays or Bank Holidays, unless in an emergency. In the event of any need to deviate from these agreed working hours, this would be agreed with CDC in advance.

A Construction Environmental Management Plan (CEMP) would be agreed with CDC prior to the commencement of Rickman's Green Village to avoid, minimise, and mitigate effects on both the environment and on people (including workers, local residents and the wider public). All construction would be carried out in line with good industry practice via the approved CEMP. The Plan would include details of mitigation for traffic (including traffic routing within the site and to the site), dust, noise, waste, odour, pollution prevention and response, as a minimum.

3.2 Description of the Operational Phase

3.2.1 The Framework Masterplan

3.2.1.1 Introduction

The framework masterplan (see **Figure 3-1** with Phase 2 Option A and **Figure 3-2** with Phase 2 Option B) illustrates a potential arrangement of development areas and open space across the Site. This has been produced in light of a thorough analysis of the Site, including desktop and on-site work (Carter Jonas, 2022). The development parcels have been set around key existing vegetation, including ancient woodland, to create a connected network of open spaces and green links across the Site. Key connections for walking and cycling can be made between the development areas, the proposed facilities at Crouchlands Farm and the wider countryside to the north and east.

Rickman's Green Village will be of the highest quality design that respects and enhances the existing character of the surrounding area. The proposal makes use of the existing agricultural field pattern to ensure the rural character of the site is maintained, as well as protecting existing woodland and hedgerows.

A linear green corridor through the centre of the development joins all areas of housing to one another, along with play and public open spaces, and commercial elements. The areas of housing will also be connected by secondary recreation routes positioned throughout the site, linking to destinations to the east and west and the surrounding area. The proposal will also retain all existing woodland and incorporates enhanced green buffers to screen the proposal from external viewpoints, and maintain the rural character of the settlement.

3.2.1.2 Sustainability

To ensure that thew new homes have a limited impact on the natural environment, modern methods of construction and sustainable design standards (including a 'fabric first approach' and RIBA 2030 Sustainable Outcomes) are being incorporated from the outset. Rickman's Green Village will promote sustainable living, connectivity, biodiversity and good health and wellbeing. Work is ongoing to determine the most effective way to both reduce energy demands by maximising the use of insulation, having predominately south facing facades, having airtight building fabric, amongst other strategies.

3.2.1.3 Housing

The new homes will be designed to reflect the villages elsewhere in this part of Sussex like Kirdford, Wisborough Green or Plaistow. The layout will be landscape-led, with trees, hedges and fields forming the backbone and backdrop to the buildings, with a focus on connectivity and promoting sustainable modes of transport. Houses will generally be of the village-street type and primarily two storeys, some two-and-a-half (two plus dormer). The homes will be built to a traditional style, comprising a range of different sizes and tenures.

3.2.1.4 Bus Service

A new frequent bus service is also proposed, between Rickman's Green Village and Billingshurst, to offer a link to the nearest town and thus connection to a range of facilities including a rail station, and the opportunity to connect with an existing bus service for onward travel to Broadbridge Heath and Horsham.

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Figure 3-1 Rickman's Green Village Framework Masterplan with Option A

Figure 3-2 Rickman's Green Village Framework Masterplan with Option B

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3.2.2 Phase 1 of the masterplan

Figure 3-3 shows the proposed site layout for Phase 1 of the masterplan. This has been designed to include:

- green infrastructure and landscaping features;
- zones for allotments;
- a central green corridor with a play space; and
- a peripheral recreational route.

3.2.3 Phase 2 of the masterplan

Phase 2 of the masterplan comprises two options:

- Option A - up to 412 homes (Use Class C3) and education provision including primary school (Use Class F1) and associated access, footpaths, open spaces, landscaping and site infrastructure (26.45 ha) (**Figure 3-1**); or
- Option B - up to 492 homes (Use Class C3) with associated access, footpaths, open spaces, landscaping and site infrastructure (26.45 ha) (**Figure 3-2**).

3.2.3.1 Education provision

In the event that Option A is taken forwards, 2.47 hectares of land would be made available as part of the proposal to facilitate future education provision, including the potential for a new 420-pupil primary school. This will use funds from both West Sussex County Council (or another appropriate body) and the Community Infrastructure Levy payment associated with Rickman's Green Village.

3.3 Alternatives

3.3.1 Do Nothing

The do-nothing scenario would mean that the sole use of the Crouchlands Farm would remain as farmland. Therefore, the proposed housing provision, job creation and education facility provision would not be realised and the gap between housing provision and housing need in the District would not be reduced. This is contrary to the CDC's local plan, which sets out the need for economic development and housing provision. Consequently, the do-nothing scenario has been discounted.

3.3.2 Full Application for 130 homes

In February and March 2019, Artemis Land and Agriculture Ltd. made representations to CDC's Regulation 18 Consultation of its emerging Local Plan for the allocation of Crouchlands Farm. This representation proposed the Farm as being suitable for a range of employment and leisure uses, and the development of 130 homes.

It is not possible to meet the whole of Chichester District's housing need within the south of the District due to various infrastructure issues, and the Council is being required by the Planning Inspectorate to look to the north of the plan area to accommodate growth. The Council will not be able to prepare a Local Plan that will be found sound by the Planning Inspectorate unless it demonstrates that it has explored all options to meet the need for housing in the District, including considering sites in the north of the District. The Council's Housing and Economic Land Availability Assessment, published September 2020 and revised in March 2021, confirmed that Crouchlands Farm is suitable, achievable and available to provide 600 dwellings (plus commercial and tourism uses) in the north of the District which will help to meet the District's housing needs.

Figure 3-3 Phase 1 Proposed Site Layout

In January 2022, the CDC Planning Policy Divisional Manager set out the Council has been testing growth scenarios for an additional 795 homes in the civil parish of Plaistow and Ifold.

It is in this context that 130 homes were discounted, as 600 homes will significantly help to bridge the large gap between housing need and the available future supply.

3.4 Decommissioning

There are no plans to decommission Rickman's Green Village, given its long-term use as residential development. Further consideration of the decommissioning phase is therefore not required.

4 Regulatory Framework

4.1 Introduction

This section of the provides details on the overarching legislative framework for Rickman's Green Village.

4.2 Town and Country Planning Act 1990

The Town and Country Planning Act 1990 is the principal legislation that governs planning permission and planning law in England and Wales. The procedural rules and regulations of this Act are set out in a number of Statutory Instruments.

4.3 Town and Country Planning (EIA) Regulations 2017

The requirement to carry out an EIA on certain planning proposals is contained within the Town and Country Planning (EIA) Regulations 2017. Rickman's Green Village is considered to fall under Clause 10(b) of Schedule 2 of these regulations and as such an EIA is being undertaken to support the planning applications.

4.4 The Conservation of Habitats and Species Regulations 2017

Regulation 63 of the Conservation of Habitats and Species Regulations 2017 (as amended) (the 'Habitats Regulations') defines the procedure for the assessment of the implications of plans or projects on National Site Network (NSN) sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA)). Whilst Ramsar sites do not form part of the NSN, they are subject to the same protections as SACs and SPAs.

Under these Regulations, if a Rickman's Green Village is unconnected with site management and is likely to significantly affect a NSN site, the statutory regulator (the 'Competent Authority') of the Rickman's Green Village must undertake an 'appropriate assessment' (Regulation 63(1)). The NSN objectives are to:

- maintain or, where appropriate, restore habitats and species listed in Annexes I and II of the Habitats Directive to a favourable conservation status; and
- contribute to ensuring, in their area of distribution, the survival and reproduction of wild birds and securing compliance with the overarching aims of the Wild Birds Directive.

Should the Rickman's Green Village, either alone or in combination with other plans or projects, be deemed to have a Likely Significant Effect on an NSN or Ramsar site (or it cannot be determined that there would not be a significant effect), then, in accordance with Section 63 of the Habitats Regulations, the competent authority must undertake an 'Appropriate Assessment' of potential adverse effects, with input from the statutory nature conservation body (i.e. Natural England).

4.5 Wildlife and Countryside Act 1981, as amended

Under the terms of Section 28(4)b of the Wildlife and Countryside Act 1981, as amended by Schedule 9 to the Countryside and Rights of Way Act 2000, any operations within, or adjacent to, a Site of Special Scientific Interest (SSSI) require approval from Natural England.

Part 1 of the Wildlife and Countryside Act 1981 (Schedule 1 to 27), makes it illegal to deliberately kill, capture, or transport most species of mammals, birds, reptiles and amphibians, as well as to destroy or damage nesting sites, or habitats on which they rely for food, shelter or breeding. In addition, Section 14 relates to invasive non-native species, making it illegal to plant or allow to escape into the wild any invasive non-native species listed in Schedule 9.

4.6 The Planning and Compulsory Purchase Act 2004

The Planning and Compulsory Purchase Act 2004 carried forward the provisions of the Town and Country Planning Act 1990, giving statutory force to a planning led system of development control. Under Section 38 of the 2004 Act, the determination of planning applications must be in accordance with the approved Development Plan for the area, unless material considerations indicate otherwise.

4.7 National Planning Policy Framework 2021

The National Planning Policy Framework (NPPF, 2021) ("the Framework") is a material consideration of significant weight to Rickman's Green Village.

Paragraph 60 of the Framework states:

To support the Government's objective of significantly boosting the supply of homes, it is important that a sufficient amount and variety of land can come forward where it is needed, that the needs of groups with specific housing requirements are addressed.

Paragraph 73 of the Framework states:

The supply of large numbers of new homes can often be best achieved through planning for larger scale development, such as new settlements or significant extensions to existing villages and towns, provided they are well located and designed, and supported by the necessary infrastructure and facilities (including a genuine choice of transport modes). Working with the support of their communities, and with other authorities if appropriate, strategic policy-making authorities should identify suitable locations for such development where this can help to meet identified needs in a sustainable way.

Rickman's Green Village seeks to address the District's identified housing need requirements and provide education facilities. As described above in **Section 3** every home will be designed with sustainable design principles to ensure a resilient and adaptable development. The homes will be built to a traditional style, comprising a range of different sizes and tenures, and will evoke an agricultural character to reflect the local rurality of the site.

4.8 Local Planning Policy Context

The adopted Development Plan for Chichester, relevant to this application, comprise:

- Chichester Local Plan (July 2015);
- Site Allocation Development Plan Document 2014 - 2029 (January 2019);
- West Sussex Waste Local Plan April 2014; and
- West Sussex and South Downs Joint Minerals Plan (2018).

CDC is currently undertaking a Local Plan review which will shape where new development will go in the Chichester District up to 2035. The Preferred Approach version of the plan was consulted on until 7 February 2019. Artemis Land and Agriculture Ltd. submitted representations to the Preferred Approach version of the plan which are now available on the Council's website. CDC has since undertaken extensive work on the Local Plan with regards to infrastructure and housing need. It is currently predicted that the Regulation 19 Local Plan will be published in winter 2022 for public consultation. Following this, the plan could be submitted to the Secretary of State for examination. The earliest adoption could happen is in Summer 2023.

Crouchlands Farm spans across Kirdford Parish and Plaistow and Ifold Parish, but the application site is located only in Plaistow and Ifold Parish. The Ifold and Plaistow Neighbourhood Plan was submitted to the Local Planning Authority in August 2018 (Artemis Land and Agriculture Ltd. submitted representations to the Neighbourhood Plan in April and October 2020 which are now available on CDC's website) but the examiner found that the plan could not proceed for a number of reasons. CDC confirmed that the Neighbourhood Plan was formally withdrawn on 18 May 2022.

4.8.1 Chichester Local Plan 2015

The site is located in the North of the Plan Area, which is predominately rural with a few sizeable settlements. Whilst conserving the rural character of the area is a key objective in the Local Plan, there is an identified need to accommodate some development to address local housing and employment needs and to support village facilities. The Local Plan is now out of date.

4.8.2 Draft Chichester Local Plan 2016 - 2035

It is important to recognise that CDC is preparing a new Local Plan to replace the adopted plan that is now out-of-date. The Preferred Approach version of the plan was consulted on in February 2019. This set out to provide for at least 12,350 dwellings to be delivered in the period 2016-2035.

The draft plan can be afforded limited weight at the current time, particularly due to the subsequent identification of highway capacity constraints in the south of the District that render previously proposed housing allocations there undeliverable in the Plan period. It is anticipated that an updated plan will be published in winter 2022, which will be afforded increased weight.

Artemis Land and Agriculture Ltd. are engaging with CDC within the local plan process to seek an allocation for Crouchlands Farm (up to 600 homes, education, and the Whole Farm Plan development).

5 Approach to EIA

5.1 Introduction

This chapter sets out the approach for the assessment of potential impacts which has been adopted within this ES. In summary, this section presents:

- the EIA process;
- the approach adopted to define the baseline environment (specific details are provided for each environmental topic considered in the relevant chapter);
- the generic approach taken to assess potential impacts, including the evaluation of significance (where a different approach has been adopted for a specific topic, this is set out in the relevant chapter);
- the generic approach taken to the derivation of mitigation measures and the assessment of residual impacts; and
- the approach taken to the assessment of potential cumulative impacts.

The approach to the EIA considers the following development scenarios:

- Development Scenario 1 - Phase 1 of the Masterplan;
- Development Scenario 2 - Phase 2 of the Masterplan; and
- Development Scenario 3 - combination Development Scenarios 1 and 2.

5.2 EIA Guidance

This EIA has been undertaken in accordance with the requirements of the Town and Country Planning (EIA) Regulations 2017, and has taken into account key policies, legislation, guidance and advice, including but not limited to the following:

- Department for Levelling Up, Housing and Communities and Ministry for Communities and Local Government (DLUHC and MCLG) "*Guidance: Environmental Impact Assessment*" (2020); and
- Chartered Institute of Ecology and Environmental Management (CIEEM) "*Guidelines for Ecological Impact Assessment in the UK and Ireland*" (2018).

It is noted that this list of guidance is not exhaustive, and the relevant guidance adopted for the assessment of each environmental parameter is described in the relevant topic chapter.

5.3 The EIA Process

EIA is an iterative tool for systematically examining and assessing the impacts and effects of the construction and operational phases of Rickman's Green Village on the environment.

In accordance with Part 5, Section 18 of the Town and Country Planning (EIA) Regulations 2017, the ES should include such information as is reasonably required to assess the likely significant environmental effects of Rickman's Green Village and which the applicant can reasonably be required to compile, including:

- a description of Rickman's Green Village comprising information on its site, design, size and other relevant features of the development;
- a description of the likely significant effects of Rickman's Green Village on the environment;
- a description of any features of Rickman's Green Village, or measures envisaged in order to avoid, prevent or reduce and, if possible, offset likely significant adverse effects on the environment;

- a description of the reasonable alternatives studied by the developer, which are relevant to Rickman's Green Village and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the environmental effects of the development on the environment; and
- a non-technical summary of the above.

EIA is a process that systematically examines and assesses the likely significant effects of a project on the environment. The process is outlined in **Table 5-1**.

Table 5-1: The EIA process

Stage	Task	Aim / objective	Work / output (examples)
Screening report (Optional)	Screening	To formally confirm route for EIA and lead responsible authority.	Appropriate level of information on proposals and approach.
Scoping study (Optional)	Scoping	To identify the potentially significant direct and indirect effects of the Rickman's Green Village.	Preliminary consultation with key consultees. Targets for specialist studies (e.g. benthic ecology survey).
EIA	Consultation	Consult with statutory and non-statutory organisations and individuals with an interest in the area and Rickman's Green Village.	Local knowledge and information.
	Primary data collection	To characterise the existing environment.	Background data including existing literature and specialist studies.
	Specialist studies	To further investigate those environmental parameters which may be subject to potentially significant effects.	Specialist reports.
	Impact assessment	To evaluate the existing environment, in terms of sensitivity. To evaluate and predict the impact (i.e. magnitude) on the existing environment. To assess the significance of the predicted effects.	Series of significant adverse and beneficial effects.
	Mitigation measures	To identify appropriate and practicable mitigation measures and enhancement measures.	The provision of solutions to minimise adverse effects as far as possible. Feedback into the design process, as applicable.
	ES	Production of the ES in accordance with EIA guidance.	ES

The approach adopted for this EIA is summarised in the following sections. It should be noted that these stages are not consecutive and overlap. For example, iterative design changes may be made in light of emerging findings of the EIA process to prevent or reduce the significance of a potential effect. This would then require re-assessment of the significance of the potential effect, potentially informed by further survey work to adequately describe the baseline environment.

5.4 Screening

Given the scale of Rickman's Green Village and the character of the surrounding environment, it is considered that it does constitute an EIA Development and a request for a formal EIA Screening Opinion has not been submitted to CDC.

5.5 Scoping

A Scoping Report was submitted to CDC on 24 June 2022. The Scoping Report provided an outline of the proposed approach to assessment and the potential environmental effects. A Scoping Opinion was received from CDC on 2 September 2022. The Scoping Opinion has been considered and used to inform the focus of the EIA for the purposes of this ES.

5.6 Environmental Statement

5.6.1 Impact Assessment

The assessment of likely significant effects presented in the ES was guided by both EIA professionals and technical specialists using available data, new data, experience and, where appropriate, expert judgement. A matrix approach was used to provide a consistent framework and system of common tools and terms, unless topic-specific guidance documents provided alternative methodologies for the determination of the significance of effects. Where different assessment methodologies were employed in the ES, these are described in the relevant technical chapters.

The impact assessment steps are detailed below.

5.6.2 Baseline Conditions

The term 'baseline conditions' is used to describe the nature, scale, condition, and other relevant information to provide a detailed description of a given environmental receptor that falls within the scope of the ES. Within this ES, the description of the baseline conditions consists of the following aspects:

- the spatial location and extent of the environmental features or receptors;
- a description of the environmental features or receptors and their character;
- the context of the environmental features or receptors in terms of rarity, function, and population at the local, regional and national level;
- the sensitivity of the environmental features or receptors in relation to physical, chemical or biological changes; and
- the value of the environmental features or receptors (e.g. designated status).

5.6.3 Impact Identification

Where appropriate to do so, the assessment has used the conceptual 'source-pathway-receptor' model. The model identifies potential impacts resulting from the proposed activities on the environment and sensitive receptors within it. This process provides an easy-to-follow assessment route between impact sources and potentially sensitive receptors ensuring a transparent impact assessment. The aspects of this model are defined as follows:

- source - the origin of a potential impact (i.e. an activity such as earthworks and a resultant effect e.g. contaminated run-off from the site);
- pathway - the means by which the effect of the activity could impact a receptor (e.g. for the example above, changes to the water quality in the watercourses affected); and

- receptor - the element of the receiving environment that is impacted (this could either be a component of the physical, ecological or human environment such as water quality, e.g. for the above example, species living on or in the watercourses affected).

Where a different approach has been necessary to reflect the specific assessment requirements of a particular topic, this is described in the corresponding technical chapter.

5.6.4 Determining Receptor Value and Sensitivity

The characterisation of the existing environment helps to determine the receptor sensitivity in order to assess the potential impacts upon it.

Receptor value considers whether, for example, the receptor is rare, has protected or threatened status, has importance at a local, regional, national or international scale and; in the case of biological receptors, whether the receptor has a key role in the ecosystem function.

The ability of a receptor to adapt to change, tolerate, and/or recover from potential impacts is key to assessing its sensitivity to the impact under consideration. For ecological receptors, tolerance could relate to short term changes in the physical environment; for human environment receptors, tolerance could relate to impacts upon community. The time required for recovery is an important consideration in determining receptor sensitivity.

The overall receptor sensitivity is determined by considering a combination of value, adaptability, tolerance and recoverability. This is achieved through applying known research and information on the status and sensitivity of the feature under consideration coupled with professional judgement and past experience.

Expert judgement is particularly important when determining the sensitivity of receptors. For example, an Annex II species (under the Habitats Directive) would have a high inherent value, but may be tolerant to an impact or have high recoverability. In this case, sensitivity should reflect the ecological robustness of the species and not necessarily default to its protected status. Example definitions of the different sensitivity levels for a generic receptor are given in **Table 5-2**.

Table 5-2: Example definitions of different sensitivity levels for a generic receptor

Sensitivity	Definition
High	Individual receptor has very limited or no capacity to avoid, adapt to, accommodate or recover from the anticipated impact.
Medium	Individual receptor has limited capacity to avoid, adapt to, accommodate or recover from the anticipated impact.
Low	Individual receptor has some capacity to accommodate, adapt or recover from the anticipated impact.
Negligible	Individual receptor is generally can accommodate or recover from the anticipated impact.

The definitions of sensitivity given within each chapter are relevant to that particular EIA topic and are clearly defined by the assessor within the context of that assessment.

In addition, for some assessments the value of a receptor may also be an element to add to the assessment where relevant, for instance if a receptor is designated or has economic value.

Example definitions of the value levels for a generic receptor are given in **Table 5-3**.

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Table 5-3: Example definitions of the value levels for a generic receptor

Value	Definition
High	Internationally / nationally important (for example internationally or nationally protected site).
Medium	Regionally important / regionally protected site.
Low	Locally important.
Negligible	Not considered to be important (for example common or widespread).

The terms ‘high value’ and ‘high sensitivity’ are not necessarily linked within a particular impact and it is important not to inflate impact significance specifically because a feature is ‘valued’. For example, a receptor could be of high value (e.g. an Annex I habitat) but have a low or negligible physical / ecological sensitivity to an effect.

5.6.5 Determining Magnitude of Effect

In order to predict the level and significance of an impact, it is necessary to establish the magnitude of effect, as well as the probability of an impact occurring through consideration of:

- scale or spatial extent (small scale to large scale or a few individuals to most of the population);
- duration (short term to long term);
- likelihood of impact occurring;
- frequency; and
- nature of change relative to the pre-impact condition of the existing environment.

5.6.6 Evaluation of Significance

Subsequent to establishing the sensitivity of the receptor and the magnitude of effect, the significance of the effect is predicted by using quantitative or qualitative criteria, as appropriate, to ensure a robust assessment. The matrix presented in **Table 5-4** has been used to provide transparency to the assessment process; however, it should be stressed that the assessments are based on the application of expert judgement.

Table 5-4: Significance of effect matrix

		Negative magnitude				Beneficial magnitude			
		High	Medium	Low	Negligible	Negligible	Low	Medium	High
Sensitivity	High	Major	Major	Moderate	Minor	Minor	Moderate	Major	Major
	Medium	Major	Moderate	Minor	Negligible	Negligible	Minor	Moderate	Major
	Low	Moderate	Minor	Minor	Negligible	Negligible	Minor	Minor	Moderate
	Negligible	Minor	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Minor

Table 5-4 provides an indication of the significance levels used in the assessment process for the majority of parameters. Any exceptions to these definitions are due to the application of best practice methodologies for a particular topic, as described above. The general approach taken in this ES is that effects which will be determined to be of major or moderate significance are considered to be ‘significant’ under the EIA Regulations. It is also possible that a moderate effect may not be considered significant under the EIA Regulations however, in these cases a justification and rationale is provided in the impact assessment text.

Descriptions of the approach to impact assessment and the interpretation of significance levels are provided within the relevant chapters of this EIA. This approach ensures that the definition of impacts is transparent and specific to each topic under consideration.

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Example definitions of the significance levels for a generic receptor are given in **Table 5-5**.

Table 5-5:Example effect significance definitions

Value	Definition
Major	Fundamental, permanent / irreversible changes, over the whole receptor, and / or fundamental alteration to key characteristics or features of the particular receptor's character or distinctiveness. May include change to key environmental characteristics which are well in excess of the natural range of variability, and likely to occur some distance away from the development area.
Moderate	Considerable, permanent / irreversible changes, over the majority of the receptor, and / or discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness. May include change to key environmental characteristics which are in excess of the natural range of variability but may be largely restricted to the development area. Change occurs throughout the associated project development phase.
Minor	Discernible, temporary (throughout project duration) change, over a minority of the receptor, and / or limited but discernible alteration to key characteristics or features of the particular receptor's character or distinctiveness. May include change to key environmental characteristics which are similar to, but occasionally in excess of, the natural range of variability. Change occurs intermittently during associated project development phase and is likely to be restricted to the development area.
Negligible	Discernible, temporary (for part of the project duration) change, or barely discernible change for any length of time, over a small area of the receptor, and/or slight alteration to key characteristics or features of the particular receptor's character or distinctiveness.

For each topic within the EIA, best practice methodology (based on the latest available guidance) has been followed, which may augment the assessment framework presented above. In all cases the specific approach taken to assess significance of effects is described within each technical chapter.

5.6.7 Mitigation

Where the assessment identifies that an aspect of the development is likely to give rise to significant environmental effects, mitigation measures were proposed and discussed with the relevant authorities in order to avoid, prevent or reduce impacts to acceptable levels.

For the purposes of the EIA, two types of mitigation are defined:

- embedded mitigation: consisting of mitigation measures that are identified and adopted as part of the evolution of the project design, and form part of the project design that is assessed in the EIA; and
- additional mitigation: consisting of mitigation measures that are identified during the EIA process specifically to reduce or eliminate any predicted significant effects.

5.6.8 Residual Effects

Following initial assessment, if the impact does not require additional mitigation (or none is possible) the residual effect will remain the same. However, if additional mitigation measures are identified, effects are re-assessed, and all residual effects clearly described.

5.6.9 Assumptions and limitations

The EIA process requires an ES to provide an indication of any difficulties (technical deficiencies or lack of expertise) encountered during the assessment process. Any such assumptions or limitations are identified within the relevant topic chapter, where appropriate.

5.7 Cumulative Impact Assessment

5.7.1 Inter-relationships between Effects

This ES has given due consideration to the potential for different residual effects to have a combined effect on key sensitive receptors. The objective is to identify where the accumulation of effects on a single receptor, and the relationship between those effects, potentially gives rise to a need for additional mitigation. Inter-relationships were assessed within the relevant sections of the topic chapters of the ES.

5.7.2 Cumulative Effects

There is no legislation that outlines how cumulative impact assessments (CIAs) should be undertaken; however, the EIA and Habitats Regulations require the consideration of direct impacts and any indirect, secondary and cumulative effects of a project. Government guidance states that: *"Each application (or request for a screening opinion) should be considered on its own merits. There are occasions, however, when other existing or approved development may be relevant in determining whether significant effects are likely as a consequence of a proposed development"* (DLUHC and MCLG, 2020). Guidance on CIA is provided in a number of good practice documents (e.g. the European Commission, 1999). This guidance is not prescriptive, but rather suggests various approaches which may be used, depending on their suitability to the project (for example the use of matrices, expert opinion, consultation, spatial analysis and carrying capacity analysis).

With respect to 'past' projects, a useful ground rule in CIA is that the environmental effects of schemes that have been completed should be included within the environmental baseline; as such, these effects will be taken into account in the EIA process and, generally, can be excluded from the scope of CIA. However, the environmental effects of recently completed projects may not be fully manifested and, therefore, the potential effects of such projects should be taken into account in the CIA.

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6 Consultation

The following sections outlines the EIA consultation that has been undertaken with CDC and key stakeholders.

6.1 Scoping Opinion

The Scoping Opinion was issued by CDC on 2 September 2022 and takes into account consultee responses from the following statutory and other consultees:

- CDC Environment Strategy Unit
- CDC Coast Protection and Land Drainage
- WSCC Highways
- WSCC Flood Risk Management
- WSCC Public Rights of Way
- Environment Agency
- CDC Archaeology
- CDC Environmental Protection
- Natural England
- National Highways
- Historic England
- South Downs National Park Authority

Table 6-1 below includes both the Scoping Opinion and key Scoping Responses received, and where these comments have been addressed in the ES.

6.2 Statutory Consultation

Details of topic specific consultation that has been undertaken is descried in the relevant chapter.

6.3 Planned Consultation

Consultation will continue to be undertaken with both the public and stakeholders as part of the planning process (through CDC).

Table 6-1 Scoping Responses and Scoping Opinion

Consultee	Comment	Project Response
CDC (including Environmental Protection, Archaeology Officer, Coast Protection and Land Drainage Officer, Environmental Strategy and Scoping Opinion)	**CDC Environmental Protection**	
	Land Contamination The approach detailed in section 5.2 of the report is considered to be acceptable and the preliminary risk assessment that will result as part of this study will determine what future conditions would be deemed appropriate in order to develop the site.	A preliminary risk assessment is provided in Land Quality Desk Top Study and Preliminary Risk Assessment, Rickman's Green Village Phase 1 (RHDHV, 2022a); and Land Quality Desk Top Study and Preliminary Risk Assessment, Rickman's Green Village Outline Planning Permission (RHDHV, 2022b). A summary is provided within **Section 7.5**. The potential impacts of air and noise emissions are considered in **Chapter 9 Air Quality** and **Chapter 10 Noise and Vibration**. An assessment of cumulative impacts with the Crouchlands Farm Whole Farm Plan is included in **Chapter 14 Cumulative Impact Assessment**.
	Air quality Section 5.5 details the approach to be taken to assess the impact of the development on air quality. Once the assessment of impacts has been made, it would be expected that mitigation measures would be proposed to mitigate the impacts on local air quality, both during the construction phase and the operational phase. Conditions would then be applicable in order to ensure that the relevant mitigation measures were put in place at the development.	
	Noise Section 5.6 details the approach to be taken to assess the impact of the development on noise levels. The assessment of operational noise should include an estimation of plant noise associated with heating/cooling systems at the future school and residential properties in order to determine likely impacts on existing noise sensitive receptors and future residential properties. Conditions would be applied to secure suitable measures at the future development to ensure noise criteria are met. Section 5 of the report should also have a section on foul drainage proposals and other infrastructure matters. If it is proposed to put in place an on-site waste water treatment works then an odour assessment should be undertaken as part of the environmental impact assessment. Section 5.10 of the report outlines the approach to consideration of cumulative impacts. It is noted that the Crouchlands Farm Whole Farm development will be taken into consideration with respect to assessment of impacts and the Whole Farm development should be considered as a potential source with respect to the transport, noise and air quality impact sections of the EIA for the Rickman's Green village development	
	CDC Archaeology Officer	
	Archaeology I agree with the summary of the likely effects of development on deposits of archaeological interest as outlined in the environmental scoping report. I also agree with the proposed approach to the EIA and that this should inform measures to ensure appropriate preservation and enhancement of significance. The latter should ultimately be secured via the imposition of suitable planning conditions.	A desk-based assessment has been provided in **Chapter 12 Cultural Heritage and Archaeology**.
	CDC Coast Protection and Land Drainage Officer	

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Consultee	Comment	Project Response
	Similarly to the Lead Local Flood Authority's response, we agree that the EIA will need to include a full Flood Risk Assessment and appropriate Drainage Strategy.	A Flood Risk Assessment and Drainage Strategy have been submitted with this application (Aegaea 2022).
	CDC Environmental Strategy and Scoping Opinion	
	The Council's Environmental Strategy Unit has considered the Environmental Scoping Report and has advised that the EIA should include the following elements: • Phase one habitat surveys and subsequent protected species surveys. • In addition, due to the location of the site within the buffer zone of the Mens and Ebernoe Common SACs, bat surveys will need to carried out to assess the impact of the proposed development on those European sites. • Mitigation strategies for any species found on site • Consideration and safeguarding of green infrastructure and connectivity across the site and into the wider landscape including the district identified wildlife corridors • Habitat enhancements onsite • Assessment of the direct and indirect impacts on protected sites • Address requirements within the Local Plan Policy 40: Sustainable Construction and Design and demonstrate how these will be met. • Impacts from climate change and planning for the future • Due to the site's location in the Sussex North Water Supply Zone a water neutrality report, showing the baseline and proposed water consumption and mitigation measures proposed will be required. • Due to the site's location within the Mens and Ebernoe Common SAC buffer zone bat surveys will need to be undertaken to assess the impact this development may have on any SAC species potentially using the site in order to undertake a Habitat Regulations Assessment.	The potential impacts on designated sites, the ecology of the area, and protected species surveys (including mitigation strategies and habitat enhancements) are considered in **Chapter 11 Nature Conservation and Biodiversity** and P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a). The potential impacts on NSN sites have been assessed within the Habitats Regulations Assessment (HRA) (Ecology Co-op, 2022b). The Phase 1 habitat survey which considered Crouchlands Farm including the Rickman's Green Village site is provided in P2645. (2018) Habitat Assessment and Ecological Appraisal (Ecology Co-op, 2018) As discussed in **Section 3.2**, sustainable design standards have been incorporated into the design of Rickman's Green Village. This is covered further within the Design and Access Statement (DAS) (HLM, 2022). Climate change and planning for the future has been considered in relation to flood risk included within the Flood Risk Assessment and Drainage Strategy (Aegaea 2022). A Water Neutrality Report has been submitted with this application (Ward Associates, 2022).

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Consultee	Comment	Project Response
	CDC Scoping Opinion	
	Habitats Regulations Assessment The site is located within the Mens and Ebernoe Common SAC buffer zone, and also within the Sussex North Water Supply Zone. The Council must therefore, as competent authority under the Habitats Regulations 2017, undertake a Habitats Risk Assessment (HRA) to assess the impact of the proposals on the Arun Valley SAC, SPA and Ramsar Site and the Mens and Ebernoe Common SACs. Whilst the HRA is a separate assessment, carried out under a separate suite of regulations to the EIA regulations, the potential impacts, and the potential effects of any proposed mitigation measures, must be included and assessment within the EIA. For assessment of impact on the Arun Valley SAC, SPA and Ramsar site, a Water Neutrality report is required to be submitted, separate to the EIA. This report will document the baseline, proposed water consumption and mitigation measures proposed in order to achieve water neutrality. However, the ES will need to consider the potential effects on the Arun Valley SAC, and also to describe and assess the effects of the proposed mitigation measures in order to achieve water neutrality. For the assessment of impact on the Mens and Ebernoe Common SACs, the suite of bat surveys necessary in order to assess the impact on the SCA species potentially using the site can be described within the ES and will be considered separately by the Council as competent authority under the Habitats Regulations in addition to consideration under the EIA Regulations.	The potential impacts on designated sites have outlined within **Chapter 11 Nature Conservation and Biodiversity** and P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).
	Biodiversity Net Gain Should a planning application be likely to be determined after November 2023, the provisions of the Environment Act 2021 relating to Biodiversity Net Gain will be mandatory. Notwithstanding the provisions of the Environment Act, paragraph 174 of the NPPF states that decisions should contribute to and enhance the natural and local environment by minimising impacts on and providing net gains for biodiversity. Natural England has advised that the ES should use an appropriate biodiversity metric such as Biodiversity Metric 3.0, together with ecological advice, to calculate the change in biodiversity resulting from the proposed development and demonstrate how the proposals can achieve a net gain.	Details on Biodiversity Net Gain are provided within the Biodiversity Net Gain Report provided with this application (Ecology Co-op, 2022d).
	Landscape and Visual Impacts Natural England has advised that the methodology for the Landscape and Visual Impact Assessment (LVIA) should be undertaken in accordance with the latest published version of the 'Guidelines for Landscape and Visual Impact Assessment' from the Landscape Institute and the Institute of Environmental Management and Assessment. For National Parks and AONBs, including impacts to the settings of these designated areas, the EIA should include assessment of the effects on the 'special qualities' of the designated landscape, as set out in the statutory management plan for the area.	The potential impacts on the Landscape and Visual Setting are considered in **Chapter 13 Landscape and Visual Setting**.

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Consultee	Comment	Project Response
	This is echoed by the consultation response from the South Downs National Park Authority (SDNP) which suggests that the EIA should include an assessment of landscape, amenity and visual impact including landscape and visual setting of the SDNP. The EIA should also refer to the relevant National Character Areas in addition to the landscape character areas of West Sussex. These provide a basis for guiding, informing, and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character. In addition, Natural England has advised that the EIA should include an assessment of the impacts on Heritage Landscapes (specifically, any land in the area affected by the development which qualifies for conditional exemption from capital taxes on the grounds of outstanding, scenic, scientific, or historic interest). The scoping report has considered the landscape character areas and sensitive receptors which have the potential to be affected by the scheme. The degree of landscape and visual effects can vary considerably during the life of the project particularly during a development of this scale, likely to have phased implementation, and so the assessment will need to include different stages of the proposed scheme to identify and assess the extent of overall impacts. Details have been provided within the Scoping report which show the Zone of Theoretical Visibility (ZTV). It is not clear whether the ZTV indicates summer or winter views, however the Council would expect that the ZTV during winter months would be used. The assessment of Landscape and visual impact includes 13 scoping viewpoints selected to represent the places from which the proposed development may be seen. On the basis of the ZTV, it is considered that in addition to the 13 identified, an additional scoping viewpoint within Ifold village should be included. Further viewpoints may need to be added depending on the extent of winter views, such as viewpoints located within the South Downs National Park. It is also expected that a cumulative ZTV, to include the proposed scheme, the Whole Farm Plan, and any other major proposals in the locality would be submitted (such as the potential redevelopment of Foxbridge Golf Club), with additional scoping viewpoints as necessary to identify locations when more than one of the proposals may be visible.	
	Impact on heritage assets The Council agrees with the Environmental Scoping Report on the fact that the development will have no direct physical impacts on any designated heritage assets, but that there is the potential that designated heritage assets may experience indirect impacts, through changes to their wider setting, thus resulting in potential harm to their significance. In addition, the masterplan is expected to protect and enhance the visibility of Chichester Cathedral's spire from the site. In addition, Natural England has advised that the EIA should include an assessment of the impacts on Heritage Landscapes (specifically, any land in the area affected by the development which qualifies for conditional exemption from capital taxes on the grounds of outstanding, scenic, scientific or historic interest).	A desk-based assessment has been provided in **Chapter 12 Cultural Heritage and Archaeology**.

Consultee	Comment	Project Response
	Climate Change Adaptation Natural England has provided guidance relating to the assessment of Climate Change within EIA and advises that the ES should identify how the development affects the ability of the natural environment (including habitats, species, and natural processes) to adapt to climate change, including its ability to provide adaptation for people. This should include impacts on the vulnerability or resilience of a natural feature (i.e., what's already there and affected) as well as impacts on how the environment can accommodate change for both nature and people, for example whether the development affects species ability to move and adapt. Nature based solutions, such as providing green infrastructure on-site and in the surrounding area (e.g., to adapt to flooding, drought and heatwave events), habitat creation and peatland restoration, should be considered. The ES should set out the measures that will be adopted to address impacts. In addition, the UK has legally binding GHG reduction targets, seeking to achieve net zero by 2050, and Environmental Impact Assessments must therefore give due consideration to how a project will contribute to the achievement of these targets. The 2022 IEMA guidance 'Assessing Greenhouse Gases Emissions and Evaluating their Significance' states that where an EIA is to be undertaken based on other factors, it is envisaged that the assessment would include greenhouse gas emissions at the scoping stage as a matter of good practice.	Climate change adaptation has been addressed in **Section 11.13** in response to this guidance by Natural England. Rickman's Green Village's design framework will be based on the Royal Institute of British Architects (RIBA) Sustainable Outcomes, and is likely to be more energy efficient than the average housing stock in the UK. The outline strategy for meeting these outcomes is detailed in the DAS (HLM, 2022). In addition, energy demands will be reduced by maximising the use of insulation, having predominately south facing facades, having airtight building fabric, amongst other strategies. The 2022 IEMA guidance 'Assessing Greenhouse Gases Emissions and Evaluating their Significance' includes significance criteria for impact assessments, which are aligned with the UK's GHG reduction targets and in particular net zero by 2030. Rickman's Green Village is not considered likely to affect the UK's ability to meet its net zero targets, and therefore GHG impacts are unlikely to be significant in accordance with the guidance set out in the IEMA guidance.
	Soil, Contaminated Land and Land Quality The Council has consulted with the Environment Agency which has advised that it is aware of a number of pollution events on this site and therefore agree with the inclusion of the requirement to establish a baseline for the land quality and hydrogeology by a Land Quality desk study and Preliminary risk assessment. The EA has provided a number of recommendations relating to contamination. The Council's Environmental Protection officers have been consulted and have advised that the approach detailed in section 5.2 of the Environmental Scoping Report is considered to be acceptable and the preliminary risk assessment that will result as part of this study will determine what future conditions would be deemed appropriate in order to develop the site. The Council will also expect the EIA to include details of the agricultural land quality of the site with details of the Agricultural Land Classification.	A preliminary risk assessment is provided in Land Quality Desk Top Study and Preliminary Risk Assessment, Rickman's Green Village Phase 1 (RHDHV, 2022a); and Land Quality Desk Top Study and Preliminary Risk Assessment, Rickman's Green Village Outline Planning Permission (RHDHV, 2022b). A summary is provided within **Section 7.5**.

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Consultee	Comment	Project Response
	Water Quality, Flood Risk and Drainage The Council has consulted with WSCC Lead Local Flood Authority and its own Coastal and Water Management Officers who have advised that the EIA should include a full Flood Risk Assessment and proportionate Drainage Strategy. In addition, the EA has advised that the Environment Scoping Report needs to include provision for surface water drainage and appropriate mitigation measures to protect controlled waters both during the construction and operational phases of the development. A risk assessment to be carried out to determine the level of treatment required prior surface water being discharged to ground, the results of this incorporated into the EIA. Piling has the potential to mobilise contamination, and therefore if piling is proposed a piling risk assessment is required to demonstrate that the risks to controlled waters can be mitigated against, the results of which should be incorporated into the EIA. Furthermore the EA has advised that as a major development, the proposed development would be expected to connect to Mains Sewage. The Council's Environmental Protection Officer has advised that the EIA should include consideration of proposals relating to foul drainage.	A Flood Risk Assessment and Drainage Strategy have been submitted with this application (Aegaea 2022). Impacts on groundwater and surface water associated with Rickman's Green Village are covered within **Chapter 7 Land Quality and Hydrogeology**. If piling is proposed as part of detailed design, a piling risk assessment will be undertaken which would be informed by a Ground Investigation. Consideration of foul drainage will be included within an addendum to the EIA.
	Air Quality The Council's Environmental Health Officer has advised that the approach described in Section 5.5 of the Environmental Scoping Report is acceptable. Once the assessment of impacts has been made, it would be expected that mitigation measures would be proposed to mitigate the impacts on local air quality, both during the construction phase and the operational phase. Conditions would then be applicable in order to ensure that the relevant mitigation measures were put in place at the development. Natural England has advised that the ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts on air quality. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk). The Council's Environmental Protection Officers have advised that if an on-site waste water treatment works is proposed, an odour assessment should be undertaken as part of the environmental impact assessment.	Potential impacts to air quality associated with Rickman's Green Village are considered within **Chapter 9 Air Quality** and mitigation measures are recommended where required. Consideration of foul drainage, including odour, will be included within an addendum to the EIA.
	Noise and Vibration The Council's Environmental Protection Officer have advised that the assessment of operational noise should include an estimation of plant noise associated with heating/cooling systems at the future school and residential properties in order to determine likely impacts on existing noise sensitive receptors and future residential properties. Conditions would be applied to secure suitable measures at the future development to ensure noise criteria are met.	Potential impacts associated with noise and vibration are considered in **Chapter 10 Noise and Vibration**.

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	Socio-economics The socio economics assessment should provide an impact assessment of a development on relevant social economic indicators. There is no specific requirements or 'standard' practice guidance for the socio-economic assessment, and assessments typically include consideration of the demographic, economic and housing provide of the local and wider area, along with consideration of social infrastructure, such as healthcare, education and open space. The socio-economic assessment could also include an assessment of the proposal on the viability of the farm unit. The cumulative impact with the Whole Farm Plan proposal should also be assessed.	An Economic and Social Impact Assessment will follow as part of the addendum to the EIA.
	Transport and Access Both West Sussex County Council Local Highways Authority and National Highways state that any consideration of Transport and Access within the Environmental Impact Assessment should be compatible and consistent with the required Transport Assessment. The Scoping report indicates that this chapter will be prepared in line with the IEA Guidelines for the Environmental Assessment of Road Traffic which, together with DMRB Volume 11 is understood to be the current standard guidelines for this topic. The West Sussex County Council Public Rights of Way officer has also commented and has advised that the proposal would inevitably increase usage of the PROW network. The EIA should include details of mitigation measures to protect and enhance local PROWs within and around the site to safeguard and promote active travel and also detail appropriate safety measures to protect PROW users.	Potential impacts of Rickman's Green Village on traffic, transport and Public Rights of Way are considered in **Chapter 8 Transport and Access**.
	Cumulative Effects Cumulative effects can be additive or synergistic and can arise in the following ways: • When a single resource or receptor is affected by more than one development at the same time (inter-project), when two or more impacts of the proposed development combine to act on individual receptors or resources or (intra-project). The Council will expect to view and agree the list of other projects and applications to be considered as part of this assessment, and may identify additional projects to include within this assessment if appropriate.	The cumulative effects of Rickman's Green Village are considered in **Chapter 14 Cumulative Impact Assessmen**t.
South Downs National Park Authority	The National Park's comments on the development are as follows: We agree with the applicants' conclusions that the proposals would be considered Schedule ii EIA development as the proposals would constitute an urban development of over 150 dwellings/5ha. In terms of potential impacts upon the South Downs National Park and its setting, we would suggest the following be included: • Transport and Access (including impacts upon the rural road network within and around the SDNP)	Potential impacts of Rickman's Green Village on the transport and access networks are considered in **Chapter 8 Transport and Access**. Potential impacts to European Designated Sites, and the species located within these areas, are considered in **Chapter 11 Nature Conservation and Biodiversity**.

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	• Nature Conservation and Biodiversity (including water neutrality and impacts upon bat species within the Mens SAC and Ebernoe Common SAC) • Amenity and Visual Impact (including the landscape and visual setting of the SDNP).	Potential impacts associated with the landscape and visual setting are considered in **Chapter 13 Landscape and Visual Setting**.
	Given the proximity to the South Downs Dark Night Skies Reserve, we would also suggest that the environmental impacts of lighting both during and after construction be assessed.	An External Lighting Strategy & Detailed Design Report (DPA Lighting Consultants, 2022) has been provided which considers the requirements to preserve the darkness of the night sky and reduces the impacts of any proposed lighting to a minimum in line with the strict limits of the Environmental Zone E1. Due to the proximity to the SDNP and associated dark skies reserve, the General Limitations and Constraints cover the protection of light sensitive ecology, reduction of light pollution and protection of dark skies as a priority.
WSCC Highways	WSCC Highways would not raise any comments on the requirement of an EIA for the development. As set out in the Scoping, separate discussions are progressing with WSCC regarding the assessment of transport related matters with these to be presented as part of a Transport Assessment. These discussions including scope of assessment for each scenario and use of iRAP star rating for safety analysis are on-going. It's understood that the TA will then feed into the EIA	The potential impacts of Rickman's Green Village on Public Rights of Way will be covered in an addendum to the EIA.
WSCC Highways – Public Rights of Way	Public Rights of Way (PRoW) within the vicinity of the site are shown accurately on the Emerging Master plan and included in the Environmental Scoping Report. PRoW provide important connectivity and opportunities for safe, off-road, sustainable methods of transport. The development of this site will inevitably increase usage of these PRoW, particularly as essential connections are made with them (I refer to my response to22/01224/PRELM). Mitigation measures should be identified within any EIA to; • protect and enhance local PRoW both within and adjacent to the site to safeguard and promote active travel, • implement appropriate safety measures to protect PRoW users.	
Natural England	A robust assessment of environmental impacts and opportunities based on relevant and up to date environmental information should be under taken prior to a decision on whether to grant planning permission.	An assessment of the environmental impacts associated with Rickman's Green Village are discussed for each of the potential development scenarios in **Chapters 7 - 13**. Cumulative impacts are considered in **Chapter 14 Cumulative Impact Assessment**. A Non-Technical Summary has been provided with this application.
	General Principles Schedule 4 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017, sets out the information that should be included in an Environmental Statement (ES) to assess impacts on the natural environment. This includes: • A description of the development – including physical characteristics and the full land use requirements of the site during construction and operational phases	

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	• Expected residues and emissions (water, air and soil pollution, noise, vibration, light, heat, radiation etc.) resulting from the operation of the proposed development • An assessment of alternatives and clear reasoning as to why the preferred option has been chosen • A description of the aspects of the environment likely to be significantly affected by the development including biodiversity (for example fauna and flora), land, including land take, soil, water, air, climate (for example greenhouse gas emissions, impacts relevant to adaptation, cultural heritage and landscape and the interrelationship between the above factors • A description of the likely significant effects of the development on the environment – this should cover direct effects but also any indirect, secondary, cumulative, short, medium, and long term, permanent and temporary, positive, and negative effects. Effects should relate to the existence of the development, the use of natural resources (in particular land, soil, water and biodiversity) and the emissions from pollutants. This should also include a description of the forecasting methods to predict the likely effects on the environment • A description of the measures envisaged to prevent, reduce and where possible offset any significant adverse effects on the environment • A non-technical summary of the information • An indication of any difficulties (technical deficiencies or lack of know-how) encountered by the applicant in compiling the required information	
	Cumulative and in-combination effects The ES should fully consider the implications of the whole development proposal. This should include an assessment of all supporting infrastructure. An impact assessment should identify, describe, and evaluate the effects that are likely to result from the project in combination with other projects and activities that are being, have been or will be carried out. The following types of projects should be included in such an assessment (subject to available information): a. existing completed projects; b. approved but uncompleted projects; c. ongoing activities; d. plans or projects for which an application has been made and which are under consideration by the consenting authorities; and e. plans and projects which are reasonably foreseeable, i.e. projects for which an application has not yet been submitted, but which are likely to progress before completion of the development and for which sufficient information is available to assess the likelihood of cumulative and in-combination effects.	An assessment of Cumulative Effects has been provided in **Chapter 14 Cumulative Impact Assessment**.
	Biodiversity and Geodiversity **International and European sites** The development site is within or may impact on the following European/internationally designated nature conservation site(s): • Ebernoe Common SAC • The Mens SAC	Potential impacts on designated sites and biodiversity have been assessed in **Chapter 11 Nature Conservation and Biodiversity**, P2645 EcIA Rickman's Green Village (Ecology Co-op,

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	• Arun Valley SPA • Arun Valley SAC • Arun Valley Ramsar European site conservation objectives are available at http://publications.naturalengland.org.uk/category/6490068894089216 The ES should thoroughly assess the potential for the proposal to affect nationally and internationally designated sites of nature conservation importance, including marine sites where relevant. European sites (Special Areas of Conservation (SAC) and Special Protection Areas (SPA) fall within the scope of the Conservation of Habitats and Species Regulations 2017 (the 'Habitats Regulations'). In addition paragraph 181 of the National Planning Policy Framework (NPPF) requires that potential SPAs, possible SAC, listed or proposed Ramsar sites, and any site identified or required as compensatory measures for adverse effects on habitat (European) sites, potential SPAs, possible SACs and listed or proposed Ramsar sites have the same protection as classified sites (NB. sites falling within the scope of regulation 8 of the Conservation of Habitats and Species Regulations 2017 are defined as 'habitats sites' in the NPPF). Under Regulation 63 of the Habitats Regulations, an appropriate assessment must be undertaken in respect of any plan or project which is (a) likely to have a significant effect on a European site (either alone or in combination with other plans or projects) and (b) not directly connected with or necessary to the management of the site. The consideration of likely significant effects should include any functionally linked land outside the designated site. These areas may provide important habitat for mobile species populations that are qualifying features of the site, for example birds and bats. This can also include areas which have a critical function to a habitat feature within a designated site, for example by being linked hydrologically or geomorphologically. Should a likely significant effect on a European/Internationally designated site be identified (either alone or in-combination) or be uncertain, the competent authority (in this case the Local Planning Authority) may need to prepare an appropriate assessment in addition to the consideration of impacts through the EIA process. Further guidance is set out in Planning Practice Guidance on appropriate assessment https://www.gov.uk/guidance/appropriate-assessment This should also take into account any agreed strategic mitigation solution that may be being developed or implemented in the area to address recreational disturbance, nutrients, or other impacts.	2022a) and the Habitats Regulations Assessment (Ecology Co-op, 2022b). An Arboricultural Impact Assessment has also been undertaken by SJA Trees and provided with this application (SJA Trees, 2022).
	Nationally designated sites The development site is within or may impact on the following Site of Special Scientific Interest: • Ebernoe Common SSSI • The Mens SSSI • Upper Arun SSSI Sites of Special Scientific Interest are protected under the Wildlife and Countryside Act 1981 and paragraph 180 of the NPPF. Further information on the SSSI and its special interest features can be found at www.magic.gov	

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	Natural England's SSSI Impact Risk Zones can be used to help identify the potential for the development to impact on a SSSI. The dataset and user guidance can be accessed from the Natural England Open Data Geoportal. The Environmental Statement should include a full assessment of the direct and indirect effects of the development on the features of special interest within the SSSI and identify appropriate mitigation measures to avoid, minimise or reduce any adverse significant effects. The consideration of likely significant effects should include any functionally linked land outside the designated site. These areas may provide important habitat for mobile species populations that are interest features of the SSSI, for example birds and bats. This can also include areas which have a critical function to a habitat feature within a site, for example by being linked hydrologically or geomorphologically.	
	Regionally and Locally Important Sites The ES should consider any impacts upon local wildlife and geological sites, including local nature reserves. Local Sites are identified by the local wildlife trust, geoconservation group or other local group and protected under the NPPF (paragraph 174 and 175). The ES should set out proposals for mitigation of any impacts and if appropriate, compensation measures and opportunities for enhancement and improving connectivity with wider ecological networks. Contact the relevant local body for further information.	
	Protected Species The conservation of species protected under the Wildlife and Countryside Act 1981 and the Conservation of Habitats and Species Regulations 2017 is explained in Part IV and Annex A of Government Circular 06/2005 Biodiversity and Geological Conservation: Statutory Obligations and their Impact within the Planning System. The ES should assess the impact of all phases of the proposal on protected species (including, for example, great crested newts, reptiles, birds, water voles, badgers and bats). Natural England does not hold comprehensive information regarding the locations of species protected by law. Records of protected species should be obtained from appropriate local biological record centres, nature conservation organisations and local groups. Consideration should be given to the wider context of the site, for example in terms of habitat linkages and protected species populations in the wider area. The area likely to be affected by the development should be thoroughly surveyed by competent ecologists at appropriate times of year for relevant species and the survey results, impact assessments and appropriate accompanying mitigation strategies included as part of the ES. Surveys should always be carried out in optimal survey time periods and to current guidance by suitably qualified and, where necessary, licensed, consultants. Natural England has adopted standing advice for protected species, which includes guidance on survey and mitigation measures. A separate protected species licence from Natural England or Defra may also be required.	
	District Level Licensing for Great Crested Newts District level licensing (DLL) is a type of strategic mitigation licence for great crested newts (GCN) granted in certain areas at a local authority or wider scale. A DLL scheme for GCN may be in place at the location of the development site. If a DLL scheme is in place, developers can make a financial contribution to strategic, off-site habitat compensation instead of	

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	applying for a separate licence or carrying out individual detailed surveys. By demonstrating that DLL will be used, impacts on GCN can be scoped out of detailed assessment in the Environmental Statement.	
	Priority Habitats and Species Priority Habitats and Species are of particular importance for nature conservation and included in the England Biodiversity List published under section 41 of the Natural Environment and Rural Communities Act 2006. Most priority habitats will be mapped either as Sites of Special Scientific Interest, on the Magic website or as Local Wildlife Sites. Lists of priority habitats and species can be found here. Natural England does not routinely hold species data. Such data should be collected when impacts on priority habitats or species are considered likely. Consideration should also be given to the potential environmental value of brownfield sites, often found in urban areas and former industrial land. Sites can be checked against the (draft) national Open Mosaic Habitat (OMH) inventory published by Natural England and freely available to download. Further information is also available here. An appropriate level habitat survey should be carried out on the site, to identify any important habitats present. In addition, ornithological, botanical, and invertebrate surveys should be carried out at appropriate times in the year, to establish whether any scarce or priority species are present. The Environmental Statement should include details of: • Any historical data for the site affected by the proposal (e.g. from previous surveys) • Additional surveys carried out as part of this proposal • The habitats and species present • The status of these habitats and species (e.g. whether priority species or habitat) • The direct and indirect effects of the development upon those habitats and species • Full details of any mitigation or compensation measures • Opportunities for biodiversity net gain or other environmental enhancement.	
	Ancient Woodland, ancient and veteran trees The development site is within an area of ancient woodland. Ancient woodland is an irreplaceable habitat of great importance for its wildlife, its history, and the contribution it makes to our diverse landscapes. Paragraph 180 of the NPPF sets out the highest level of protection for irreplaceable habitats and development should be refused unless there are wholly exceptional reasons and a suitable compensation strategy exists. Natural England maintains the Ancient Woodland Inventory which can help identify ancient woodland. The wood pasture and parkland inventory sets out information on wood pasture and parkland. The ancient tree inventory provides information on the location of ancient and veteran trees. Natural England and the Forestry Commission have prepared standing advice on ancient woodland, ancient and veteran trees.	

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	The ES should assess the impacts of the proposal on the ancient woodland and any ancient and veteran trees, and the scope to avoid and mitigate for adverse impacts. It should also consider opportunities for enhancement.	
	Biodiversity net gain Paragraph 174 of the NPPF states that decisions should contribute to and enhance the natural and local environment by minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures. Biodiversity Net Gain is additional to statutory requirements relating to designated nature conservation sites and protected species. The ES should use an appropriate biodiversity metric such as Biodiversity Metric 3.0 together with ecological advice to calculate the change in biodiversity resulting from proposed development and demonstrate how proposals can achieve a net gain. The metric should be used to: • assess or audit the biodiversity unit value of land within the application area • calculate the losses and gains in biodiversity unit value resulting from proposed development • demonstrate that the required percentage biodiversity net gain will be achieved Biodiversity Net Gain outcomes can be achieved on site, off-site or through a combination of both. On-site provision should be considered first. Delivery should create or enhance habitats of equal or higher value. When delivering net gain, opportunities should be sought to link delivery to relevant plans or strategies e.g. Green Infrastructure Strategies or Local Nature Recovery Strategies. Opportunities for wider environmental gains should also be considered.	Details on Biodiversity Net Gain are provided within the Biodiversity Net Gain Report provided with this application (Ecology Co-op, 2022d).
	Landscape and visual impacts The environmental assessment should refer to the relevant National Character Areas. Character area profiles set out descriptions of each landscape area and statements of environmental opportunity. The ES should include a full assessment of the potential impacts of the development on local landscape character using landscape assessment methodologies. We encourage the use of Landscape Character Assessment (LCA), based on the good practice guidelines produced jointly by the Landscape Institute and Institute of Environmental Assessment in 2013. LCA provides a sound basis for guiding, informing, and understanding the ability of any location to accommodate change and to make positive proposals for conserving, enhancing or regenerating character. A landscape and visual impact assessment should also be carried out for the proposed development and surrounding area. Natural England recommends use of the methodology set out in Guidelines for Landscape and Visual Impact Assessment 2013 ((3rd edition) produced by the Landscape Institute and the Institute of Environmental Assessment and Management.	Potential impacts associated with the landscape and visual setting are considered in **Chapter 13 Landscape and Visual Setting**.

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	For National Parks and AONBs, we advise that the assessment also includes effects on the 'special qualities' of the designated landscape, as set out in the statutory management plan for the area. These identify the particular landscape and related characteristics which underpin the natural beauty of the area and its designation status. The assessment should also include the cumulative effect of the development with other relevant existing or proposed developments in the area. This should include an assessment of the impacts of other proposals currently at scoping stage. To ensure high quality development that responds to and enhances local landscape character and distinctiveness, the siting and design of the proposed development should reflect local characteristics and, wherever possible, use local materials. Account should be taken of local design policies, design codes and guides as well as guidance in the National Design Guide and National Model Design Code. The ES should set out the measures to be taken to ensure the development will deliver high standards of design and green infrastructure. It should also set out detail of layout alternatives, where appropriate, with a justification of the selected option in terms of landscape impact and benefit.	
	Heritage Landscapes The ES should include an assessment of the impacts on any land in the area affected by the development which qualifies for conditional exemption from capital taxes on the grounds of outstanding scenic, scientific, or historic interest. An up-to-date list is available at www.hmrc.gov.uk/heritage/lbsearch.htm.	Rickman's Green Village is not located on any land which qualifies for conditions exemption from capital taxes on the ground of outstanding scenic, scientific, or historic interest.
	Connecting People with nature The ES should consider potential impacts on access land, common land, public rights of way and, where appropriate, the England Coast Path and coastal access routes and coastal margin in the vicinity of the development, in line with NPPF paragraph 100. It should assess the scope to mitigate for any adverse impacts. Rights of Way Improvement Plans (ROWIP) can be used to identify public rights of way within or adjacent to the proposed site that should be maintained or enhanced. Measures to help people to better access the countryside for quiet enjoyment and opportunities to connect with nature should be considered. Such measures could include reinstating existing footpaths or the creation of new footpaths, cycleways, and bridleways. Links to other green networks and, where appropriate, urban fringe areas should also be explored to help promote the creation of wider green infrastructure. Access to nature within the development site should also be considered, including the role that natural links have in connecting habitats and providing potential pathways for movements of species. Relevant aspects of local authority green infrastructure strategies should be incorporated where appropriate.	Potential impacts of Rickman's Green Village on, Public Rights of Way, will be covered in an addendum to the EIA.
	Soils and Agricultural Land Quality Soils are a valuable, finite natural resource and should also be considered for the ecosystem services they provide, including for food production, water storage and flood mitigation, as a carbon store, reservoir of biodiversity and buffer against pollution. It is therefore important that the soil resources are protected and sustainably managed. Impacts from the development on soils and best and most versatile (BMV) agricultural land should be considered in line with paragraphs 174	An Agricultural Land Classification (ALC) and Soil Resources report is provided with this application (Reading Agricultural Consultants, 2022).

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	and 175 of the NPPF. Further guidance is set out in the Natural England Guide to assessing development proposals on agricultural land. As set out in paragraph 211 of the NPPF, new sites or extensions to sites for peat extraction should not be granted planning permission. The following issues should be considered and, where appropriate, included as part of the Environmental Statement (ES): • The degree to which soils would be disturbed or damaged as part of the development • The extent to which agricultural land would be disturbed or lost as part of this development, including whether any best and most versatile (BMV) agricultural land would be impacted. This may require a detailed Agricultural Land Classification (ALC) survey if one is not already available. For information on the availability of existing ALC information see www.magic.gov.uk. • Where an ALC and soil survey of the land is required, this should normally be at a detailed level, e.g. one auger boring per hectare, (or more detailed for a small site) supported by pits dug in each main soil type to confirm the physical characteristics of the full depth of the soil resource, i.e. 1.2 metres. The survey data can inform suitable soil handling methods and appropriate reuse of the soil resource where required (e.g. agricultural reinstatement, habitat creation, landscaping, allotments and public open space). • The ES should set out details of how any adverse impacts on BMV agricultural land can be minimised through site design/masterplan. • The ES should set out details of how any adverse impacts on soils can be avoided or minimised and demonstrate how soils will be sustainably used and managed, including consideration in site design and master planning, and areas for green infrastructure or biodiversity net gain. The aim will be to minimise soil handling and maximise the sustainable use and management of the available soil to achieve successful after-uses and minimise off-site impacts. Further information is available in the Defra Construction Code of Practice for the Sustainable Use of Soil on Development Sites and The British Society of Soil Science Guidance Note Benefitting from Soil Management in Development and Construction.	This includes the results of an ALC survey which concludes the site is classified as subgrade 3b and does not include any best and most versatile (BMV) land. Therefore, an BMV assessment is not required.
	Air Quality Air quality in the UK has improved over recent decades but air pollution remains a significant issue. For example, approximately 85% of protected nature conservation sites are currently in exceedance of nitrogen levels where harm is expected (critical load) and approximately 87% of sites exceed the level of ammonia where harm is expected for lower plants (critical level of 1µg). A priority action in the England Biodiversity Strategy is to reduce air pollution impacts on biodiversity. The Government's Clean Air Strategy also has a number of targets to reduce emissions including to reduce damaging deposition of reactive forms of nitrogen by 17% over England's protected priority sensitive habitats by 2030, to reduce emissions of ammonia against the 2005 baseline by 16% by 2030 and to reduce emissions of NOx and SO2 against a 2005 baseline of 73% and 88% respectively by 2030. Shared Nitrogen Action Plans (SNAPs) have also been identified as a tool to reduce environmental damage from air pollution.	Noted, the potential impacts on air quality are considered in **Chapter 9 Air Quality**.

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	The planning system plays a key role in determining the location of developments which may give rise to pollution, either directly, or from traffic generation, and hence planning decisions can have a significant impact on the quality of air, water and land. The ES should take account of the risks of air pollution and how these can be managed or reduced. This should include taking account of any strategic solutions or SNAPs, which may be being developed or implemented to mitigate the impacts on air quality. Further information on air pollution impacts and the sensitivity of different habitats/designated sites can be found on the Air Pollution Information System (www.apis.ac.uk). Information on air pollution modelling, screening and assessment can be found on the following websites: • SCAIL Combustion and SCAIL Agriculture - http://www.scail.ceh.ac.uk/ • Ammonia assessment for agricultural development https://www.gov.uk/guidance/intensive-farming-risk-assessment-for-your-environmental-permit • Environment Agency Screening Tool for industrial emissions https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit • Defra Local Air Quality Management Area Tool (Industrial Emission Screening Tool) – England http://www.airqualityengland.co.uk/laqm	
	Water Quality The planning system plays a key role in determining the location of developments which may give rise to water pollution, and hence planning decisions can have a significant impact on water quality, and land. The assessment should take account of the risks of water pollution and how these can be managed or reduced. A number of water dependent protected nature conservation sites have been identified as failing condition due to elevated nutrient levels and nutrient neutrality is consequently required to enable development to proceed without causing further damage to these sites. The ES needs to take account of any strategic solutions for nutrient neutrality or Diffuse Water Pollution Plans, which may be being developed or implemented to mitigate and address the impacts of elevated nutrient levels. Further information can be obtained from the Local Planning Authority.	A Water Neutrality Report has been submitted with this application (Ward Associates, 2022).
	Climate Change The ES should identify how the development affects the ability of the natural environment (including habitats, species, and natural processes) to adapt to climate change, including its ability to provide adaptation for people. This should include impacts on the vulnerability or resilience of a natural feature (i.e. what's already there and affected) as well as impacts on how the environment can accommodate change for both nature and people, for example whether the development affects species ability to move and adapt. Nature-based solutions, such as providing green infrastructure on-site and in the surrounding area (e.g. to adapt to flooding, drought and heatwave events), habitat creation and peatland restoration, should be considered. The ES should set out the measures that will be adopted to address impacts. Further information is available from the Committee on Climate Change's (CCC) Independent Assessment of UK Climate Risk, the National Adaptation Programme (NAP), the Climate Change Impacts Report Cards (biodiversity, infrastructure, water etc.) and the UKCP18 climate projections.	Climate change adaptation has been addressed in **Section 11.13** in response to this guidance by Natural England.

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	The Natural England and RSPB Climate Change Adaptation Manual (2020) provides extensive information on climate change impacts and adaptation for the natural environment and adaptation focussed nature-based solutions for people. It includes the Landscape Scale Climate Change Assessment Method that can help assess impacts and vulnerabilities on natural environment features and identify adaptation actions. Natural England's Nature Networks Evidence Handbook (2020) also provides extensive information on planning and delivering nature networks for people and biodiversity. The ES should also identify how the development impacts the natural environment's ability to store and sequester greenhouse gases, in relation to climate change mitigation and the natural environment's contribution to achieving net zero by 2050. Natural England's Carbon Storage and Sequestration by Habitat report (2021) and the British Ecological Society's nature-based solutions report (2021) provide further information.	
	Contribution to local environmental initiatives and priorities The ES should consider the contribution the development could make to relevant local environmental initiatives and priorities to enhance the environmental quality of the development and deliver wider environmental gains. This should include considering proposals set out in relevant local strategies or supplementary planning documents including landscape strategies, green infrastructure strategies, tree and woodland strategies, biodiversity strategies or biodiversity opportunity areas.	Details on Biodiversity Net Gain are provided within the Biodiversity Net Gain Report provided with this application (Ecology Co-op, 2022d).
National Highways	We note that we have also been consulted on 22/01735/FULEIA| Regeneration of Crouchlands Farm, comprising demolition of selected buildings, extension, refurbishment and remodelling of selected buildings and the erection of new buildings to provide up to a total of 17,169 sq. m (including retained / refurbished existing buildings) comprising the existing farm hub (sui generis), a rural enterprise centre (Use Classes E, C1 and F1), a rural food and retail centre (Use Class E and F1), an equestrian centre (Use Class F2 and C1) and a glamping site(Use Class E and sui generis); provision of new hardstanding, pedestrian, cycle and vehicular access, circulation and parking, landscaping including new tree planting, maintenance and improvements to the Public Rights of Way, site infrastructure and ground remodelling. Crouchlands Farm Rickman's Lane Plaistow Billingshurst West Sussex RH14 0LE. However, the sites edged red are separate, and hence we will be responding separately on this case in due course. National Highways (formerly Highways England) has been appointed by the Secretary of State for Transport as strategic highway company under the provisions of the Infrastructure Act 2015 and is the highway authority, traffic authority and street authority for the strategic road network (SRN). The SRN is a critical national asset and as such we work to ensure that it operates and is managed in the public interest, both in respect of current activities and needs as well as in providing effective stewardship of its long-term operation and integrity. We will be concerned with proposals that have the potential to impact on the safe and efficient operation of the SRN, in this case, particularly the A3, A23 and A27 Trunk Roads.	The potential impacts of Rickman's Green Village on traffic and transport will be covered in an addendum to the EIA.

Consultee	Comment	Project Response
	We have no comment on whether an EIA is required; but if it is, it should be compatible and consistent with the required Transport Assessment (TA) for the application site. In this respect we note that data to be used for the EIA Transport chapter will be taken from the TA, which is welcomed. Any TA and EIA assessment should be undertaken in accordance with the DfT Circular 02/2013 "The Strategic Road Network and the Delivery of Sustainable Development. The TA should include a robust assessment of the vehicular impacts "with" and "without" development for the Opening Year and a Review Period year which will be either the end of the relevant Local Plan or ten years post registration of the planning application, whichever is the greater, to assess the impact of the proposed development. If it is likely that any SRN mitigation will be required, the EIA must demonstrate how it accords with the Design Manual for Roads and Bridges (DMRB) LA104 Environmental Assessment and Monitoring.	
	Transport Assessment and Travel Plan. We are pleased to see that a Transport Assessment is to be prepared for these proposals. We would also recommend that Residential and School Travel Plans are prepared. It is recommended that scoping notes are produced, particularly for the Transport Assessment, and we look forward to the opportunity to provide advice and comments. Any TA assessment should be undertaken in accordance with the DfT Circular 02/2013 "The Strategic Road Network and the Delivery of Sustainable Development". The TA should include a robust assessment of the vehicular impacts "with" and "without" development for the horizon year (full occupation) and the end of the Local Plan period to examine the net impact of non-consented development. In addition, the TA needs to be mindful of the Chichester Local Plan review. We will be pleased to advise further in due course at such time the TA scoping report is presented to us for review.	
	Construction Environmental Management Plan Potential construction traffic related issues will need to be addressed within a Construction Environmental Management Plan. Should the CEMP not be available at the time planning permission is sought, we will be minded to recommend the following condition be attached to any planning consent which may be granted: ***Condition***: *No works shall commence on the site hereby permitted (including site clearance or preparation) until the details of a Construction Management Plan have been submitted to and approved in writing by the local planning authority (who shall consult with National Highways). Thereafter the construction of the development shall proceed in strict accordance with the approved Construction Management Plan unless otherwise agreed in writing by the local planning authority (who shall consult National Highways).*	A Construction Environmental Management Plan (CEMP) would be agreed with CDC prior to the commencement of Rickman's Green Village.

Consultee	Comment	Project Response
	***Reason**: To ensure that the A3, A23 and A27 Trunk Roads continue to be an effective part of the national system of routes for through traffic in accordance with section 10 of the Highways Act 1980 and to satisfy the reasonable requirements of road safety.* ***Informative**: The CMP shall include details (text, maps, and drawings as appropriate) of the scale, timing and mitigation of all construction related aspects of the development. It will include but is not limited to: site hours of operation; numbers, frequency, routing and type of vehicles visiting the site(including measures to limit delivery journeys on the SRN during highway peak hours such as the use vehicle booking systems etc); measures to ensure that HGV loads are adequately secured, travel plan and guided access/egress and parking arrangements for site workers, visitors and deliveries; plus sheeting of loose loads and wheel washing and other facilities to prevent dust, dirt, detritus etc from entering the public highway(and means to remove if it occurs).*	
Environment Agency	**Groundwater and Contaminated Land** This site is located on the Weald Clay. The more permeable limestone and sandstone horizons within the Weald Clay are designated as a secondary A aquifer, which indicates these layers are capable of providing small local water supplies and base flow to local surface waters. The Weald Clay also comprises mudstones and clays which are designated unproductive. We are aware of a number of pollution events on this site and therefore agree with the inclusion of the requirement to establish a baseline for the land quality and hydrogeology by a Land Quality desk study and Preliminary risk assessment. We recommend that developers should: 1.Follow the risk management framework provided in CLR11, Model Procedures for the Management of Land Contamination, when dealing with land affected by contamination. 2.Refer to the Environment Agency Guiding principles for land contamination for the type of information that we required in order to assess risks to controlled waters from the site. The Local Authority can advise on risk to other receptors, such as human health. 3.Consider using the National Quality Mark Scheme for Land Contamination Management which involves the use of competent persons to ensure that land contamination risks are appropriately managed. 4.Refer to the contaminated land pages on GOV.UK for more information. The Environment Scoping Report needs to include provision for surface water drainage and appropriate mitigation measures to protect controlled waters both during the construction and operational phases of the development. We would expect a risk assessment to be carried out to determine the level of treatment required prior surface water being discharged to ground. We would like to direct the developer to the CiriaSuDs manual C753 where industry best practice is provided. It provides further information and guidance on risk assessment and the likely level of treatment needed for such sites. This can be found athttp://www.susdrain.org/. In addition is piling is proposed this has the potential to mobilise contamination and so a piling risk assessment would be required to demonstrate that the risks to controlled waters can be mitigated against.	A preliminary risk assessment is provided in Land Quality Desk Top Study and Preliminary Risk Assessment, Rickman's Green Village Phase 1 (RHDHV, 2022a); and Land Quality Desk Top Study and Preliminary Risk Assessment, Rickman's Green Village Outline Planning Permission (RHDHV, 2022b). A summary is provided within **Section 7.5**.

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Consultee	Comment	Project Response
	Provision for the disposal of foul effluent needs to be considered. Our preferred option for the disposal of treated sewage effluent is a mains sewer. Where this is not feasible our preferred hierarchy is for discharge to ground via a British Standard infiltration system, then to a watercourse, and lastly via a soakaway or borehole. Disposal and reuse of waste needs to be considered and the Environment Agency recommends that developers should refer to the Position statement on the Definition of Waste: Development Industry Code of Practice and the Environmental regulations page on GOV.UK.	
	Foul Drainage As a major development we would expect that the Rickman's Green development to connect to Mains Sewerage. We recommend that the Applicant seeks confirmation from the sewerage undertaker Southern Water Ltd at the earliest opportunity to establish if the existing sewerage infrastructure has the capacity to accept sewage from the 600 new properties. Connection must be made to a public sewer where it is reasonable to do so. Where it is not reasonable to connect to the public foul sewer we may grant an environmental permit, as long as the proposed discharge is otherwise environmentally acceptable and where adequate justification has been provided. Please note lack of capacity in the existing infrastructure is not sufficient justification for a non-mains solution. Where a private sewerage system is proposed as part of an application for either planning permission or an environmental permit in circumstances where it appears that it may be reasonable to connect to sewer we will expect the applicant to show: (i) why it would not be reasonable to connect to public sewer; and (ii) that the proposed discharge is otherwise environmentally acceptable, taking into consideration the specific needs and uses of the receiving water. Government guidance contained within the National Planning Practice Guidance (Water supply, wastewater and water quality–considerations for planning applications, paragraph 020) sets out a hierarchy of drainage options that must be considered and discounted in the following order: 1.Connection to the public sewer. 2.Package sewage treatment plant (adopted in due course by the sewerage company or owned and operated under a new appointment or variation). 3.Septic Tank. Foul drainage should be connected to the main sewer. Where this is not possible, under the Environmental Permitting (England and Wales) Regulations 2016, any discharge of sewage or trade effluent made to either surface water or groundwater will need to be registered as an exempt discharge activity, or hold a permit issued by the Environment Agency. This applies to any discharge to inland freshwaters, coastal waters or relevant territorial waters.	Consideration of foul drainage will be included within an addendum to the EIA.

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Consultee	Comment	Project Response
	Please note that the need for an environmental permit is separate to the need for planning permission. The granting of planning permission does not necessarily lead to the granting of a permit. Upon receipt of a correctly filled in application form for an environmental permit, we will carry out an assessment. Please note that it can take up to 4 months before we are in a position to decide whether to grant a permit or not. If it is the applicant's intention to install a private sewage treatment plant to serve the new development, we advise them to contact the Environment Agency at the earliest opportunity as they will need to apply for a discharge permit.	
	Agricultural Buildings If the buildings are to be used for livestock housing, the operator must ensure that they comply with the relevant regulations regarding the storage of slurry and silage. Any increase in the numbers of livestock may require the construction or expansion of slurry and silage storage facilities. The operator should ensure that they comply with the requirements of The Water Resources (Control of Pollution) (Silage, Slurry and Agricultural Fuel Oil) (England) Regulations 2010, commonly known as the 'SSAFO regs', and the storage requirements of The Nitrate Pollution Prevention Regulations 2015, commonly known as the 'NVZ regs'.	Rickman's Green Village does not include the provision for agricultural buildings or practises; therefore these scoping comments have not been assessed within this ES.
	Slurry Storage If your livestock produces slurry, you must be able to store the slurry produced in accordance with the Regulations on capacity, construction, and the associated calculations and records. Depending on the relevant regulations, slurry stores must have the capacity to store: • •4, 5 or 6 months of slurry; • •Rainfall expected to enter the store during the storage period including yards and roofs; and • •Any wash water or other liquids that enter the store during that period. If you have poultry manure or other types of solid manure you must store them: • •In a vessel; • •On an impermeable base, with appropriate collection and containment of runoff; • •In a roofed building; or • •In an appropriately located temporary field heap. If you build a new facility for storing organic manure (i.e. slurry stores or impermeable bases for solid manure) and/or if you substantially reconstruct or enlarge your existing facilities, you must: • •Comply with standards set down in the SSAFO Regulations, and • •Notify the Environment Agency in writing about your intention to build a new store, or substantially enlarge or reconstruct an existing store at least14days before you start construction or reconstruction works.	
	Silage Storage All parts of a silo must be resistant to attack. Your silo must have:	

Consultee	Comment	Project Response
	• An impermeable base extending beyond any walls • Impermeable drainage collection channels around the outside, flowing into an appropriately sized effluent tank. Further guidance is available at the GOV.UK website.	
	Advice to Applicant Environmental Permit Please note that this development may require an environmental permit, a variation of an existing permit or an exception from an environmental permit from us. Further information can be found on the gov.uk website– https://www.gov.uk/topic/environmental-management/environmental-permitshttps://www.gov.uk/guidance/discharges-to-surface-water-and-groundwater-environmental-permits The Applicant must ensure that the operations at the site are in accordance with the Environmental Permitting (England and Wales) Regulations 2016. The Applicant is advised to contact the National Customer Contact Centre on03708 506 506(Monday to Friday 8am to 6pm) or by emailing enquiries@environment-agency.gov.uk. Please note that the need for an environmental permit is separate to the need for planning permission. The granting of planning permission does not necessarily lead to the granting of a permit. Pollution prevention All precautions must be taken to avoid discharges and spills to the ground both during and after construction. For advice on pollution prevention measures, the Applicant should refer to our guidance 'PPG 1–general guide to the prevention of pollution' which can be found on the GOV.UK website using the following link:https://www.gov.uk/government/publications/basic-good-environmental-practices-ppg1-prevent-pollution. In the event of a pollution incident, all works should cease immediately and the Environment Agency should be contacted via the incident hotline0800 80 70 60 (24-hour service).	Acknowledged
Historic England	On the basis of the information available to date, in our view you do not need to notify or consult us on this application under the relevant statutory provisions	Acknowledged
Plaistow and Ifold Parish Council (non statutory)	1.Foul water infrastructure network. The Parish Council asks that consideration is given to the foul water infrastructure network within the area that would service the proposed development, given that the local treatment works is overcapacity, and the Applicant acknowledges that "the Environment Agency's Surface Water flood map[...] demonstrates that the site is at a very high risk from surface water flooding" (para 5.3.2, pg.22 of the Report). It must be a key consideration that the Loxwood Wastewater Treatment Works is currently over-capacity. Southern Water (SW) have failed to keep abreast of the increases in demand on the sewerage infrastructure that recent housing development has created. SW repeatedly respond to planning application consultations by stating that there is no capacity in the system. The new housing developments in the vicinity of the Loxwood Wastewater Treatment Works will have its sewerage stored in underground tanks and tankered	Consideration of foul drainage will be included within an addendum to the EIA. A Water Neutrality Report has been submitted with this application (Ward Associates, 2022).

Consultee	Comment	Project Response
	offsite at SW expense. Therefore, in the absence of adequate/ sufficient mains foul drainage at the Crouchlands Farm site and in the knowledge of i. the current over capacity of the local treatment works and ii. the very high risk from surface water flooding. The Parish Council requests that proper consideration and explanation be given within the Environmental Statement to the treatment of effluent from the proposed Rickman's Green Village development of up to 600 residential homes without the risk of pollution to local water courses and associated risk of environmental damage and risk to human health. This will need to be considered alongside the impact of the commercial development at the site on the foul water infrastructure network, as proposed under planning application 22/01735/FULEIA. 2. Water neutrality. The site is located within the Sussex North water resource supply zone. The Parish Council respectfully requests that sufficient detail is provided within the Environmental Statement regarding the true volume of water usage (both construction over an extended period and completed residential use of the dwellings) and the means of achieving the required water neutrality as specified by Natural England. The Parish Council considers that the proposals would almost certainly lead to an increase in water consumption from the site's former use as a farm; especially when considered alongside the commercial regeneration proposals for the site as outlined in planning application 22/01735/FULEIA.	

7 Land Quality and Hydrogeology

7.1 Introduction

This chapter of the ES considers the likely effects of Rickman's Green Village with respect to land quality and hydrogeology, and how this could affect human health as well as the natural and built environment. It describes the methods used to assess potential effects, the baseline conditions currently existing within the Rickman's Green Village footprint and surrounding area. The mitigation measures required to prevent, reduce or off-set any significant adverse effects are presented together with the likely residual effects after these measures have been adopted.

This chapter is supported by the following reports:

- Land Quality Desk Top Study and Preliminary Risk Assessment, Rickman's Green Village Phase 1 (RHDHV, 2022a); and
- Land Quality Desk Top Study and Preliminary Risk Assessment, Rickman's Green Village Outline Planning Permission (RHDHV, 2022b).

7.2 Legislation, Planning Policy and Guidance

There are a number of overarching international, national and regional items of legislation, policy and guidance applicable to Rickman's Green Village, as detailed in **Chapter 4**, Regulatory Framework. The following sections build on the regulatory framework chapter by focusing on key legislation, policy and guidance with specific reference to land quality and hydrogeology.

7.2.1 Legislation

7.2.1.1 Environmental Protection Act 1990 (Part 2A): Contaminated Land Statutory Guidance

The Environmental Protection Act 1990 makes provision for the improved control of pollution arising from certain industrial and other processes. Part 2A of the Act provides the statutory definition of contaminated land: '*Contaminated Land is any land which appears to the Local Authority in whose area it is situated to be in such a condition, by reasons of substances in, on or under the land that:*

- *significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *significant pollution of controlled waters is being or is likely to be caused*.'

The Act also provides the regulatory basis for the identification, designation and remediation of contaminated land. Rickman's Green Village could be located on land potentially affected by contamination. This requires assessment to ensure that the land is suitable for use following the construction of Rickman's Green Village, and that the land cannot be determined as contaminated land under Part 2A of the Act.

7.2.1.2 Environmental Permitting (England and Wales) Regulations 2016

The 2016 Regulations (as amended) set out an environmental permitting and compliance regime that applies to various activities and industries. The environmental permitting regime is a common framework for applying for, receiving, varying or transferring and surrendering permits, along with compliance, enforcement and appeals arrangements. It rationalises the previous permitting and compliance regimes into a common framework that is easier to understand and simpler to use. The framework introduces different levels of control, based on risk:

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- Exclusions (lower risk activities which may be undertaken without any permit), standard rules permit (standard requirements and conditions for the relevant activities are set out so applicants can determine in advance whether the permit is applicable to their proposals) and bespoke permits (permits written specifically for activities which are unique or higher risk).

7.2.1.3 Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

The aim of the directive is for all waterbodies to achieve Good Status by 2027 (which is comprised of scoring of both Ecological and Chemical Status) and to ensure no deterioration from current status. This legislation is relevant to land quality and hydrogeology as it will assist in determining the sensitivity of water bodies in and around Rickman's Green Village.

7.2.1.4 Groundwater (Water Framework Directive) (England) Direction 2016

The aim of the directive is to set out instructions and obligations for the Environment Agency to protect groundwater, including monitoring and setting threshold values for both existing and new pollutants in groundwater. This legislation is relevant to land quality and hydrogeology as it will assist in determining the sensitivity of groundwater resources in and around Rickman's Green Village.

7.2.1.5 Water Resources Act. The Water Resources Act (1991) as amended by the Water Act (2003)

The Act provides the definition of and regulatory controls for the protection of water resources including the quality standard expected for controlled waters. This legislation is relevant to land quality and hydrogeology as it will assist in determining the sensitivity of controlled waters in and around Rickman's Green Village.

7.2.1.6 Environment Act 1995

The Act established the Environment Agency and gave it responsibility for environmental protection of controlled waters. This legislation is applicable to land quality and hydrogeology as it will help assess the sensitivity and potential effects associated with the construction and operation of Rickman's Green Village. It will also aid in the identification of suitable mitigation measures to provide protection of the controlled waters present.

7.2.1.7 Environmental Damage (Prevention and Remediation) (England Regulations (2015)

The regulations transpose into domestic law the EU Directive 2004/35/EC on environmental liability with regards to the prevention and remedying of environmental damage. The legislation is applicable to land quality and hydrogeology as it will aid in the identification of suitable preventative measures and mitigation techniques for the construction and operation of Rickman's Green Village.

7.2.1.8 Construction (Design and Management) Regulations 2015

The regulations are the main set of regulations used to manage the health, safety and welfare of construction projects. The legislation is applicable to land quality and hydrogeology as it ensures the safety of human receptors involved in the construction phase of Rickman's Green Village.

7.2.2 Planning Policy and Guidance

7.2.2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) (Ministry of Housing, Communities and Local Government, updated 2021 – now called the 'Department for Levelling Up, Housing and Communities') provides guidance to planning authorities on how to assess planning applications. Sections relevant to land quality and hydrogeology are summarised in **Table 7-1** below.

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Table 7-1: National Planning Policy Framework guidance relevant to land quality and hydrogeology

NPPF Requirement	NPPF Reference	Section Reference
Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives): a) an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure; b) a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and c) an environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.	NPPF2-8	Mineral resources are discussed in **Section 7.5.** Impacts and mitigation measures with respect to sterilisation of future mineral resources are discussed in **Sections 7.6.4, 7.7.4** and **7.8.4**. Impacts and mitigation measures associated with the operational phase are discussed in **Sections 7.9.3, 7.10.3** and **7.11.3**.
Plans and decisions should apply a presumption in favour of sustainable development. For plan-making this means that: a) all plans should promote a sustainable pattern of development that seeks to: meet the development needs of their area; align growth and infrastructure; improve the environment; mitigate climate change (including by making effective use of land in urban areas) and adapt to its effects; b) strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas, unless: i. the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for restricting the overall scale, type or distribution of development in the plan area; or ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole. For decision-taking this means: c) approving development proposals that accord with an up-to-date development plan without delay; or d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless: i. the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed; or ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.	NPPF2-11	Climate change mitigation and sustainability are discussed in **Section 7.5**.

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NPPF Requirement	NPPF Reference	Section Reference
Planning policies and decisions should promote an effective use of land in meeting the need for homes and other uses, while safeguarding and improving the environment and ensuring safe and healthy living conditions. Strategic policies should set out a clear strategy for accommodating objectively assessed needs, in a way that makes as much use as possible of previously-developed or 'brownfield' land. Planning policies and decisions should: … (c) give substantial weight to the value of using suitable brownfield land within settlements for homes and other identified needs, and support appropriate opportunities to remediate despoiled, degraded, derelict, contaminated or unstable land;…	NPPF11-120 item (c)	Promotion of effective use of land in the context of previously developed land is discussed in **Section 7.5**. Impacts with respect to potentially contaminated land and mitigation during the construction phase are discussed in **Sections 7.6, 7.7** and **7.8**. Impacts associated with the operational phase are discussed in **Sections 7.9, 7.10** and **7.11**.
Planning policies and decisions should contribute to and enhance the natural local environment by: protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan); preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate.	NPPF15-174	Existing environment in relation to sensitive sites is discussed in **Section 7.5**.
Planning policies and decisions should ensure that: • a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation); • after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the Environmental Protection Act 1990; and • adequate site investigation information, prepared by a competent person, is available to inform these assessments.	NPFF15-183	Existing ground conditions and potential sources of contamination are discussed in **Section 7.5**. Impacts and mitigation measures during the construction phase are discussed in **Sections 7.6, 7.7** and **7.8**. Impacts associated with the operational phase are discussed in **Sections 7.9, 7.10** and **7.11**.
Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and / or landowner. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.	NPFF15-184 and NPPF15-185	Existing ground conditions and potential sources of contamination are discussed in **Section 7.5**. Impacts and mitigation measures during the construction phase are discussed in **Sections 7.6, 7.7** and **7.8**. Impacts associated with the operational phase are discussed in Sections **7.9, 7.10** and **7.11**.
The focus of planning policies and decisions should be whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should	NPPF15-188	Existing ground conditions and potential sources of contamination are discussed in **Section 7.5**. Impacts and mitigation measures during the construction phase

NPPF Requirement	NPPF Reference	Section Reference
assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.		are discussed in **Sections 7.6, 7.7** and **7.8**. Impacts associated with the operational phase are discussed in **Sections 7.9, 7.10** and **7.11**.
It is essential that there is a sufficient supply of minerals to provide the infrastructure, buildings, energy and goods that the country needs. Since minerals are a finite natural resource, and can only be worked where they are found, best use needs to be made of them to secure their long-term conservation. Planning policies should: • safeguard mineral resources by defining Mineral Safeguarding Areas and Mineral Consultation Areas; and adopt appropriate policies so that known locations of specific minerals resources of local and national importance are not sterilised by non-mineral development where this should be avoided (whilst not creating a presumption that the resources defined will be worked); • set out policies to encourage the prior extraction of minerals, where practical and environmentally feasible, if it is necessary for non-mineral development to take place.	NPPF17-209 and NPFF17-210	Mineral consultation areas are discussed within **Section 7.5**. Impacts and mitigation measures during the construction phase are discussed in **Sections 7.6.4, 7.7.4** and **7.8.4**. Impacts and mitigation measures associated with the operational phase are discussed in **Sections 7.9.3, 7.10.3** and **7.11.3**.

7.2.2.2 Land Contamination Risk Management Framework 2021

The Environment Agency (EA) Land Contamination Risk Management Framework (2021) provides an update to the former Environment Agency Model Procedures for the Management of Land Contamination, Contaminated Land Report 11 (CLR11). The updated guidance aims to help those assessing potentially contaminated sites to identify and assess the risks posed to sensitive receptors, make appropriate decisions in relation to the outcome of the assessment and identify the required actions necessary e.g. implementation of remediation.

7.2.2.3 Guiding Principles for Contaminated Land

The Guiding Principles for Contaminated Land (GPCL) comprise three documents produced by the Environment Agency. The documents include GPCL 1 – Guiding principles for land contamination introduction, GPCL 2 – Frequently Asked Questions, technical information, detailed advice and references, and GPCL 3 – reporting checklist. The aims of these documents are to provide guidance to those who are involved with contaminated land, encourage good practice, promote compliance with regulatory requirements and to provide reference to applicable guidance.

7.2.2.4 The Environment Agency's Approach to Groundwater Protection Position Statements 2018

These position statements provide information relating to the Environment Agency's approach to managing and protecting groundwater. They detail how the Environment Agency delivers government policy for groundwater and adopts a risk-based approach where legislation allows. The primary aim of all of the position statements is the prevention of pollution of groundwater and protection of it as a resource.

7.2.2.5 Minerals Policy Statement 1: Planning and Minerals (MPS1)

The Minerals Policy Statement 1 (MPS1) aims to secure adequate and steady supplies of the minerals needed by society and the economy. Although this publication has been withdrawn, it is still deemed a relevant piece of guidance in the context of this assessment in the absence of any replacement guidance.

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7.2.3 Local Plan

7.2.3.1 Chichester Local Plan, July 2015

The Chichester Local Plan has been reviewed and the following policies and strategic objectives are considered relevant to land quality and hydrogeology.

Policy 36: Planning for Gypsies, Travellers and Travelling Showpeople. Although proposals for Rickman's Green Village do not include provisions for Gypsies, Travellers and Travelling Showpeople, the following point is deemed applicable to the residential development of the site:

> 5. *"Avoid locations where there is a risk of flooding, or which are adjacent to incompatible uses such as a refuse tip, sewage treatment works or significantly contaminated land".*

Policy 49: Biodiversity states that "*Planning permission will be granted for development where it can be demonstrated that all the following criteria have been met:*

1. *the biodiversity value of the site is safeguarded;*
2. *demonstrable harm to habitats or species which are protected or which are of importance to biodiversity is avoided or mitigated;*
3. *the proposal has incorporated features that enhance biodiversity as part of good design and sustainable development;*
4. *the proposal protects, manages and enhances the District's network of ecology, biodiversity and geological sites, including the international, national and local designated sites (statutory and non-statutory), priority habitats, wildlife corridors and stepping stones that connect them;*
5. *any individual or cumulative adverse impacts on sites are avoided; and*
6. *the benefits of development outweigh any adverse impact on the biodiversity on the site. Exceptions will only be made where no reasonable alternatives are available; and planning conditions and/or planning obligations may be imposed to mitigate or compensate for the harmful effects of the development.*"

Point 3.30 of the Health and Well-Being strategic objective is considered relevant to land quality and hydrogeology as it states:

> "*Develop safe and secure living and working environments, including the monitoring of potential health hazards (e.g. noise, air pollution and land contamination) and mitigating risks to health and well-being".*

7.2.3.2 West Sussex Joint Minerals Local Plan, July 2018 (Revised and Adopted in March 2021)

The West Sussex Joint Minerals Local Plan is a partnership between West Sussex County Council and South Downs National Park Authority. The plan was originally published in July 2018 but was revised and adopted in March 2021 following a review of soft sand resources in the county. The following policy is considered relevant to land quality and hydrogeology:

Policy M9: Safeguarding Minerals of the West Sussex Joint Minerals Plan states:

"(*b) soft sand (including silica sand), sharp sand and gravel, brick making clay, building stone resources, and chalk reserves are safeguarded against sterilisation. Proposals for non-mineral development within MSAs […] will not be permitted unless:*

I. *mineral sterilisation will not occur; or*
II. *it is appropriate and practicable to extract the mineral prior to the development taking place, having regards for the other policies in this Plan; or*
III. *the overriding need for the development outweighs the safeguarding of the mineral and it has been demonstrated that prior extraction is not practicable or environmentally feasible*".

7.3 Consultation

Consultation in relation to local potable groundwater abstractions has been undertaken with Chichester District Council. A request for information was submitted 27th June 2022 with a response given 30th June 2022 confirming that there are no private potable groundwater abstractions located within 2 km of the proposed Rickman's Green Village development.

7.4 Assessment Methodology

Chapter 5, Approach to EIA provides a summary of the general impact assessment methodology applied to Rickman's Green Village. The following sections confirm the methodology used to assess the potential impacts on land quality and hydrogeology.

7.4.1 Definitions of Sensitivity and Magnitude

For each impact, the assessment identifies receptors sensitive to that impact and implements a systematic approach to understanding the impact pathways and the level of impacts on given receptors. The definitions of sensitivity and magnitude for the purpose of the land quality and hydrogeology assessment are provided in **Table 7-2** and **Table 7-3** below.

7.4.1.1 Sensitivity

Receptor sensitivity has been defined with reference to the adaptability, tolerance, recoverability and value of individual receptors. **Table 7-2** provides an example of the likely criteria for appraisal of sensitivity for identified land quality and hydrogeology receptors based on professional judgement.

Receptor sensitivity considers, for example, whether the receptor:

- is rare;
- has protected or threatened status;
- has importance at a local, regional or national scale; or
- has a key role in ecosystem function (in the case of biological receptors).

Generic receptor sensitivity examples based on the above criteria are presented below in **Table 7-2**.

Table 7-2: Receptor sensitivity criteria

Sensitivity	Examples
High - has very limited or no capacity to accommodate physical or chemical changes.	**General** • receptor is internationally or nationally important / rare with limited potential for offsetting / compensation.
	Land quality – human health • construction workers involved in below ground construction works / ground breaking activities; • public and local residents / children (on and off-site within 50 m); and • future end users (residential or allotment end use).
	Land quality – controlled waters and ecology

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Sensitivity	Examples
	• groundwater source protection zones (SPZ) 1; • public water supplies/ licensed surface water and groundwater abstractions for potable use; • private water supplies for potable use (on and off-site within 50 m); • supports habitats or species that are highly sensitive to change in surface hydrology or water quality; and, • surface and groundwaters supporting internationally designated sites (e.g. Special Area of Conservation (SAC), Ramsar sites).
	Land quality – geological sites and mineral resources • Mineral Safeguarding Area – nationally important resource; and • designated geological sites of international importance.
	Built environment • sites of international importance, World Heritage Sites and Scheduled Monuments.
Medium - has limited capacity to accommodate physical or chemical changes.	**General** • receptor is regionally important / rare with limited potential for offsetting / compensation.
	Land quality – human health • future end users (commercial / industrial end use / open space / farmers and workers on agricultural land); • public and local residents / children (off-site at distances >50 m but <250 m); • commercial / industrial workers (off-site within 50 m); and • construction workers (above ground).
	Land quality – controlled waters and ecology • groundwater SPZ 2 and SPZ 3; • Principal Aquifers; • Secondary A and B Aquifers with private potable groundwater abstractions; • private water supplies for potable groundwater abstraction (off site within 250 m) and • surface and groundwaters supporting nationally designated sites (SSSI).
	Land quality – geological sites and mineral resources • Mineral Safeguarding Areas – regionally important resource; and • designated geological site of national importance e.g. SSSIs.
	Built environment • commercial or residential buildings.
Low - has moderate capacity to accommodate physical or chemical changes.	**General** • receptor is locally important / rare.
	Land quality – human health • future end users (transport end use such as car parks or highways); • public and local residents / children (off-site >250 m); and • commercial / industrial workers (off-site at distances >50 m but <250 m).
	Land quality – controlled waters and ecology • Secondary A and B Aquifers without groundwater abstractions; and • groundwater or surface waters supporting locally important sites (e.g. Local Nature Reserve LNR))
	Land quality – geological sites and mineral resources • adjacent to a Mineral Safeguarding Area; and • low economically viable mineral resource.
	Built environment • car parks, highways, transport infrastructure and utilities.
Negligible - is generally tolerant of physical or chemical changes.	**General** • receptor is not considered to be particularly important / rare.
	Land quality – Human Health

Sensitivity	Examples
	• commercial / industrial workers (off-site >250 m).
	Land quality – Controlled Waters • unproductive strata; and • supports or contributes to habitats that are not sensitive to changes in surface hydrology or water quality.
	Land quality – geological sites and mineral resources • no economically viable minerals.
	Built environment • locally important roads and footpaths.

7.4.1.2 Magnitude

Potential effects may be adverse, beneficial or neutral. The impact magnitude is assessed qualitatively, according to the criteria set out in **Table 7-3**.

For impacts related to human health, magnitude reflects the likely increase or decrease in exposure risk for a receptor. For controlled waters, magnitude represents the likely effect that an activity would have on resource availability or value, at the receptor. Magnitude is therefore affected by the distance and connectivity between an impact source and the receptor.

Table 7-3: Definition of magnitude levels for land quality and hydrogeology

Magnitude	Definition
High - permanent or large-scale change affecting usability, risk or, value over a wide area, or certain to affect regulatory compliance.	**Land quality – human health** • permanent or major change to existing risk exposure (adverse / beneficial); • unacceptable risks / severe harm to one of more receptors with a long-term or permanent effect (adverse); or • remediation and complete source removal (beneficial).
	Land quality – controlled waters • permanent, long-term or wide scale effects on water quality or availability (adverse / beneficial); • permanent loss or long-term derogation of a water supply source resulting in prosecution (adverse); • change in WFD water body status / potential or its ability to achieve WFD objectives in the future (adverse / beneficial); • permanent habitat creation or complete loss (adverse / beneficial); or • measurable habitat change that is sustainable / recoverable over the long-term (adverse / beneficial).
	Land quality – geological sites and mineral resources • complete loss of designated sites; or • complete sterilisation of mineral resource.
	Built environment • catastrophic damage to buildings or structures.
Medium - Reversible change affecting usability, value, or risk, over the medium-term or local area: possibly affecting regulatory compliance.	**Land quality – human health** • medium-term or moderate change to existing risk of exposure (adverse / beneficial); • unacceptable risks to one or more of the receptors with a medium-term effect (adverse); or • serious concerns or opposition from Statutory Consultees (adverse).
	Land quality – controlled waters • medium-term or local scale effects on water quality or availability (adverse / beneficial); • medium-term derogation of a water supply source, possibly resulting in prosecution (adverse); • observable habitat change that is sustainable / recoverable over the medium-term (adverse / beneficial); or

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Magnitude	Definition
	• temporary change in status / potential of a WFD water body or its ability to meet objectives (adverse / beneficial).
	Land quality – geological sites and mineral resources • partial loss of the designated geological sites; or • medium-term or local scale loss of mineral resources.
	Built environment • damage to buildings or structures.
Low - temporary change affecting usability, risk or value over the short-term or within the study area; measurable permanent change with minimal effect, usability, risk or value; no effect on regulatory compliance.	**Land quality – human health** • short-term temporary or minor change to existing risk exposure (adverse / beneficial); or • unacceptable risks to one or more receptors with a short-term effect (adverse).
	Land quality – controlled waters • short-term or very localised effects on water quality or availability (adverse / beneficial); • short-term derogation of a water supply source (adverse); • measurable permanent effects on a water supply source that do not impact on its operations (adverse); • observable habitat change that is sustainable / recoverable over the short-term (adverse / beneficial); or • no change in status / potential of a WFD water body or its ability to meet objectives (neutral).
	Land quality – geological sites and mineral resources • temporary change in status of designated geological sites; or • short-term or very localised effects on mineral resources.
	Built environment • easily repairable damage to buildings or structures.
Negligible - minor permanent or temporary change, indiscernible over the medium to long-term. Short-term, with no effect on usability.	**Land quality – human health** • negligible change to existing risk of exposure; or • activity is unlikely to result in unacceptable risks to receptors (neutral).
	Land quality – controlled waters • very minor or intermittent impact on local water quality or availability (adverse / beneficial); • usability of a water supply source will be unaffected (neutral); • very slight local changes that have no observable impact on dependent receptors (neutral); or • no change in status / potential of a WFD water body or its ability to meet objectives (neutral).
	Land quality – geological sites and mineral resources • no change in status of designated geological site; or • very minor impact on mineral resources.
	Built environment • very slight non-structural damage or cosmetic harm to buildings or structures.

7.4.1.3 Impact Significance

In basic terms, the potential significance of an impact is a function of the sensitivity of the receptor and the magnitude of the effect see **Chapter 5**, Approach to EIA for further details.

7.5 Baseline Conditions

The baseline environment for Development Scenarios 1 and 2 is discussed below in **Table 7-4**. As Development Scenario 3 is a combination of Scenarios 1 and 2 it has not been discussed separately.

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Table 7-4: Baseline Environment for Development Scenarios 1 and 2

<table>
<tr><th>Parameter</th><th>Development Scenario 1</th><th>Development Scenario 2</th></tr>
<tr><td>Geology</td><td colspan="2">Superficial deposits are absent within both Development Scenario boundaries.

Bedrock associated with the Weald Clay Formation is present beneath both development scenarios. The Weald Clay Formation is composed of dark grey thinly bedded mudstones (shales) and mudstones with subordinate siltstone, fine to medium -grained sandstones, including calcareous sandstone, shelly limestones and clay ironstones predominantly of non-marine facies. Mudstones of the Weald Clay Formation are present below both Development Scenarios.</td></tr>
<tr><td rowspan="2">Hydrogeology</td><td colspan="2">The Weald Clay Formation is designated as Unproductive Strata. These are predominantly rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

Historical mapping indicates the presence of wells throughout the area surrounding both the Development Scenarios (within a 250 m search zone). It is possible that the wells were abstracting groundwater from more permeable layers of sandstone and limestone within the Weald Clay Formation. The more permeable areas of the Weald Clay Formation are classified as Secondary A Aquifers. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

Neither Development Scenario is located within a SPZ.</td></tr>
<tr><td>There are no active groundwater abstractions located on or within 1 km of Development Scenario 1.</td><td>There are no active groundwater abstractions located on or within 1 km of Development Scenario 2.</td></tr>
<tr><td>Hydrology and Surface Drainage</td><td>There are 28 records of inland rivers and one record of a pond located within 250 m of Development Scenario 1, all are unnamed.

There are no surface water features recorded within the boundary of Development Scenario 1.</td><td>There are 12 records of inland rivers located within the boundary of Development Scenario 2, all are unnamed. There are an additional 37 records of inland rivers located within 250 m. Four ponds, and a lagoon, are also recorded within 250 m of Development Scenario 2.</td></tr>
<tr><td>Sensitive Land Use</td><td colspan="2">Sensitive land use sites are considered, by statutory agencies, to be of special importance due to their intrinsic qualities which are unique to those areas. There are no recorded sensitive sites located on or within 250 m of either development scenario. There are, however, multiple areas of ancient woodland recorded both on and within 250 m of both development scenarios. Potential impacts to the ecology within and around both Development Scenarios are discussed in Chapter 11 Nature Conservation and Biodiversity.

Both Development Scenarios are located within the River Arun (U/S Pallingham) Nitrate Vulnerable Zone.</td></tr>
<tr><td>Mineral Safeguarding and Consultation Areas</td><td colspan="2">The land within both Development Scenarios is underlain by mudstones associated with the Weald Clay Formation and fall within an area identified by West Sussex Council as a Mineral Safeguarding Area (MSA) and a Mineral Consultation Area (MCA). The resources present within the MSA that covers both Development Scenarios includes brick clay. Oil and gas resources are located within the MCA associated with both Development Scenarios.

An assessment of BGS recorded mineral sites identified that there are no mineral extraction sites on or within 250 m of either Development Scenario.</td></tr>
<tr><td>Human Health</td><td colspan="2">The required elements of each Development Scenario comprise those discussed in Chapter 3 Description of Rickman’s Green Village.

During construction, the critical human health receptors would be those involved in construction activities, adjacent off-site residents, nearby workers (e.g. agricultural workers) and visitors (e.g. those using Public Rights of Way). During the operational phase of either development scenario, the human health receptors will be residential / school users and maintenance workers.</td></tr>
</table>

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Parameter	Development Scenario 1	Development Scenario 2
Historical Setting	The research undertaken to inform the PRA (RHDHV, 2022a) indicates that Development Scenario 1 has comprised agricultural land and woodland since the earliest available OS maps (1874). Two ponds were recorded within the Development Scenario boundary between 1912 – 2000. Within 100 m of Development Scenario 1, potentially contaminative historical land uses were identified during the research undertaken to inform the PRA (see **Table 7-5**).	The research undertaken to inform the PRA (RHDHV, 2022b) indicates that Development Scenario 2 has comprised agricultural land and woodland since the earliest available OS maps (1874). Two ponds were recorded within the Development Scenario boundary between 1974 – post 1996. Evidence from the Client indicates an area of Development Scenario 2 referred to as 'Rainbow Field' was formally used for the storage of household waste materials prior to them taking ownership. Within 100 m of Development Scenario 2, potentially contaminative historical land uses were identified during the research undertaken to inform the PRA (see **Table 7-5**).

Table 7-5: Potential Sources of Contamination (✓ present, X absent)

Potential Source	Potential Contaminant of Concern	Development Scenario 1	Development Scenario 2
Onsite			
Agricultural land / practices potential for fertilisers, pesticides and herbicides	Herbicides and pesticides, in addition it is not uncommon for discarded material to be buried on farmland which could potentially contain a range of contaminants.	✓	✓
Ponds (potentially infilled land)	Localised Made Ground may be present in areas associated with the backfilling of former ponds. Potential contaminants include, but are not limited to, asbestos, metals and metalloids, polycyclic aromatic hydrocarbons (PAH), fuel and oil hydrocarbons, volatile and semi-volatile organic compounds (VOCs and SVOCs), inorganic and organic contaminants, herbicides, polychlorinated biphenyls (PCBs) and ground gas.	✓	✓
Rainbow Field	Information indicates that the area has undergone a significant clean up. Chemical data validating the condition of this area in relation to contamination has not been provided at the time of writing. In the absence of this information, the potential contaminants of concern may include, but are not limited to, asbestos, metals and metalloids, PAH, fuel and oil hydrocarbons, VOCs and SVOCs, inorganic and organic contaminants, herbicides, PCBs and ground gas.	✓ (offsite source)	✓
Radon	Parts of Development Scenario 2 are located within an area where 3 – 5 % of homes are at or above the Action Level for radon gas.	X	✓
Offsite (within 100 m)			
Lagoon 4 and Anaerobic Digestor	The contaminants of concern associated with the anaerobic digestion lagoons are largely dependent on the types of materials received at the site for digestion. Anecdotal information indicates that Lagoon 4, which was utilised as part of the anaerobic digester facility, is filled with rainwater, however this has not been confirmed.	X	✓

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Potential Source	Potential Contaminant of Concern	Development Scenario 1	Development Scenario 2
Wells / ponds (potentially infilled land)	Asbestos, metals and metalloids, PAHs, fuel and oil hydrocarbons, VOCs and SVOCs, inorganic and organic contaminants, PCBs, vapours and ground gas.	✓	✓
Pump house	Lubricants and greases, PAHs and metals.	X	✓
Tank	Following a review of available historical mapping it is anticipated that the tank is associated with a farm. It is not uncommon for tanks to be located on farms for the purpose of on-site storage of either heating oil or diesel for machinery. Ground contamination associated with spillages or leakages from fuel tanks include PAHs, total petroleum hydrocarbons (TPH) and metals.	X	✓

7.5.1 Climate Change, Sustainability and Natural Settings

7.5.1.1 Geology

No major changes to the underlying geology in relation to climate change and natural trends are anticipated to occur over the lifetime of Development Scenarios 1, 2 or 3.

7.5.1.2 Hydrogeology

There is increased regulation of agricultural chemicals and catchment wide initiatives to reduce pressures on groundwater to achieve compliance with the Water Framework Directive (WFD). Therefore, baseline groundwater quality is likely to improve over time through the natural breakdown of chemicals that may currently be present in groundwater bodies.

7.5.1.3 Hydrology and Surface Drainage

Climate change is expected to result in wetter winters, drier summers and a greater number of convectional rainstorms. This means that the hydrology of the surface drainage network could change, with higher winter flows, lower summer flows and a greater number of storm-related flood flows. The risk of flooding will also be amplified as a result of the predicted increase in rainfall associated with climate change, with an increase in peak river flows and an increase in the magnitude of surface water flooding.

7.5.1.4 Possible Sources of Contamination

Climate change is expected to result in wetter winters and drier summers, which has the potential to mobilise pre-existing sources of contamination either through increased rates of infiltration due to heavier rainfalls or dust generation through drier summers. These changes have the potential to increase the exposure risks of receptors to pre-existing sources. Natural degradation of contaminants over time may result in a general improvement in ground conditions.

7.5.1.5 Mineral Resources and Reuse of Soils

Climate change and natural trends are not anticipated to impact mineral resources present within land located associated with Development Scenarios 1, 2 or 3.

7.6 Potential Environmental Effects During Construction – Development Scenario 1

7.6.1 Impact 1: Exposure of workforce, land owners, land users and neighbouring land users[1] to contaminated soils and groundwater and associated health impacts

The proposed earthworks as well as the movement and stockpiling of soils has the potential to mobilise pre-existing ground contamination. This could result in impacts to human health through dermal contact, inhalation and ingestion of contaminants.

A PRA (RHDHV, 2022a) has been undertaken for land associated with Development Scenario 1 to identify plausible linkages as a result of the potential presence of contaminants within soils and groundwater. The PRA identified areas associated with historical uses as having the potential for contamination to be present (see **Table 7-5**).

The potential contaminants of concern (PCOC) that may be present could represent an unacceptable risk to construction workers, land owners, land users and neighbouring land users if exposed to the contaminants during construction. Construction works, particularly earthworks, may disturb and expose construction workers and other site users to potential soil and groundwater contaminants associated with the historical uses. Construction works could create pollutant linkages through ingestion, inhalation and direct dermal contact pathways.

In the event of exposing soils and stockpiling construction waste (including excavated soils), dust could be generated during dry and windy conditions. Under these conditions, construction workers, land owners, land users and neighbouring land users could temporarily be exposed to contamination via inhaling potentially contaminated dusts.

Additionally, the risks associated with soil contamination sources to human health could be altered by changes in migration pathways due to construction activities. A specific risk of concern is ground gases associated with areas of Made Ground (e.g. areas of infilling). Construction activities have the potential to create preferential pathways for any gases to migrate and accumulate within the proposed infrastructure. The potential risk from ground gas could represent a risk to human health through asphyxiation and explosion.

Construction workers are considered to be the most sensitive receptors as the activities they engage in constitute more direct exposure routes over longer periods of time.

7.6.1.1 Receptor Sensitivity

The sensitivity of construction workers, land owners, land users and neighbouring land users is considered to be **high**.

7.6.1.2 Magnitude of Impact

Potential impacts associated with construction activities (excavation works) on the health of construction workers, land owners, land users and neighbouring land users are predicted to be of local spatial extent (localised to work areas). They are also predicted to be of short-term duration (occurring during construction

[1] *Both land users and neighbouring land users comprise members of the public an local residents using public rights of way that are present within the Proposed Development and surrounding areas.*

works only), of intermittent occurrence and high reversibility. The magnitude is therefore considered to be **low**.

With regards to the potential risks posed to construction workers from the migration of ground gases, the magnitude is considered to be **high**. This is due to the potential for both acute and chronic health impacts. The magnitude of impact however is subject to the plausibility of a ground gas source and receptor contaminant linkage.

7.6.1.3 Impact Significance

The potential impact on human health associated with excavation works is considered to be of **moderate adverse** significance of effect. With regards to risks to construction workers from ground gas, the potential effect is considered to be of **major adverse** significance.

7.6.1.4 Mitigation

A targeted ground investigation may be required within Development Scenario 1, including the collection of soil, groundwater (if present) and surface water samples for laboratory analysis. The installation of ground gas / groundwater monitoring wells may also be required. This would assist in characterising the site conditions, identify unacceptable risks and determine whether remediation is required. If areas of potential concern are identified, then a remediation strategy would be developed and agreed with the relevant bodies prior to the commencement of remedial works and construction activities. The ground investigation, risk assessment and remediation would follow the guidance provided within the 2021 Environment Agency Land Contamination Risk Management Framework.

The development of, and adherence to, a CEMP would also be undertaken. The CEMP would be regularly reviewed and updated post consent, prior to and during the construction period. The CEMP would be informed by the findings of pre-construction ground investigations and include an assessment of the potential risks to human health and controlled waters receptors. Based on the risk assessment, appropriate working methods would be developed to avoid, minimise or mitigate impacts relating to construction. The risk management strategies incorporated into the CEMP would also include:

- use of appropriate Personal Protective Equipment (PPE);
- provision of welfare facilities;
- monitoring of works including air quality and odour; and
- implementation of relevant good working practices, including stockpile management and dust suppression activities to reduce the risk relating to the creation and inhalation of wind-blown dusts.

The CEMP would incorporate legislation requirements including the Construction Design Management (CDM) Regulations (2015), Health and Safety at Work Act (1974) and Control of Substances Hazardous to Health (COSHH) Regulations (2002).

In addition, a plan for dealing with unexpected contamination would be developed as part of the CEMP. This plan would also incorporate the EA best practice guidelines for pollution prevention. These have been withdrawn, but still provide a useful best practice guide in the absence of any other replacement guidance, and include:

- Environment Agency Pollution Prevention Guidance (PPG) 01 – Understanding your environmental responsibilities;
- Environment Agency PPG 05 – Works and maintenance near water;
- Environment Agency PPG 06 – Working at construction and demolition sites: preventing pollution guidance;
- Environment Agency PPG 08 – Safe storage and disposal of used oils;

- Environment Agency PPG 21 – Pollution incident response training; and
- Environment Agency PPG 22 – Dealing with spills.

The CEMP would be submitted for approval with the relevant bodies in advance of implementation. Risks to construction workers in relation to ground gas would be mitigated by the use of appropriate working methods incorporated into the CEMP and use of suitable PPE.

7.6.1.5 Residual Effect

Following the implementation of the measures identified above, the magnitude of impact would be reduced to **negligible**, and therefore represent a residual effect of **minor adverse** significance for both construction workers and other human health receptors.

7.6.2 Impact 2: Direct impacts on groundwater quality and groundwater resources

The Weald Clay Formation present beneath Development Scenario 1 is classified as unproductive strata and so direct impacts to an aquifer are not anticipated. A site walkover conducted as part of the **PRA (RHDHV, 2022a)** did not identify the presence of potential potable groundwater abstractions within the boundary of the development scenario.

During construction, surface layers will be excavated (e.g. as part of topsoil stripping and service installation), which would allow increased infiltration of rainwater and surface run-off to the subsurface. This could potentially mobilise any residual contamination already present within the overlying strata which could potentially migrate into groundwater bodies should more permeable layers be present. Migration of contaminants into groundwater bodies has the potential to impact on the quality of the groundwater.

If required, dewatering of perched water or groundwater within excavations could also affect groundwater flow and water quality within more permeable areas (if present). This may result in short-term impacts to base flow of local watercourses.

In addition, during construction there is the potential for the accidental release of contaminants from construction machinery. This can occur as a result of spillages, leakage or storage. These can enter into the ground and subsequently into groundwater impacting groundwater quality.

7.6.2.1 Receptor Sensitivity

Due to the unproductive nature of the underlying geology, the absence of private potable abstractions or SPZs located on or within 1 km of Development Scenario 1, the sensitivity of groundwater is considered to be **negligible**.

7.6.2.2 Magnitude of Impact

Should there be any changes to infiltration rates, surface runoff or dewatering during construction works that may directly impact more permeable layers of the Weald Clay Formation (if present), then the impacts are predicted to be of local spatial extent, of short-term duration and high reversibility (occurring during the works only). The magnitude of impact is therefore considered to be **low**.

7.6.2.3 Impact Significance

The overall effect on groundwater quality and resources is considered to be of **negligible adverse** significance.

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7.6.2.4 Mitigation

Although the overall significance of effect is considered to be negligible, the mitigation measures discussed in **Section 7.6.1.4** would be implemented prior to and during construction. Should contamination be encountered that is considered to pose an unacceptable risk to groundwater, a remediation strategy proportionate to the level of risk would be developed and agreed with the relevant bodies. Once agreed, any required remediation works, which would be dependent on the type and level of contamination encountered would be undertaken.

In addition, the CEMP would also include specific measures relevant to the storage of fuels, oils, lubricants, waste water and other chemicals during construction works. This will include:

- storing all fuels, oils, lubricants, waste water and other chemicals in impermeable bunds with at least 110% of the stored capacity, with any damaged containers being removed from site;
- refueling would take place in a dedicated impermeable area, using a bunded bowser;
- biodegradable oils to be used where possible; and
- ensuring that spill kits are available on site at all times as well as sand bags and stop logs for deployment in case of emergency spillages.

7.6.2.5 Residual Effect

By incorporating the measures discussed above, the magnitude of impact would be reduced to **negligible**, the overall significance of effect would remain **negligible adverse**.

7.6.3 Impact 3: Impacts on surface water quality and the ecological habitats they support from contamination

There are no surface water features located within the boundary of Development Scenario 1. There are however surface water features located within 250 m the development scenario. As described in **Table 7-5**, potential sources of contamination have been identified on and within 100 m of the development scenario. Construction works have the potential to disturb pre-existing contamination which could migrate and be released into surface water bodies via the following pathways:

- mobilisation and migration of free phase hydrocarbons, soil contaminants or dissolved phase contaminants in groundwater due to construction activities which may subsequently discharge into surface waters;
- surface water runoff from contaminated made ground soils brought to the surface during construction;
- runoff from stockpiles of potentially contaminated soils;
- migration of soil and groundwater contaminants into surface water drains during construction activities which may discharge into surface water bodies;
- accidental spillage whilst handling, storing or treating contaminated water, fuels or other chemicals during construction; or
- changes in hydraulic regime due to, for example, backfilling areas of excavation with less compacted / more porous materials that could potentially create preferential flow paths into surface water bodies.

7.6.3.1 Receptor Sensitivity

Any migration and discharge of contamination into surface waters could lead to a reduction in surface water quality and impact on the ecological habitats they support. As there are no designated sites located on or within 250 m of the development scenario, the sensitivity of surface waters is considered to be **low**.

Additional impacts relating to surface water quality and ecological habitats are provided in **Chapter 11 Nature Conservation and Biodiversity**.

7.6.3.2 Magnitude of Impact

Potential impacts to surface water quality and the ecology they support are considered to be of short-term duration and localised to areas where construction is taking place. Therefore, the magnitude of impact is considered to be **low**.

7.6.3.3 Impact Significance

The overall effect to surface water quality is considered to be of **minor adverse** significance.

7.6.3.4 Mitigation

Mitigation measures discussed in **Sections 7.6.1** and **7.6.2** would also serve to prevent the migration of contamination into surface water bodies. Additional mitigation measures will also be implemented during construction in areas previously identified as potential sources of contamination. The measures will include collecting perched water within the Made Ground (where present) or groundwater from dewatering activities. The water will be stored prior to any treatment or discharge. This is also true of perched water / groundwater encountered in areas of unexpected contamination. The wastewater shall either be:

- discharged to foul sewer under a trade effluent consent agreed with Southern Water; and / or
- discharged to surface water under an environmental permit issued from the EA.

On site treatment plant may be required to treat the wastewater prior to disposal in order to meet discharge limits set by either the EA or Southern Water.

7.6.3.5 Residual Effect

Following the adoption of the mitigation measures described above, and in previous sections, the risk to surface water bodies would be reduced to a **negligible** magnitude of impact. This would therefore reduce the significance of effect to **negligible adverse**.

7.6.4 Impact 4: Sterilisation of Future Mineral Resources

As described in **Table 7-4**, Development Scenario 1 is located within a MSA for brick clay as well as a MCA for oil and gas. Construction activities would prevent the extraction of brick clay and may impede oil and gas exploration.

7.6.4.1 Receptor Sensitivity

MSAs (and MCAs) are considered to be of regional importance. Therefore, the sensitivity of the mineral resources is considered to be **medium**.

7.6.4.2 Magnitude of Impact

The potential effects associated with sterilising part of the MSA (and MCA) located within the boundary of Development Scenario 1 would be effective during the lifetime of Rickman's Green Village and so are considered to be long-term effects. A Qualitative Mineral Resource Risk Assessment was undertaken for land associated with the Crouchlands Farm Project (which also partially covers all development scenarios) (Henrys, 2021). The report states that there are sufficient reserves of brick clay within the county for 45 years from existing quarries. In addition, it states that it is unlikely that significant prior extraction within the area covered by the report would be appropriate or practicable. The magnitude of impact is therefore considered to be **low**.

7.6.4.3 Impact Significance

The overall effect to mineral resources is considered to be of **minor adverse** significance.

7.6.4.4 Mitigation

It is considered unlikely that significant prior extraction of mineral resources on site would be appropriate or practicable. In addition, the area of the MSA (and MCA) present within the county that would be sterilised as a result of construction works is considered to be relatively small. It is considered unlikely that Development Scenario 1 would significantly effect resource availability; therefore no further mitigation is recommended.

7.6.4.5 Residual Effect

As it is considered unnecessary to adopt mitigation measures due to the relatively small area that would be sterilised, and any prior extraction is not considered to be appropriate or practicable, the residual effect remains **minor adverse**.

7.6.5 Impact 5: Impacts on the built environment and utilities

The construction phase of Development Scenario 1 has the potential to affect the existing built environment. This may be through creating new preferential pathways for contaminants or gases to migrate which could lead to the degradation of utilities and concrete from aggressive attack. This could potentially compromise the integrity of buildings and utilities or result in explosions in the case of ground gases.

7.6.5.1 Receptor Sensitivity

A combination of farm buildings and residential properties are located within 250 m of Development Scenario 1; therefore, the sensitivity of the built environment is considered to be **medium**.

7.6.5.2 Magnitude of Impact

Potential impacts to the built environment are considered to be of short-term duration, localised to those areas where construction is taking place and easily repairable; therefore, the magnitude of impact is considered to be **low**.

7.6.5.3 Impact Significance

The overall effect to the built environment is considered to be of **minor adverse** significance.

7.6.5.4 Mitigation

Pre-construction site characterisation works in areas identified as potential sources of contamination may be required. This would allow for the identification of potential contamination and the risks these may present to the built environment during construction works. Should it be deemed that risks to the built environment are present, appropriate remediation works would be undertaken to mitigate the potential impacts.

7.6.5.5 Residual Effect

Following the implementation of the measures described above, the magnitude of impact is reduced to **negligible** in relation to the built environment; therefore, the residual effect to the built environment is considered to be of **negligible adverse** significance.

7.7 Potential Environmental Effects During Construction – Development Scenario 2

7.7.1 Impact 1: Exposure of workforce, land owners, land users and neighbouring land users to contaminated soils and groundwater and associated health impacts

As discussed in **Section 7.6.1**, the proposed construction works have the potential to mobilise pre-existing ground contamination and impact on human health through the creation of pollutant linkages via direct dermal contact, inhalation pathways.

The PRA (RHDHV, 2022b) undertaken for the land associated with Development Scenario 2 identified areas associated with historical uses as having the potential for contamination to be present (see **Table 7-5**). The PCOC that may present could represent an unacceptable risk to construction workers, land owners, land users and neighbouring land users if exposed to the contaminants during construction. As mentioned previously, construction works have the potential to disturb and expose construction workers and other site users to potential soil and groundwater contaminants associated with the historical uses.

As with Development Scenario 1, the risks associated with soil contamination sources to human health could be altered by changes in migration pathways due to construction activities. Ground gases associated with areas of Made Ground (e.g. Rainbow Field) have the potential to migrate and accumulate within proposed infrastructure should preferential pathways be created during construction works. The potential risk from ground gas could represent a risk to human health through asphyxiation and explosion.

Risks associated with radon may also be present within the northern and north eastern part of the land associated with Development Scenario 2 (Areas R5, R6, R7 and R8 as described on **Figure 3-1** and **Figure 3-2**). Construction activities have the potential to create preferential pathways for radon to migrate and accumulate within the proposed infrastructure of these areas. The potential risks from radon could represent a chronic risk to human health.

As with Development Scenario 1, construction workers are considered to be the most sensitive receptors as the activities they engage in constitute more direct exposure routes over longer periods of time.

7.7.1.1 Receptor Sensitivity

The sensitivity of construction workers, land owners, land users and neighbouring land users is considered to be **high**.

7.7.1.2 Magnitude of Impact

Potential impacts associated with construction activities (excavation works) on the health of construction workers, land owners, land users and neighbouring land users are predicted to be of local spatial extent (localised to work areas). They are also predicted to be of short-term duration (occurring during construction works only), of intermittent occurrence and high reversibility. The magnitude of impact is therefore considered to be **low**.

With regards to the potential risks posed to construction workers from the migration of ground gases and radon, the magnitude of impact is considered to be **high**. This is due to the potential for both acute and chronic health impacts. The magnitude of impact however is subject to the plausibility of a ground gas and / or radon source and receptor contaminant linkage.

7.7.1.3 Impact Significance

The potential effect on human health associated with excavation works is considered to be of **moderate adverse** significance. With regards to risks to construction workers from ground gas and radon, the potential effect is considered to be of **major adverse** significance.

7.7.1.4 Mitigation

The mitigation measures discussed in **Section 7.6.1.4** would also be applied to Development Scenario 2.

7.7.1.5 Residual Effect

Following the implementation of the mitigation measures discussed in **Section 7.6.1.4**, the magnitude of impact would be reduced to **negligible**, and therefore represent a residual effect of **minor adverse** significance for both construction workers and other human health receptors.

7.7.2 Impact 2: Direct impacts on groundwater quality and groundwater resources

As with Development Scenario 1, the Weald Clay Formation underlying Development Scenario 2 is classified as unproductive strata. A site walkover conducted as part of the PRA (RHDHV, 2022b) did not identify the presence of potential groundwater abstractions within the boundary of the development scenario.

Similar to Development Scenario 1, construction activities will involve the excavation of surface layers which may allow for increased infiltration of rainwater and surface run-off to the subsurface. This has the potential to mobilise residual contamination which may be present within the overlying strata which could potentially migrate into the groundwater should more permeable layers be present within the Weald Clay Formation.

Dewatering activities may also be required as part of the construction works associated with Development Scenario 2 which may impact on base flow to local watercourses.

There also is the possibility for the potential accidental release of contaminants (e.g. spillages or leaks) from construction machinery. These can enter into the ground and subsequently into groundwater impacting groundwater quality.

7.7.2.1 Receptor Sensitivity

Due to the unproductive nature of the underlying geology and the absence of private potable abstractions or SPZs located on or within 1 km of Development Scenario 2, the sensitivity of groundwater is considered to be **negligible**.

7.7.2.2 Magnitude of Impact

Potential impacts to groundwater quality and resources are predicted to be of local spatial extent, of short-term duration and high reversibility (occurring during the works only). The magnitude of impact is therefore considered to be **low**.

7.7.2.3 Impact Significance

The overall effect on groundwater quality and resources is considered to be of **negligible adverse** significance.

7.7.2.4 Mitigation

The mitigation measures discussed in **Section 7.6.2.4** would also be applied to Development Scenario 2.

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7.7.2.5 Residual Effect

Following the implementation of the mitigation measures discussed in **Section 7.6.2.4**, the magnitude of impact would be reduced to **negligible**, the overall significance would remain **negligible adverse**.

7.7.3 Impact 3: Impacts on surface water quality and the ecological habitats they support from contamination

A number of surface water features are located within the boundary of Development Scenario 2, additional surface water features are also located within 250 m. As described in **Table 7-5**, potential sources of contamination have been identified on and within 100 m of the development scenario. Construction works have the potential to disturb pre-existing contamination which could migrate and be released into water bodies via the pathways discussed in **Section 7.6.3**.

7.7.3.1 Receptor Sensitivity

Any migration and discharge of contamination into surface waters could lead to a reduction in surface water quality and impact on the ecological habitats they support. As there are no designated sites located on or within 250 m of the development scenario, the sensitivity of surface waters is considered to be **low**.

Additional impacts relating to surface water quality and ecological habitats are provided in **Chapter 11 Nature Conservation and Biodiversity**.

7.7.3.2 Magnitude of Impact

Potential impacts to surface water quality and the ecology they support are considered to be of short-term duration and localised to areas where construction is taking place; therefore, the magnitude of impact is considered to be **low**.

7.7.3.3 Impact Significance

The overall effect on surface water quality is considered to be of **minor adverse** significance.

7.7.3.4 Mitigation

Mitigation measures discussed in Sections **7.6.1.4**, **7.6.2.4** and **7.6.3.4** would also be applied to the construction works associated with Development Scenario 2.

7.7.3.5 Residual Effect

Following the adoption of the mitigation measures described in previous sections, the risk to surface water bodies would be reduced to a **negligible** magnitude of impact. This would therefore reduce the effect significance to **negligible adverse**.

7.7.4 Impact 4: Sterilisation of Future Mineral Resources

As described in **Table 7-4**, Development Scenario 2 is located within a MSA for brick clay as well as a MCA for oil and gas. Construction activities would prevent the extraction of brick clay and may impede oil and gas exploration.

7.7.4.1 Receptor Sensitivity

MSAs (and MCAs) are considered to be of regional importance. Therefore, the sensitivity of the mineral resources is considered to be **medium**.

7.7.4.2 Magnitude of Impact

As with Development Scenario 1, the potential impacts associated with sterilising part of the MSA (and MCA) located within the boundary of Development Scenario 2 would be effective during the lifetime of Rickman's Green Village and so are considered to be long-term effects.

As discussed in **Section 7.6.4.2**, a Qualitative Mineral Resource Risk Assessment indicates that there is a 45 year supply of brick clay from existing quarries within the county. It is also considered unlikely that significant prior extraction within the area covered by the report would be appropriate or practicable; therefore, the magnitude of impact is considered to be **low**.

7.7.4.3 Impact Significance

The overall effect on mineral resources is considered to be of **minor adverse** significance.

7.7.4.4 Mitigation

As discussed in **Section 7.6.4.4**, it is considered unlikely that significant prior extraction of mineral resources on site would be appropriate or practicable. In addition, the area of the MSA (and MCA) present within the county that would be sterilised as a result of construction works is considered to be relatively small. It is considered unlikely that Development Scenario 2 would significantly affect resource availability; therefore, no further mitigation is recommended.

7.7.4.5 Residual Effect

As it is considered unnecessary to adopt mitigation measures due to the relatively small area that would be sterilised, and any prior extraction is not considered to be appropriate or practicable, the residual effect significance remains **minor adverse**.

7.7.5 Impact 5: Impacts on the built environment and utilities

The construction phase of Development Scenario 2 has the potential to impact on the existing built environment. As with Development Scenario 1, this may be through creating new preferential pathways for contaminants or gases to migrate which could lead to the degradation of utilities and concrete from aggressive attack. This could potentially compromise the integrity of buildings or utilities or result in explosions in the case of ground gases.

7.7.5.1 Receptor Sensitivity

A combination of farm buildings and residential properties are located within 250 m of Development Scenario 2. Therefore, the sensitivity of the built environment is considered to be **medium**.

7.7.5.2 Magnitude of Impact

Potential impacts to the built environment are considered to be of short-term duration, localised to those areas where construction is taking place and easily repairable; therefore, the magnitude of impact is considered to be **low**.

7.7.5.3 Impact Significance

The overall effect to the built environment is considered to be of **minor adverse** significance.

7.7.5.4 Mitigation

Mitigation measures discussed within **Section 7.6.5.4**, would also be applied to Development Scenario 2.

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7.7.5.5 Residual Effect

Following the implementation of mitigation measures, the magnitude of impact would be reduced to **negligible**. Therefore, the residual effect to the built environment is considered to be of **negligible adverse** significance.

7.8 Potential Environmental Effects During Construction – Development Scenario 3

7.8.1 Impact 1: Exposure of workforce, land owners, land users and neighbouring land users to contaminated soils and groundwater and associated health impacts

As described in **Section 5.1**, Development Scenario 3 is a combination of both Development Scenarios 1 and 2. Therefore the potential exposure pathways, historical land uses and PCOC discussed in **Sections 7.6.1** and **7.7.1** are applicable to Development Scenario 3.

7.8.1.1 Receptor Sensitivity

The sensitivity of construction workers, land owners, land users and neighbouring land users is considered to be **high**.

7.8.1.2 Magnitude of Impact

Potential impacts associated with construction activities (excavation works) on the health of construction workers, land owners, land users and neighbouring land users are predicted to be of local spatial extent (localised to work areas). They are also predicted to be of short-term duration (occurring during construction works only), of intermittent occurrence and high reversibility. The magnitude of impact is therefore considered to be **low**.

With regards to the potential risks posed to construction workers from the migration of ground gases and radon, the magnitude of impact is considered to be **high**. This is due to the potential for both acute and chronic health impacts. The magnitude of impact however is subject to the plausibility of a ground gas and / or radon source and receptor contaminant linkage.

7.8.1.3 Impact Significance

The potential effect on human health associated with excavation works is considered to be of **moderate adverse** significance. With regards to risks to construction workers from ground gas and radon, the potential effect is considered to be of **major adverse** significance.

7.8.1.4 Mitigation

The mitigation measures discussed in **Section 7.6.1.4** would also be applied to Development Scenario 3.

7.8.1.5 Residual Effect

Following the implementation of the mitigation measures discussed in **Section 7.6.1.4**, the magnitude of impact would be reduced to **negligible**, and therefore represent a **minor adverse** effect significance for both construction workers and other human health receptors.

7.8.2 Impact 2: Direct impacts on groundwater quality and groundwater resources

As discussed previously, both Development Scenario 1 and 2 are underlain by the Weald Clay Formation which is classified as unproductive strata. As previously mentioned, there are no potable groundwater abstractions located within 1 km of either development scenario, and are therefore not considered as part of the impact assessment.

The construction methodologies, the potential for mobilising existing contamination or introducing new sources via spillages discussed in **Sections 7.6.2** and **7.7.2** are also applicable to Development Scenario 3.

7.8.2.1 Receptor Sensitivity

Due to the unproductive nature of the underlying geology and the absence of private potable abstractions or SPZs located on or within 1 km of Development Scenario 3, the sensitivity of groundwater is considered to be **negligible**.

7.8.2.2 Magnitude of Impact

The potential impacts associated with the construction of Development Scenario 3 are predicted to be of local spatial extent, of short-term duration and high reversibility (occurring during the works only). The magnitude of impact is therefore considered to be **low**.

7.8.2.3 Impact Significance

The overall significance on groundwater quality and resources is considered to be of **negligible adverse** significance.

7.8.2.4 Mitigation

The mitigation measures discussed in **Section 7.6.2.4** would also be applied to Development Scenario 3.

7.8.2.5 Residual Effect

Following the implementation of the mitigation measures discussed in **Section 7.6.2.4**, the magnitude of impact would be reduced to **negligible**, the overall effect significance would remain **negligible adverse**.

7.8.3 Impact 3: Impacts on surface water quality and the ecological habitats they support from contamination

As discussed previously, a number of surface water features are located within the boundary of Development Scenario 2, with additional features located within 250 m of both Development Scenarios 1 and 2. As described in **Table 7-5**, potential sources of contamination have been identified on and within 100 m of each development scenario. Construction works have the potential to disturb pre-existing contamination which could migrate and be released into water bodies via the pathways discussed in **Section 7.6.3**.

7.8.3.1 Receptor Sensitivity

Any migration and discharge of contamination into surface waters could lead to a reduction in surface water quality and impact on the ecological habitats they support. As there are no designated sites located on or within 250 m of Development Scenario 3, the sensitivity of surface waters is considered to be **low**.

Additional impacts relating to surface water quality and ecological habitats are provided in **Chapter 11 Nature Conservation and Biodiversity**.

7.8.3.2 Magnitude of Impact

Potential impacts to surface water quality and the ecology they support are considered to be of short-term duration and localised to areas where construction is taking place; therefore, the magnitude of impact is considered to be **low**.

7.8.3.3 Impact Significance

The overall effect to surface water quality is considered to be of **minor adverse** significance.

7.8.3.4 Mitigation

Mitigation measures discussed in Sections **7.6.1.4**, **7.6.2.4** and **7.6.3.4** would also be applied to the construction works associated with Development Scenario 3.

7.8.3.5 Residual Effect

Following the adoption of the mitigation measures described in previous sections, the risk to surface water bodies would be reduced to a **negligible** magnitude of impact. This would therefore reduce the effect significance to **negligible adverse**.

7.8.4 Impact 4: Sterilisation of Future Mineral Resources

Development Scenario 3 is located within a MSA for brick clay as well as a MCA for oil and gas. Construction activities would prevent the extraction of brick clay and may impede oil and gas exploration.

7.8.4.1 Receptor Sensitivity

MSAs (and MCAs) are considered to be of regional importance; therefore, the sensitivity of the mineral resources is considered to be **medium**.

7.8.4.2 Magnitude of Impact

The potential impacts associated with sterilising part of the MSA (and MCA) located within the boundary of Development Scenario 3 would be effective during the lifetime of Rickman's Green Village and so are considered to be long-term effects.

As discussed in **Section 7.6.4.2**, a Qualitative Mineral Resource Risk Assessment indicates that there is a 45 year supply of brick clay from existing quarries within the county. It is also considered unlikely that significant prior extraction within the area covered by the report would be appropriate or practicable.

Therefore, the magnitude of impact is considered to be **low**.

7.8.4.3 Impact Significance

The overall effect to mineral resources is considered to be of **minor adverse** significance.

7.8.4.4 Mitigation

As discussed in both **Sections 7.6.4.4** and **7.7.4.4**, it is considered unlikely that significant prior extraction of mineral resources on site would be appropriate or practicable. The combined area of Development Scenario 3 that would be sterilised by construction works is still considered to be relatively small when compared to the MSA (and MCA) present within the county. It is therefore considered unlikely that Development Scenario 3 would significantly effect resource availability; therefore, no further mitigation is recommended.

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7.8.4.5 Residual Effect

As it is considered unnecessary to adopt mitigation measures due to the relatively small area that would be sterilised, and any prior extraction is not considered to be appropriate or practicable, the residual effect remains **minor adverse**.

7.8.5 Impact 5: Impacts on the built environment and utilities

The construction phase of Development Scenario 3 has the potential to impact on the existing built environment. As discussed in **Section 7.6.5**, this may be through creating new preferential pathways for contaminants or gases to migrate which could lead to the degradation of utilities and concrete from aggressive attack. This could potentially compromise the integrity of buildings and utilities or result in explosions in the case of ground gases.

7.8.5.1 Receptor Sensitivity

A combination of farm buildings and residential properties are located within 250 m of Development Scenario 3; therefore, the sensitivity of the built environment is considered to be **medium**.

7.8.5.2 Magnitude of Impact

Potential impacts to the built environment are considered to be of short-term duration, localised to those areas where construction is taking place and easily repairable; therefore, the magnitude of impact is considered to be **low**.

7.8.5.3 Impact Significance

The overall effect to the built environment is considered to be of **minor adverse** significance.

7.8.5.4 Mitigation

Mitigation measures discussed within **Section 7.6.5.4**, would also be applied to Development Scenario 3.

7.8.5.5 Residual Effect

Following the implementation of mitigation measures, the magnitude of impact would be reduced to **negligible**; therefore, the residual effect to the built environment is considered to be of **negligible adverse** significance.

7.9 Potential Environmental Effects During Operation Development Scenario 1

7.9.1 Impact 1: Exposure of workforce, land owners, land users and neighbouring land users to contaminated soils and groundwater and associated health impacts

During the operation of Development Scenario 1, maintenance works (e.g. to services) may be required which would likely involve the excavation of inground materials. If contaminated materials are brought to the surface during maintenance works and no mitigation measures are implemented, there is the potential for these materials to remain permanently exposed at the surface. This creates the potential for maintenance workers, land owners, land users and neighbouring land users to come into direct contact with contaminated soils left in-situ via direct contact pathways.

Materials excavated during the construction of Development Scenario 1 are likely to be re-instated following the works. If however a different source of material is required to backfill excavations that is not of a similar porosity as the surrounding environment (e.g. a more porous material is used), there is the potential for preferential pathways to be created which may lead to the migration of contaminants and / or ground gas. This may result in an accumulation of ground gases within buildings during its operation; therefore, risks associated with asphyxia and explosion may be present.

7.9.1.1 Receptor Sensitivity

The sensitivity of maintenance workers, land owners, land users and neighbouring land users is considered to be **high**.

7.9.1.2 Magnitude of Impact

The potential impacts associated with direct contact with contaminated soils are predicted to be localised to areas where contamination may be present and where the excavation works are required. The impacts are considered to be of short-term duration, of intermittent occurrence (occurring only during maintenance works) and high reversibility. The magnitude is therefore considered to be **low**.

In relation to the potential migration of contaminants and ground gas along newly created preferential pathways the magnitude of effect is considered to be **high**.

7.9.1.3 Impact Significance

Without mitigation, the potential significance of effect associated with direct contact is considered to be **moderate adverse**. Potential impacts associated with ground gas migration is considered to be of **major adverse** significance.

7.9.1.4 Mitigation

As discussed in **Section 7.6.1.4**, should remedial works be required in areas identified as posing unacceptable risks following site characterisation works, these would be completed prior to the construction of Development Scenario 1. If unexpected contamination was encountered during construction works, appropriate remediation works would also be undertaken. The remedial works, if required, undertaken prior to construction would reduce the potential for contaminated soils to be present and therefore reduce the potential for impacts to occur to human health.

In addition, remediation works may also remove potential sources of gas generating materials and so reduce the potential risks associated with asphyxia and explosion. By re-instating excavated materials or ensuring material with a similar porosity of the surrounding environment is used, risks associated with the creation of new preferential pathways are also reduced.

Maintenance workers that may be required to undertake ground excavations during the operation of Development Scenario 1 would be provided with information regarding the nature of the ground conditions. This will allow for the development of site and task specific risk assessments and method statements to be produced and implemented.

7.9.1.5 Residual Effect

With the incorporation of the measures described above, the risks to human health during the operation of Development Scenario 1 would be minimised as far as possible. The residual magnitude of impact is considered to be **negligible** for both direct contact and migration of ground gases; therefore, the residual effect to human health is considered to be of **minor adverse** significance.

7.9.2 Impact 2: Impact on controlled waters (groundwater and surface waters)

Maintenance activities that may be required during the operational phase have the potential to mobilise pre-existing contamination or create new contamination through leakage or spills of fuel, oils and other chemicals from machinery, vehicles or operational equipment. This could affect water quality within the more permeable layers of the Weald Clay Formation (if present) as well as surface water receptors located within 250 m.

7.9.2.1 Receptor Sensitivity

The sensitivity of controlled waters is considered to be **low**.

7.9.2.2 Magnitude of Impact

Impacts to controlled waters during the operational phase of Development Scenario 1 are predicted to be localised to areas of maintenance / shallow excavation activities where contamination may be present. The magnitude is therefore considered to be **low.**

7.9.2.3 Impact Significance

The overall effects on controlled waters during the operation of Development Scenario 1 are considered to be **minor adverse**.

7.9.2.4 Mitigation

Should ground excavations be required during the operational phase (e.g. maintenance of services), workers would be provided with information regarding the nature of ground conditions. This will aid in the development of site and task specific risk assessments and method statements that would protect controlled waters.

Fuels, oil lubricants and other chemicals required for maintenance works would be stored in an impermeable bund with at least 110% of stored capacity. Spill kits would be available on site at all times and an Emergency Response Plan (ERP) (or similar) would be developed which outlines mitigation measures to be undertaken in the event of an uncontrolled release of hazardous materials.

7.9.2.5 Residual Effect

Following the implementation of the mitigation measures described above, the magnitude of impact is reduced to **negligible**. The overall significance of effect to controlled waters would remain **minor adverse**.

7.9.3 Impact 3: Sterilisation of future mineral resources

Future extraction of resources within the MSA and MCA would be prevented during the operational phase of Development Scenario 1. The impacts are predicted to be permanent and impact the receptor directly, however, the proportion of the MSA and MCA that would be sterilised is considered to be relatively small.

7.9.3.1 Receptor Sensitivity

The sensitivity of future mineral resources is considered to be **medium**.

7.9.3.2 Magnitude of Impact

The Qualitative Mineral Resource Risk Assessment discussed in **Section 7.6.4.2** states that there are sufficient reserves of brick clay within the county for 45 years from existing quarries. In addition, it states that it is unlikely that significant prior extraction on the site would be appropriate and practicable.

Therefore, the magnitude of impact is considered to be **low**.

7.9.3.3 Impact Significance

The overall impact significance of effect to mineral resources is considered to be of **minor adverse**.

7.9.3.4 Mitigation

As discussed in **Section 7.6.4.4**, it is considered unlikely that significant prior extraction of mineral resources on site would be appropriate or practicable. In addition, the area of the MSA (and MCA) present within the county that would be sterilised is considered to be relatively small. It is considered unlikely that Development Scenario 1 would significantly impact resource availability; therefore, no further mitigation is recommended.

7.9.3.5 Residual Effect

As it is considered unnecessary to adopt mitigation measures due to the relatively small area that would be sterilised, the residual effect remains **minor adverse**.

7.9.4 Impact 4: Impacts on the built environment and utilities

Materials such as concrete used in the infrastructure have the potential to undergo degradation, such as chemical attack, from aggressive ground conditions due to the presence of acids or sulphates. This has the potential to compromise the integrity of structures.

In addition, the presence of contaminants in soils could also result in a risk of corrosion and permeation of utilities, such as plastic water supply pipes.

Buildings built on or near sources of ground gas (e.g. Made Ground associated with infilling) could also be at risk from the accumulation of gases potentially causing explosion.

7.9.4.1 Receptor Sensitivity

Due to the presence of residential properties that are to be built as part of Development Scenario 1, the sensitivity of the built environment is considered to be **medium**.

7.9.4.2 Magnitude of Impact

Due to the nature of Development Scenario 1, the magnitude is considered to be **medium** during operation.

7.9.4.3 Impact Significance

The overall impact significance of effect to the built environment is considered to be of **moderate adverse** significance.

7.9.4.4 Mitigation

Should unexpected sources of ground gas be identified prior to or during construction works, additional ground investigation works to those described in **Section 7.6.1.4** would be undertaken. This will allow for an assessment of the conditions and potential risks to be undertaken. Depending on the outcome of the assessment, mitigation measures such as the use of gas protection measures within buildings will be implemented.

Should utilities be located within areas affected by contamination, construction of clean or lined service corridors will be installed to protect human health and utilities. This would include, for example, the use of soils deemed not to contain contamination above human health generic assessment criteria or United Kingdom Water Industry Research (UKWIR) Water Supply Threshold Values.

In line with BRE Special Digest 1, material suitable for the identified ground conditions would be used to ensure that the correct concrete type for the environment has been selected. This will mitigate against the potential for ongoing material degradation of infrastructure and utilities during the operation of Development Scenario 1.

7.9.4.5 Residual Effect

With the incorporation of the measures described above, the magnitude of impact would be reduced to **low; t**herefore, the residual effect to the built environment during the operation of Development Scenario 1 is considered to be of **minor adverse** significance.

7.10 Potential Environmental Effects During Operation Development Scenario 2

7.10.1 Impact 1: Exposure of workforce, land owners, land users and neighbouring land users to contaminated soils and groundwater and associated health impacts

As discussed in **Section 7.9.1**, maintenance works have the potential to bring contaminated material to the surface should excavation works be required. Should no mitigation measures be implemented, there is the potential for these materials to remain permanently exposed at the surface. This creates the potential for maintenance workers, land owners, land users and neighbouring land users to come into direct contact with contaminated soils left in-situ via direct contact pathways.

As with Development Scenario 1, materials excavated during construction are likely to be re-instated following the works. There is the potential for preferential pathways to be created should excavations be backfilled with materials with a differing porosity to the surrounding environment (e.g. more porous). This could allow for the migration of contaminants, ground gas and / or radon. This may result in an accumulation of ground gases and / or radon within buildings during its operation. Therefore, risks associated with asphyxia and explosion (ground gas) or other chronic health conditions (radon) may be present.

7.10.1.1 Receptor Sensitivity

The sensitivity of maintenance workers, land owners, land users and neighbouring land users is considered to be **high**.

7.10.1.2 Magnitude of Impact

The impacts associated with potential direct contact with contaminated soils are predicted to be localised to areas where contamination may be present and where the excavation works are required. The impacts are considered to be of short-term duration, of intermittent occurrence (occurring only during maintenance works) and high reversibility. The magnitude is therefore considered to be **low**.

In relation to the potential migration of contaminants, ground gas and radon along newly created preferential pathways the magnitude is considered to be **high**.

7.10.1.3 Impact Significance

Without mitigation, the potential significance of effect associated with direct contact is considered to be **moderate adverse**. Potential impacts associated with ground gas and radon migration is considered to be of **major adverse** significance.

7.10.1.4 Mitigation

The mitigation measures discussed in **Section 7.9.1.4** would also be implemented during the operational phase of Development Scenario 2.

7.10.1.5 Residual Effect

With the incorporation of mitigation measures, the risks to human health during the operation of Development Scenario 2 would be minimised as far as possible. The residual magnitude of impact is considered to be **negligible** for both direct contact and migration of ground gases / radon. Therefore, the residual effect for human health receptors is considered to be of **minor adverse** significance.

7.10.2 Impact 2: Impact on controlled waters (groundwater and surface waters)

As discussed in **Section 7.9.2**, maintenance activities have the potential to mobilise pre-existing contamination or create new contamination which may affect water quality within surface water features and groundwater (if present) in more permeable layers of the Weald Clay Formation.

7.10.2.1 Receptor Sensitivity

The sensitivity of controlled waters is considered to be **low**.

7.10.2.2 Magnitude of Impact

Impacts to controlled waters during the operational phase of Development Scenario 2 are predicted to be localised to areas of maintenance / shallow excavation activities where contamination may be present. The magnitude is therefore considered to be **low.**

7.10.2.3 Impact Significance

The overall significance of effect on controlled waters during the operation of Development Scenario 2 are considered to be **minor adverse**.

7.10.2.4 Mitigation

The mitigation measures discussed in **Section 7.9.2.4** would also be implemented during the operational phase of Development Scenario 2.

7.10.2.5 Residual Effect

Following the implementation of the mitigation measures, the magnitude of impact is reduced to **negligible**. The overall significance of effect to controlled waters would remain **minor adverse**.

7.10.3 Impact 3: Sterilisation of future mineral resources

As with Development Scenario 1, future extraction of resources within the MSA and MCA would be prevented during the operational phase of Development Scenario 2. The impacts are predicted to be permanent and impact the receptor directly, however, the proportion of the MSA and MCA that would be sterilised is considered to be relatively small.

7.10.3.1 Receptor Sensitivity

The sensitivity of future mineral resources is considered to be **medium**.

7.10.3.2 Magnitude of Impact

As discussed in **Section 7.6.4.2**, a Qualitative Mineral Resource Risk Assessment indicates that there is a 45 year supply of brick clay from existing quarries within the county. It is also considered unlikely that significant prior extraction within the area covered by the report would be appropriate or practicable.

Therefore, the magnitude of impact is considered to be **low**.

7.10.3.3 Impact Significance

The overall impact significance of effect on mineral resources is considered to be of **minor adverse** significance.

7.10.3.4 Mitigation

As discussed previously, it is considered unlikely that significant prior extraction of mineral resources on site would be appropriate or practicable. In addition, the area of the MSA (and MCA) present within the county that would be sterilised is considered to be relatively small. It is considered unlikely that Development Scenario 2 would significantly impact resource availability. Therefore, no further mitigation is recommended.

7.10.3.5 Residual Effect

As it is considered unnecessary to adopt mitigation measures due to the relatively small area that would be sterilised, the residual effect remains **minor adverse**.

7.10.4 Impact 4: Impacts on the built environment and utilities

As discussed in **Section 7.9.4**, materials used to construct the infrastructure (up to 492 residential properties or up to 412 residential properties and a school) have the potential to undergo degradation due to the presence of aggressive ground conditions. This has the potential to compromise the integrity of structures. The presence of contamination within soils also has the potential to impact utilities through corrosion and permeation.

Buildings built on or near sources of ground gas (e.g. Made Ground associated with infilling) could also be at risk from the accumulation of gases potentially causing an explosion.

7.10.4.1 Receptor Sensitivity

Due to the presence of residential properties / residential properties and a school that are to be built as part of Development Scenario 2, the sensitivity of the built environment is considered to be **medium**.

7.10.4.2 Magnitude of Impact

Due to the nature of Development Scenario 2, the magnitude of impact is considered to be **medium** during operation.

7.10.4.3 Impact Significance

The overall impact significance of effect on the built environment is considered to be of **moderate adverse** significance.

7.10.4.4 Mitigation

The mitigation measures discussed in **Section 7.9.4.4** would also be implemented during the operational phase of Development Scenario 2.

7.10.4.5 Residual Effect

With the incorporation of the measures described above, the magnitude of impact would be reduced to **low**. Therefore, the residual effect to the built environment during the operation of Development Scenario 2 is considered to be of **minor adverse** significance.

7.11 Potential Environmental Effects During Operation Development Scenario 3

7.11.1 Impact 1: Exposure of workforce, land owners, land users and neighbouring land users to contaminated soils and groundwater and associated health impacts

As discussed in **Sections 7.9.1** and **7.10.1**, maintenance works have the potential to bring contaminated material to the surface should excavation works be required. This creates the potential for maintenance workers, land owners, land users and neighbouring land users to come into direct contact with contaminated soils left in-situ via direct contact pathways.

As with Development Scenarios 1 and 2, should excavations be backfilled with a more porous material, there is the potential for preferential pathways to be created which could allow for the migration of contaminants, ground gas and / or radon. This may result in an accumulation of ground gases and / or radon within buildings during its operation. Therefore, risks associated with asphyxia and explosion (ground gas) or other chronic health conditions (radon) may be present.

7.11.1.1 Receptor Sensitivity

The sensitivity of maintenance workers, land owners, land users and neighbouring land users is considered to be **high**.

7.11.1.2 Magnitude of Impact

The impacts associated with potential direct contact with contaminated soils are predicted to be localised to areas where contamination may be present and where the excavation works are required. The impacts are considered to be of short-term duration, of intermittent occurrence (occurring only during maintenance works) and high reversibility. The magnitude of impact is therefore considered to be **low**.

In relation to the potential migration of contaminants, ground gas and radon along newly created preferential pathways the magnitude of impact is considered to be **high**.

7.11.1.3 Impact Significance

Without mitigation, the potential significance of effect associated with direct contact is considered to be **moderate adverse**. Potential impacts associated with ground gas and radon migration is considered to be of **major adverse** significance.

7.11.1.4 Mitigation

The mitigation measures discussed in **Section 7.9.1.4** would also be implemented during the operational phase of Development Scenario 3.

7.11.1.5 Residual Effect

With the incorporation of mitigation measures, the risks to human health during the operation of Development Scenario 3 would be minimised as far as possible. The residual magnitude of impact is considered to be **negligible** for both direct contact and migration of ground gases / radon. Therefore, the residual effect on human health receptors is considered to be of **minor adverse** significance.

7.11.2 Impact 2: Impact on controlled waters (groundwater and surface waters)

As discussed previously in **Section 7.9.2**, maintenance activities have the potential to mobilise pre-existing contamination or create new contamination which may affect water quality within surface water features and groundwater (if present) in more permeable layers of the Weald Clay Formation.

7.11.2.1 Receptor Sensitivity

The sensitivity of controlled waters is considered to be **low**.

7.11.2.2 Magnitude of Impact

Impacts to controlled waters during the operational phase of Development Scenario 3 are predicted to be localised to areas of maintenance / excavation activities where contamination may be present. The magnitude of impact is therefore considered to be **low.**

7.11.2.3 Impact Significance

The overall significance of effect on controlled waters during the operation of Development Scenario 3 are considered to be **minor adverse**.

7.11.2.4 Mitigation

The mitigation measures discussed in **Section 7.9.2.4** would also be implemented during the operational phase of Development Scenario 3.

7.11.2.5 Residual Effect

Following the implementation of the mitigation measures, the magnitude of impact is reduced to **negligible**. The overall significance of effect on controlled waters would remain **minor adverse**.

7.11.3 Impact 3: Sterilisation of future mineral resources

The future extraction of resources within the MSA and MCA would be prevented during the operational phase of Development Scenario 3. The impacts are predicted to be permanent and impact the receptor directly, however, the proportion of the MSA and MCA that would be sterilised is considered to be relatively small.

7.11.3.1 Receptor Sensitivity

The sensitivity of future mineral resources is considered to be **medium**.

7.11.3.2 Magnitude of Impact

As discussed in **Section 7.6.4.2**, a Qualitative Mineral Resource Risk Assessment indicates that there is a 45 year supply of brick clay from existing quarries within the county. It is also considered unlikely that significant prior extraction within the area covered by the report would be appropriate or practicable.

Therefore, the magnitude of impact is considered to be **low**.

7.11.3.3 Impact Significance

The overall impact significance of effect to mineral resources is considered to be of **minor adverse** significance.

7.11.3.4 Mitigation

As previously discussed, it is considered unlikely that Development Scenario 3 would significantly impact the resource availability within the county due to the relatively small area that would be sterilised. Therefore, no further mitigation is recommended.

7.11.3.5 Residual Effect

As it is considered unnecessary to adopt mitigation measures due to the relatively small area that would be sterilised, the residual effect remains **minor adverse**.

7.11.4 Impact 4: Impacts on the built environment and utilities

As discussed in **Sections 7.9.4** and **7.10.4**, aggressive ground conditions have the potential to degrade materials (e.g. concrete) used in infrastructure. Utilities may also be impacted through corrosion and permeation due to the presence of contamination within soils.

Buildings built on or near sources of ground gas (e.g. Made Ground associated with infilling) could also be at risk from the accumulation of gases potentially causing an explosion.

7.11.4.1 Receptor Sensitivity

Due to the presence of residential properties / residential properties and a school that are to be built as part of Development Scenario 3, the sensitivity of the built environment is considered to be **medium**.

7.11.4.2 Magnitude of Impact

Due to the nature of Development Scenario 3, the magnitude of impact is considered to be **medium** during operation.

7.11.4.3 Impact Significance

The overall impact significance of effect on the built environment is considered to be of **moderate adverse** significance.

7.11.4.4 Mitigation

The mitigation measures discussed in **Section 7.9.4.4** would also be implemented during the operational phase of Development Scenario 3.

7.11.4.5 Residual Effect

With the incorporation of the measures described above, the magnitude of impact would be reduced to **low**. Therefore, the residual effect on the built environment during the operation of Development Scenario 3 is considered to be of **minor adverse** significance.

7.12 Summary

This chapter has provided a characterisation of the existing environment for land quality and hydrogeology within and surrounding the three development scenarios. Impact assessments have identified that, with the exception of mineral resources, there will be some minor adverse effects on receptors associated with land quality and hydrogeology during the construction and operational phases.

The assessment has established that the receptors relating to land quality and hydrogeology could also be affected as a result of direct disturbance and mobilisation of existing contamination. The receptors may also be affected through the introduction of new sources of contamination and sterilisation of mineral resources during the construction and operation of each of the development scenarios. Residual effects, however, are not considered to be significant in EIA terms.

8 Transport and Access

Considerations relating to traffic and transport are set out in the Transport Assessments (for Phase 1 of the masterplan (RHDHV, 2022c) and Phase 2 of the masterplan (RHDHV, 2022d)), provided under separate cover for each of the Phases of the Rickman's Green Village proposal. As noted in those reports, extensive modelling of operational capacity of off-site junctions and road safety in the wider study area is being carried out as identified in scoping dialogue with both relevant Local Highway Authorities, namely West Sussex County Council and Surrey County Council. The modelling results and associated off site works for each will be presented in forthcoming reports, forming Annexes to the Transport Assessments.

As the methodology set out in Guidelines for the Environmental Assessment of Road Traffic (published January 1993) relies on the output of junction modelling and road safety data, the formal Traffic and Transport chapter for the Rickman's Green Village proposals will be provided as a separate Addendum report and will be submitted alongside the additional Annexes to the Transport Assessment.

9 Air Quality

9.1 Introduction

This chapter of the ES considers the likely effects of Rickman's Green Village with respect to air quality and odour, and how this could affect human and ecological receptors. It describes the methods used to assess potential effects, the baseline conditions currently existing within the Rickman's Green Village footprint and surrounding area. The mitigation measures required to prevent, reduce or off-set any significant adverse effects are presented together with the likely residual effects after these measures have been adopted.

At this stage of the project the trip generation for the outline elements of Rickman's Green Village has not been finalised, and therefore the assessment of road traffic emissions for the full and outline planning applications will be provided as a forthcoming Air Quality Addendum under separate cover. At this stage, the chapter sets out the methodology that will be used for the assessment.

This chapter is supported by the following report:

- Construction Dust and Particulate Matter Assessment Methodology (RHDHV, 2022e).

9.2 Legislation, Planning Policy and Guidance

9.2.1 Legislation

European Union (EU) legislation forms the basis for UK air quality policy. The EU (Withdrawal Agreement) Act 2020 sets out arrangements for implementing the air quality limit values that are included in the EU Directive on Ambient Air Quality and Cleaner Air for Europe and in the Air Quality Regulations, and as amended. The relevant air quality limit values for this assessment for the protection of human health are detailed further in the following sections and are presented in **Table 9-1.**

9.2.1.1 UK Air Quality Strategy

The 1995 Environment Act required the preparation of a national Air Quality Strategy which sets air quality standards for specified pollutants. The Act also outlined measures to be taken by local authorities in relation to meeting these standards and Objectives, which became the Local Air Quality Management (LAQM) system.

The UK Air Quality Strategy was originally adopted in 1997 (Department of Environment, 1997) and has been reviewed and updated to take account of the evolving EU legislation, technical and policy developments and the latest information on health effects of air pollution. The strategy was revised and reissued in 2000 as the Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Department of the Environment, Transport and the Regions (DETR), 2000). This was subsequently amended in 2003 (DETR, 2003) and was last updated in July 2007 (Defra, 2007).

The Government published its Clean Air Strategy (CAS) in January 2019 (Defra, 2019), which reset the focus for the first time since the 2007 Air Quality Strategy revision (Defra, 2007). The CAS identifies a series of 'new' air quality issues, including biomass combustion, shipping emissions and releases from agricultural activities. There is a recognition that the effects of pollutant deposition on sensitive ecosystems and habitats needs greater focus. The concept of an overall exposure reduction approach is raised, in recognition that numerical standards are not safe dividing lines between a risk and a safe exposure, within a population with a varying age and health profile. Within the CAS, the government proposes an ambitious target to reduce the population exposed to concentrations of $PM_{2.5}$ above 10 $\mu g.m^{-3}$ by 50% by 2025. The CAS is supplemented by an Industrial Strategy, policy guidance for the ports sector, a developing approach for aviation, and by plans for road transport fuels shift to zero emissions by 2040.

The Environment Act gained royal assent in November 2021. The Act requires the government to set targets on air quality, including for fine particulate matter, in order to deliver cleaner air for all. The Act introduces a legally binding duty on the government to bring forward at least two air quality targets by October 2022: one to reduce annual average $PM_{2.5}$ concentrations in ambient air and the second must be a long-term target (set a minimum of 15 years in the future) in order to encourage long-term investment and to provide certainty for businesses and other stakeholders. It is expected that a public consultation on the proposed targets will be published in 2022.

9.2.1.2 LAQM

The standards and Objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) (HMSO, 2000), and the Air Quality (England) (Amendment) Regulations (2002) (HMSO, 2002). The EU Limit Values have been implemented via the Air Quality Standards (England) Regulations (2010) set out the combined Daughter Directive Limit Values and Interim Targets for Member State compliance (HMSO, 2010). The Air Quality Standards (Amendment) Regulations 2016 (HMSO, 2016) were published on 6 December 2016.

The current air quality standards and Objectives of relevance to this assessment are presented in **Table 9-1**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant Objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

Under Part IV of the Environment Act 1995, as amended by Part 4 of the Environment Act 2021, all local authorities are responsible for LAQM, the mechanism by which the government's AQS Objectives are to be achieved. It is the responsibility of local authorities to periodically review and assess present and likely future local pollution levels against these Objectives. Where an air quality Objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as AQMAs and take action to work towards meeting the Objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan to work towards meeting the Objectives and to improve air quality locally. Under the current LAQM regime, local authorities are to publish reports (following consultation and review by Defra) on the regular review and assessment of local air quality.

Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health. Pollutant Objectives, however, incorporate target dates and averaging periods which take into account economic considerations, practicability and technical feasibility.

Table 9-1: Air Quality Strategy Objectives (England) for the purpose of LAQM

Pollutant	AQO		To be Achieved by
	Concentration	Measured as*	
Nitrogen dioxide (NO_2)	200 µg.m^{-3}	1 hour mean not to be exceeded more than 18 times per year	31/12/2005
	40 µg.m^{-3}	Annual mean	31/12/2005

Royal HaskoningDHV

Pollutant	AQO		To be Achieved by
	Concentration	Measured as*	
Particles (PM_{10})	50 µg.m^{-3}	24-hour mean not to be exceeded more than 35 times per year	31/12/2004
	40 µg.m^{-3}	Annual mean	31/12/2004
Particles ($PM_{2.5}$)	25 µg.m^{-3}	Annual mean (target)	2020
	15% cut in annual mean (urban background exposure)		2010 – 2020
Note: * how the Objectives are to be measured is set out in the UK Air Quality (England) Regulations (2000)			

It should be noted that the AQS Objectives only apply in locations likely to have 'relevant exposure', i.e. where members of the public are exposed for periods equal to or exceeding the averaging periods set for the standards. For this assessment, locations of relevant exposure include building facades of residential properties, and where relevant schools and medical facilities. Places of work are not included. The Environment Act 2021 is expected to deliver key aspects of the CAS with the aim of maximising health benefits for all and will sit alongside the wider action on air quality.

National air quality Objectives also apply for the protection of vegetation and ecosystems, which are termed Critical Levels. Critical Levels apply irrespective of habitat type and are based on the concentration of the relevant pollutants in air. IAQM guidance (IAQM, 2020) recommends that only the annual mean Critical Level is used in assessments due to the comparative importance of annual effects to impacts upon vegetation, except where specifically required by the regulator where high short-term emissions may occur, such as from an industrial stack emission source. As such, given the consistent traffic exhaust emission source along road links, only annual mean Critical Levels are relevant to this assessment.

The Critical Levels of relevance to this assessment are detailed in **Table 9-2**.

Table 9-2: Critical Levels

Pollutant	Critical Level	
	Concentration (µg.m-^{3})	Measured as
Oxides of nitrogen (NO_x)	30	Annual mean
Ammonia (NH_3)	3	Annual mean

Critical Loads for habitat sites in the UK are published on the APIS website (CEH, 2022). These are the maximum levels of nutrient nitrogen and acid deposition that can be tolerated without harm to the most sensitive features of these habitat sites. An increase in Critical Load of less than 1% is typically considered to be insignificant, as a change in this level is within the magnitude of natural fluctuation and is unlikely to be measurable. The 1% threshold of insignificance is referenced in Natural England (2018), IAQM (2020) and Chapman and Kite (2021a, 2021b).

9.2.2 Planning Policy and Guidance

9.2.2.1 National Planning Policy Framework

The NPPF (MHCLG, 2019a) was updated in July 2021 and refers to the LAQM process by recognising that:

> *"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of*

Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas".

The NPPF identifies that local planning authorities should maintain consistency within the LAQM process and states that:

"Planning decisions should ensure that any new development within Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

9.2.2.2 Planning Practice Guidance

The UK Government Planning Practice Guidance (MHCLG, 2019b) provides guidance on how the planning process can take account of the impact new development may have on air quality.

The guidance states that air quality may be relevant to a planning application where:

- traffic in the vicinity of the development may be affected by increasing volume or congestion or altering the fleet composition on local roads;
- new point sources of air pollution are to be introduced;
- people may be exposed to existing sources of pollution including dust;
- potentially unacceptable impacts (such as dust) may arise during construction; and
- biodiversity may be affected.

9.2.2.3 Chichester Local Plan: Key Policies 2014-2029

The extant Local Plan was adopted in 2014. Policies relevant to air quality include:

- Policy 39, Transport, Accessibility and Parking: Planning permission will be granted for development where it can be demonstrated that all the following criteria have been considered:
    - "*6. The proposal does not create residual cumulative impacts which are severe;" (Where development is likely to have an impact on an Air Quality Management Area, an air quality assessment will be required)*."
- Policy 40, The Environment, Sustainable Design and Construction: For all new dwellings or for new non-domestic buildings, evidence will be required by the developer to demonstrate that all of the following criteria have been considered (proportionate to the scale of development):
    - "*10. The reduction of the impacts associated with traffic or pollution (including air, water, noise and light pollution) will be achieved, including but not limited to the promotion of car clubs and facilities for charging electric vehicles*."
- Policy 41: Offsite Renewable Energy: Planning permission will be granted for off-site renewable energy (e.g. solar, biomass and energy crops, anaerobic digestion, wind and landfill gas) where it has been demonstrated that all the following criteria have been met:
    - "*2. There is no significant adverse impact on local amenity, health and quality of life as a result of noise, emissions to atmosphere, electronic interference or outlook through unacceptable visual intrusion*."
- Appendix A: Green Infrastructure:
    - "*In addition, tree planting and landscaping has the potential to assist with improving air quality and biodiversity*"

9.2.2.4 Sussex Air Quality Partnership Supplementary Planning Guidance

This document, “Air quality and emissions mitigation guidance for Sussex”, published in 2021, contains a guide for developers which helps to:

- provide clarity to how authorities intend interpreting relevant Local Plan policies.
- provide advice for developers and their consultants on how to assess and mitigate the impact that new developments may have on local air quality.
- detail a consistent approach by developers and LPAs to:
    - address impacts on local air quality
    - ensure optimum scheme design to reduce emissions and/or exposure and
    - avoid unnecessary delays in the planning process.

The guidance also incorporates an air quality mitigation and damage costs assessment module, which allows the calculation of the mitigation costs that would be payable to the planning authority by a developer, based upon 5 years of operation of the development. This is related to the number of daily car trips associated with the development and emissions of nitrogen oxides (NOx) and fine particulate matter ($PM_{2.5}$).

9.3 Consultation

The Senior Environmental Protection Officer at CDC was contacted to agree the assessment methodology via email[2]; however, no response had been received at the time of writing this Chapter.

In the absence of a response, it was assumed the scope agreed with CDC for the adjoining Whole Farm Plan (Crouchlands Farm planning ref: 22/01735/FULEIA) was applicable for the proposals coming forwards with this application.

Further consultation will be undertaken with CDC to agree the scope and methodology of the operational phase road traffic assessment, and the requirement for a damage cost calculation in accordance with the Sussex Air Quality Partnership Supplementary Planning Guidance. There is also the potential for traffic generated by Rickman’s Green Village to affect AQMAs in other councils’ jurisdictions, namely Waverley Borough Council and Guildford Borough Council; this will be determined once scoping comments are received from Surrey County Council’s highways department. If required, consultation will also be undertaken with these authorities to agree the scope and methodology for assessment.

9.4 Assessment Methodology

Chapter 5 Approach to EIA provides a summary of the general impact assessment methodology applied to Rickman’s Green Village. Air quality guidance documents provide topic-specific methodologies for determining the magnitude of impacts and the significance of effects. As such, these topic-specific approaches were used. The following sections confirm the methodology used to assess the potential impacts on air quality.

9.4.1 Data Sources

The assessment was undertaken with reference to information from several sources, as detailed in **Table 9-3**.

[2] *The proposed assessment methodology was submitted via email on 6/7/2022.*

Table 9-3: Data sources used in the air quality assessment

Data Sources	Reference
Chichester District Council, Annual Status Report (2021)	2021 Air Quality Annual Status Report (ASR) (CDC, 2021)
Department for Environment Food and Rural Affairs (Defra)	(LAQM Technical Guidance TG22 (Defra, 2022)
Defra's LAQM Support Tools	LAQM 1km x 1km grid background pollutant maps (Defra, 2020)
IAQM	Guidance on the Assessment of Dust from Demolition and Construction (IAQM, 2016)
IAQM	Guidance on the assessment of odour for planning (IAQM, 2018)
IAQM and Environmental Protection UK (EPUK)	Land-use Planning and Development Control: Planning for Air Quality (IAQM and EPUK, 2017)
Joint Nature Conservation Committee (JNCC)	Guidance on Decision-making Thresholds for Air Pollution (Chapman and Kite, 2021)

9.4.2 Baseline Air Quality Conditions

The latest Air Quality ASR published by CDC is the 2021 ASR (CDC, 2021). This was downloaded from the CDC website and reviewed to establish baseline air quality conditions at, and in proximity to, Rickman's Green Village.

Background air pollutant concentrations corresponding to the 1 x 1km grid squares covering the study area were obtained from the latest 2018-based air pollutant maps provided by Defra (Defra, 2020). Background concentrations for the base year (2022) were obtained to establish baseline air quality conditions.

9.4.3 Construction Phase Assessment

An assessment of potential impacts associated with the construction phase was undertaken in accordance with the IAQM guidance (IAQM, 2016). A summary of the assessment process is provided below:

Construction phase assessment steps:

1. screen the need for a more detailed assessment;
2. separately for demolition, earthworks, construction and trackout:
    a. determine potential dust emission magnitude;
    b. determine sensitivity of the area; and,
3. establish the risk of dust impacts.
4. determine site specific mitigation; and
5. examine the residual effects to determine whether or not additional mitigation is required.

It should be noted that trackout is defined as the transport of dust and dirt from the construction site onto the public road network. Full details of the assessment methodology are provided in Construction Dust and Particulate Matter Assessment Methodology (RHDHV, 2022e).

Potential impacts of construction dust were considered separately for the Phase 1 of the masterplan and Phase 2 of the masterplan, and both phases together. In each assessment, where appropriate, consideration was given to the sensitivity of the new residential dwellings which would be present during construction of the later phases of the development.

At this stage of the Rickman's Green Village design, there is insufficient detail with regard to the construction of the development to enable construction phase traffic flows to be calculated. A CEMP will be produced for the Rickman's Green Village at post-determination stage which will include management of construction phase vehicle movements; this would minimise impacts on local air quality. It is therefore not anticipated that construction-phase vehicle movements would give rise to significant impacts at human or ecological receptors.

Defra technical guidance (Defra, 2022) states that emissions from Non-Road Mobile Machinery (NRMM)[3] used on construction sites are unlikely to have a significant impact on local air quality where relevant control and management measures are employed. As such, emissions from NRMM were not considered quantitively in this assessment, and the relevant control measures to be employed are detailed in **Section 9.6.**

9.4.3.1 Receptor Sensitivity

Definitions of the different sensitivity levels for human and ecological receptors to dust (IAQM, 2016) are given in **Table 9-4.**

Table 9-4: Definitions of the Different Sensitivity Levels for Receptors to Construction Dust

Sensitivity	Sensitivity of people and property to dust soiling	Sensitivity of people to the health effects of PM10	Sensitivity of ecological receptors
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.	Residential properties, hospitals, schools and residential care homes.	International or national designation and features affected by dust soiling or locations with dust-sensitive species.
Medium	Parks, places of work.	Office and shop workers not occupationally exposed to PM10.	Locations with important plant species or national designation with features affected by dust soiling.
Low	Playing fields, farmland, footpaths, short-term car parks and roads.	Public footpaths, playing fields, parks and shopping streets.	Local designation where features may be affected by dust deposition.

9.4.3.2 Magnitude of Effect

The IAQM guidance (IAQM, 2016) recommends that the dust emission magnitude is determined for demolition, earthworks, construction and trackout. The dust emission magnitude is based on the scale of the anticipated works. **Table 9-5** describes the potential dust emission class criteria for each outlined construction activity.

Table 9-5: Criteria Used in the Determination of Dust Emission Class

Activity	Criteria used to Determine Dust Emission Class		
	Small	Medium	Large
Demolition	Total building volume <20,000 m^2; Material with low potential for dust release Demolition activities <10 m above ground level.	Total building volume 20,000 – 50,000 m^2; Potentially dusty material. Height of building between 10-20 m above ground level.	Total building volume >50,000 m^2; Potentially dusty material. Demolition activities >20 m above ground level.
Earthworks	Total site area <2,500 m^2; <5 heavy moving earth vehicles active at any one time.	Total site area 2,500 – 10,000 m^2; 5 – 10 heavy moving earth moving vehicles active at any one time.	Total site area >10,000 m^2, >10 heavy earth moving vehicles active at any one time.
Construction	Total building volume <25,000 m^3;	Total building volume 25,000 – 100,000 m^3;	Total building volume >100,000 m^3;

[3] Non-Road Mobile Machinery is defined as any mobile machinery, transportable industrial equipment or vehicle fitted with an internal combustion engine not intended for passenger or goods transport by road. Explanatory Memorandum to the UK Non Road Mobile Machinery (Emissions of Gaseous and Particulate Pollutants) (Amendment) Regulations (2006).

Activity	Criteria used to Determine Dust Emission Class		
	Small	Medium	Large
	Construction material with low potential for dust release.	Potentially dusty construction material (e.g. concrete).	On site concrete batching.
Trackout	<10 outward HGV trips in any one day; Unpaved road length <5 0m.	10 – 50 outward HGV trips in any one day. Unpaved road length 50 – 100 m.	>50 outward HGV trips in any one day; Unpaved road length >100 m.

9.4.3.3 Impact Significance

In assessing the significance of construction dust impacts using the IAQM guidance (2016), the dust emission magnitude is combined with the sensitivity of the area to determine the risk of impacts prior to mitigation. This is shown in more detail in Construction Dust and Particulate Matter Assessment Methodology (RHDHV, 2022e). This assessment deviates from the methodology set out in **Chapter 5 Approach to EIA**, as the IAQM guidance does not assign a significance before applying mitigation measures. The IAQM considers it to be most appropriate to only assign significance post-mitigation as it assumes mitigation is inherent in the design/construction approach. A matrix is therefore not provided in the guidance to determine significance. Once appropriate mitigation measures have been identified, the significance of construction phase impacts is be determined. The aim of the guidance is to ensure that mitigation measures are recommended which are commensurate with the level of risk, which will sufficiently reduce the effect. With the implementation of these measures, impacts can be considered to be not significant.

9.4.4 Operational Phase Emissions Assessment

Rickman's Green Village development proposals will not include any on-site point sources of emissions, such as centralised energy generation plant. The methodology for assessment of other operational phase emissions, both on site and off site, is detailed below.

9.4.4.1 Off-Site Emissions Sources

The adjacent Crouchlands Farm site previously incorporated an anaerobic digestion facility. Three digestate lagoons (termed Lagoons 1, 2 and 4) were historically located within the Crouchlands Farm site boundary. These three lagoons were removed, and land remediated some considerable time ago and therefore are not potential sources of emissions. A further lagoon (Lagoon 3) remains intact. Lagoon 3 is outside the application red line and situated on third party land.

Lagoon 3, located to the west of Rickman's Green Village, is a legacy asset and remains in the ownership of the previous owner of the farm. It has previously been identified by CDC as presenting potential risks to the surrounding environment as a result of its structure, size, location and potential for gas emissions. The Lagoon has a basal liner, underlain by impermeable Weald Clay, and there is a low-density polyethylene liner that covers the Lagoon surface, the edges of which are sealed in a trench along the crest of the Lagoon. The surface liner is inflated in parts, as a result of gases evolved from the digestate contained in the Lagoon.

A detailed assessment of the potential impacts on human health as a result of emissions from Lagoon 3 was undertaken as part of the planning application for the Whole Farm Plan. Despite a Planning Enforcement Notice having lapsed in May 2021, Lagoon 3 remains and therefore the results of this previous assessment were used to determine the potential impacts on Rickman's Green Village.

For the purpose of this assessment all receptors have been classed as high sensitivity as there is a potential significant impact to human health from emissions from the Lagoon. The magnitude and overall significance of effect was determined based on the results of the Crouchlands Farm assessment and using professional judgement.

9.4.4.2 Development-Generated Road Traffic Emissions

Screening Criteria

Air quality and emissions mitigation guidance for Sussex, published in 2021, provides guidance on the assessment of operational phase air quality impacts. Proposals classified as 'major' should use the methodology included within Defra Technical Guidance (Defra, 2022) and IAQM and EPUK (IAQM and EPUK, 2017) guidance. As noted earlier in this chapter, the traffic flow data for Rickman's Green Village were not available at the time of writing. As such, the requirement for a detailed assessment of operational vehicle exhaust emissions at human receptors will be considered at a later stage using the screening criteria provided by IAQM and EPUK (2017), and the methodology included within these documents has been referred to in the following sections and will be used in the assessment. These screening criteria would also be applied to any assessment of AQMAs in Waverley Borough Council or Guildford Borough Council's areas of jurisdiction, where relevant.

Guidance from recently released reports by the JNCC (Chapman and Kite, 2021a and 2021b) will be used for the screening of ecological receptors, within 200 m of affected road links. The guidance is specifically for European designated sites; however, it will be used conservatively to assess other designations (e.g., ancient woodlands) in order to provide a conservative and robust assessment.

The assessment criteria are detailed in **Table 9-6**.

Table 9-6: Road Traffic Assessment Screening Criteria

Guidance Document	Receptor	Vehicle Type	Criteria
IAQM and EPUK (2017)	Human receptors	LDVs	A change in AADT of more than 100 within or adjacent to an AQMA, or more than 500 elsewhere
		HDVs	An increase in HDV movements of more than 25 per day within or adjacent to an AQMA, or more than 100 elsewhere
JNCC (Chapman and Kite, 2021a and 2021b)	Ecological receptors	AADT	An increase 0.15% or more of existing AADT (over 5 years) (i.e. Decision-making Threshold (DMT)) inclusive of in-combination traffic growth.

Receptor Sensitivity

Human Receptors

The sensitivity of a human receptor is not considered in the assessment of air quality impacts; the air quality Objectives in **Table 9-1**, which are health-based, only apply at locations where there is relevant public exposure as detailed in **Table 9-7**.

Table 9-7: Examples of Where the Air Quality Objectives Should and Should Not Apply

Averaging Period	Objectives should apply to:	Objectives should generally not apply at:
Annual mean	• All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, care homes, etc.	• Building facades of offices or other places of work where members of the public do not have regular access. • Hotels, unless people live there as their permanent residence. • Gardens of residential properties. • Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.

Averaging Period	Objectives should apply to:	Objectives should generally not apply at:
24-hour mean	• All locations where the annual mean Objective would apply, together with hotels and gardens of residential properties.	• Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1-hour mean	• All locations where the annual and 24-hour mean Objectives apply. Kerbside sites (for example, pavements of busy shopping streets). • Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. • Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	• Kerbside sites where the public would not be expected to have regular access.

Sensitive receptor locations that experience pollutant concentrations close to, or in exceedance of, the Objectives experience a larger impact magnitude with a smaller change in pollutant concentrations, as detailed in **Table 9-8** below. For the purposes of this assessment, the sensitivity of receptors to human health effects is considered to be high.

Ecological Receptors

Whilst Critical Levels (see **Table 9-2**) apply regardless of habitat type, Critical Loads for habitat sites in the UK are published on the APIS website (CEH, 2022). These are the maximum levels of nutrient nitrogen and acid deposition that can be tolerated without harm to the most sensitive features of these habitat sites. The sensitivity of the habitat to nitrogen or acid deposition is therefore reflected in the Critical Load value assigned to that habitat.

Magnitude of Effect

If it is determined that a detailed assessment of road traffic emissions on human health and ecological receptors is required using the screening criteria provided in **Table 9-6,** then the following methodology will be used to determine the magnitude of effect.

Human Receptors

Guidance is provided by the IAQM and EPUK (IAQM and EPUK, 2017) on determining the impact of a development on local air quality. **Table 9-8** details the impact descriptors that take account of the magnitude of change in the predicted pollutant concentration, and the concentration in relation to the air quality Objectives, which are applied to individual assessed receptors.

Table 9-8: Impact Descriptors for Existing Receptors

Annual Mean Concentration Predicted at Receptor in Assessment Year	% Change in Concentration relative to the Air Quality Assessment Level (AQAL)			
	1 to 2	2 to 5	6 to 10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76% to 94% of AQAL	Negligible	Slight	Moderate	Moderate
95% to 102% of AQAL	Slight	Moderate	Moderate	Substantial
103% to 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial
Note: Figures are to be rounded up to the nearest round number. Any value less than 1% after rounding (effectively less than 0.5%) will be described as “Negligible”.				

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Ecological Receptors

The JNCC recently published a suite of documents (Chapman and Kite, 2021a and 2021b) which provide guidance on cumulative and in-combination effects assessment for projects and plans which generate increases in atmospheric nitrogen emissions. The reports deal with identifying thresholds for road traffic flow increases, above which detailed assessment of the effects upon Critical Level and/or Critical Loads for nitrogen at nearby designated sites would be required. The reports were solely concerned with the effects arising as a result of permanent and lasting changes (increases) in operational phase road traffic flows, associated exhaust emissions of NH_3 and NOx and consequent permanent impacts on designated sites.

The reports provide data on the magnitude of increases in pollutant concentrations and deposition (NOx, NH_3, nitrogen deposition and acid) with different levels of traffic generation experienced at varying distances from the road, based on detailed modelling and monitoring measurements. The JNCC Technical Report (Chapman and Kite, 2021b) states that the road-relevant approach provided in the report is expected to provide robust and representative, albeit indicative, information which will often be better than a detailed model if that model has not been verified against measurements. As such, the consideration of impacts on designated ecological sites will be undertaken using a semi-quantitative approach, using the data provided within the JNCC reports, without project-specific detailed dispersion modelling.

Use of the JNCC guidance will allow for a more conservative assessment of any potential road traffic emission impacts on ecological receptors, as the 0.15% increase in AADT screening criterion (or DMT) is more stringent than the previous screening criteria of a 1,000 AADT or 200 HGV increase (Natural England (2018), IAQM (2020) and Highways England (2019).

Impact Significance

Human Receptors

Following determination of the impact at individual receptors, the IAQM and EPUK guidance states that an overall significance of effect should be determined which should be a binary judgement (i.e. significant or not significant). The guidance recommends that the assessment of significance of effect should take into account the following factors:

- the existing and future air quality in the absence of Rickman's Green Village;
- the extent of current and future population exposure to the impacts; and
- the influence and validity of any assumptions adopted when undertaking the prediction of impacts.

The guidance also states that a judgement of effect significance should be made by a competent professional who is suitably qualified. This air quality assessment and determination of the significance of the development on local air quality will be undertaken by current members of the IAQM.

The impact descriptors above are to be applied to annual mean concentrations. With regard to short-term air quality impacts, any exceedances of the air quality Objectives would be considered to be a significant impact in EIA terms.

Ecological Receptors

An increase in Critical Load of less than 1% is typically considered to be insignificant, as a change of this magnitude is likely to be within the natural range of fluctuations in deposition and is unlikely to be perceptible. The 1% threshold of insignificance is referenced in Natural England (2018), IAQM (2020) and Chapman and Kite (2021a, 2021b). The exceedance of a threshold is not decisive in and of itself, nor does it suggest that damage is likely to occur (in the case of SSSIs) or that it will not be possible to avoid adverse effects to site integrity (in the case of European sites) (Chapman and Kite, 2021a).

Using the JNCC reports (Chapman and Kite, 2021a and 2021b), it is possible to apply a road-relevant approach based on the distance between the affected road and the nearest boundary of a (European) designated site. This approach will be used to determine the potential magnitude of effect of Rickman's Green Village on ecological sites. The thresholds proposed in the JNCC reports focus on SSSI and European designated sites; however, they will also be applied to ancient woodland in this assessment in order to provide a conservative and robust assessment.

Where any air quality impacts on designated sites are above 1% of the Critical Load or Level, a determination of the significance of the effect will be made by an ecologist.

9.4.4.3 Operational Phase Odour Assessment

A qualitative odour assessment was undertaken to consider the potential for impacts to occur at proposed residential dwellings as a result of operations at the Farm Hub located to the west of Rickman's Green Village within Crouchlands Farm. The Farm Hub will continue to include a small scale, low impact and low intensity livestock operation, which, depending on the activity, may produce odour. The assessment was undertaken using the risk-based source-pathway-receptor approach detailed in IAQM guidance (IAQM, 2018) to determine the odour impact.

Receptor Sensitivity

Definitions of the different sensitivity levels for human and ecological receptors to odour (IAQM, 2018) are given in **Table 9-9.**

Table 9-9: Receptor Sensitivity to odours

For the sensitivity of people to odour, the IAQM recommends that the Air Quality Practitioner uses professional judgement to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the following general principles:	
High sensitivity receptor	Surrounding land where: • users can reasonably expect enjoyment of a high level of amenity; and • people would reasonably be expected to be present here continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land. Examples may include residential dwellings, hospitals, schools/education and tourist/cultural.
Medium sensitivity receptor	Surrounding land where: • users would expect to enjoy a reasonable level of amenity, but wouldn't reasonably expect to enjoy the same level of amenity as in their home; or • people wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land. Examples may include places of work, commercial/retail premises and playing/recreation fields
Low sensitivity receptor	Surrounding land where: • the enjoyment of amenity would not reasonably be expected; or • there is transient exposure, where the people would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Examples may include industrial use, farms, footpaths and roads.

Magnitude of Effect

The approach detailed in IAQM guidance (IAQM, 2018) is divided into a number of different steps, as follows:

Step 1 - Estimation of the odour-generating potential of the site activities, taking into account:

- the scale of release from the source (taking into account any mitigation measures in place);
- how odorous the emission is; and

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- the hedonic tone (pleasantness/unpleasantness) of the odour.

Step 2 - The scale of release from the source, taking into account:

- the distance from source to receptor;
- whether receptors are downwind of the source;
- the effectiveness of odour dispersion from the point of release; and
- the topography and terrain between source and receptor.

Step 3 - The source odour potential is combined with the pathway effectiveness to predict the risk of odour exposure at receptors, using the matrix in **Table 9-10**.

Table 9-10: Risk of odour exposure (impact) at the specific receptor location

		Source Odour Potential		
		Small	Medium	Large
Pathway effectiveness	Highly effective pathway	Low risk	Medium risk	High risk
	Moderately effective pathway	Negligible risk	Low risk	Medium risk
	Ineffective pathway	Negligible risk	Negligible risk	Low risk

Step 4 - The final step is to estimate the effect of the above impact on the receptor, taking into account its sensitivity, using the matrix in **Table 9-11**.

Table 9-11: Likely magnitude of odour effect at the specific receptor location

Risk of Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
High risk of odour exposure	Slight adverse effect	Moderate adverse effect	Substantial adverse effect
Medium risk of odour exposure	Negligible effect	Slight adverse effect	Moderate adverse effect
Low risk of odour exposure	Negligible effect	Negligible effect	Slight adverse effect
Negligible risk of odour exposure	Negligible effect	Negligible effect	Negligible effect

Finally, having predicted the effect at individual representative receptors, the overall effect must be determined, taking into account the varying magnitude and the number of receptors experiencing the effects. IAQM guidance (IAQM, 2018) states that this should be undertaken by a competent and suitably experienced Air Quality Practitioner. This assessment was undertaken by members of the IAQM.

Impact Significance

The IAQM assessment methodology (IAQM, 2018) determines the likely effect of odour impacts occurring at discrete receptors, with consideration of the overall effect with regard to the varying magnitude and number of receptors experiencing the effects. For the purposes of the assessment, where the overall effects are considered to be greater than ‘slight adverse’, these impacts are considered to be significant and would require the implementation of mitigation measures. Overall impacts of ‘slight adverse’ or lower are considered to be not significant.

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9.5 Baseline Conditions

9.5.1 LAQM

Rickman's Green Village is not located within or in the vicinity of a statutory Air Quality Management Area (AQMA); the closest AQMA is located in Godalming, Waverley, approximately 14 km to the north. The area is predominantly rural in nature with few pollutant sources.

9.5.2 Air Quality Monitoring

CDC undertakes ambient air quality monitoring within the district. A review of the most recent ASR (CDC, 2020) shows that there are no monitoring sites within the vicinity of Rickman's Green Village, with the closet location being DT21, approximately 14 km south-west of the scheme. CDC undertakes PM_{10} monitoring at one automatic monitoring site approximately 29 km south-west of Rickman's Green Village. Given the distance from Rickman's Green Village, concentrations monitored at these locations are not considered to be representative of conditions in the vicinity of the site and are therefore not reported.

CDC does not undertake any $PM_{2.5}$ monitoring within its area of jurisdiction.

9.5.3 Background Concentrations

2022 background concentrations of NO_2, PM_{10} and $PM_{2.5}$ were obtained from the latest 2018-based air pollutant concentration maps provided by Defra (Defra, 2020) for the grid squares covering Rickman's Green Village. Mapped background concentrations are detailed in **Table 9-12**.

Table 9-12: Background pollutant concentrations (µg.m^{-3})

Grid square	2022 Concentration (µg.m^{-3})		
	NO_2	PM_{10}	$PM_{2.5}$
501500,130500	6.41	12.06	8.03
501500,129500	6.19	12.28	8.06
500500,129500	6.11	12.04	7.98

Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ within the study area were 'well below' (less than 75% of) their respective annual mean air quality Objective, which is to be expected in a rural area.

9.6 Potential Environmental Effects During Construction – Development Scenario 1

9.6.1 Impact 1: Construction Phase Dust and Fine Particulate Matter

A qualitative assessment of construction phase dust and PM_{10} emissions was carried out in accordance with IAQM guidance (IAQM, 2016). Full details of the methodology and dust assessment undertaken are provided in Construction Dust and Particulate Matter Assessment Methodology (RHDHV, 2022e).

The construction works associated with Development Scenario 1 have the potential to impact on local air quality conditions as follows:

- dust emissions generated by demolition, excavation, construction and earthwork activities associated with the construction of Development Scenario 1 have the potential to cause nuisance to, and soiling of, sensitive receptors;
- combustion emissions (especially NO_2, but also $PM_{2.5}$ and PM_{10}) generated by construction traffic travelling on the local road network have the potential to adversely impact local air quality at sensitive receptors situated adjacent to the routes utilised by construction vehicles; and

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- emissions of NO_2, $PM_{2.5}$ and PM_{10} from non-road mobile machinery (NRMM) operating within the Development Scenario 1 site have the potential to adversely impact local air quality at sensitive receptors in close proximity to the works.

The potential for sensitive receptors to be affected will depend on where the dust-generating activity takes place within the application site, the nature of the activity and mitigation measures in place (controls), the meteorological dispersion conditions and the distance of the receptor from the dust emission source.

As described in **Section 9.4.3**, emissions from NRMM have not been considered in the assessment, but the relevant control and management measures are included in **Section 9.6.1.3**.

Phase 1 of the masterplan is seeking full planning permission for 108 residential properties. The following construction phase dust assessment qualitatively assesses the risks associated with this phase of the planning application.

9.6.1.1 Receptor Sensitivity

Step 1: Screen the need for a Detailed Assessment

The IAQM guidance states that a Detailed Assessment is required if there are human receptors located within 350 m and ecological sites within 200 m (from Natural England internal guidance) of the site boundary. There are human receptors present within 350 m of Phase 1 of the masterplan's site boundary and ecological receptors adjacent to and within the site boundary, therefore a Detailed Assessment was undertaken.

The distance boundaries for the construction phase assessment are detailed in **Figure 9-1**.

9.6.1.2 Magnitude of Effect

Step 2A: Define the Potential Dust Emission Magnitude

The IAQM guidance recommends that the dust emission magnitude is determined for demolition, earthworks, construction and trackout. The dust magnitudes for each activity were determined from site plans and in accordance with the IAQM methodology and are summarised in **Table 9-13**.

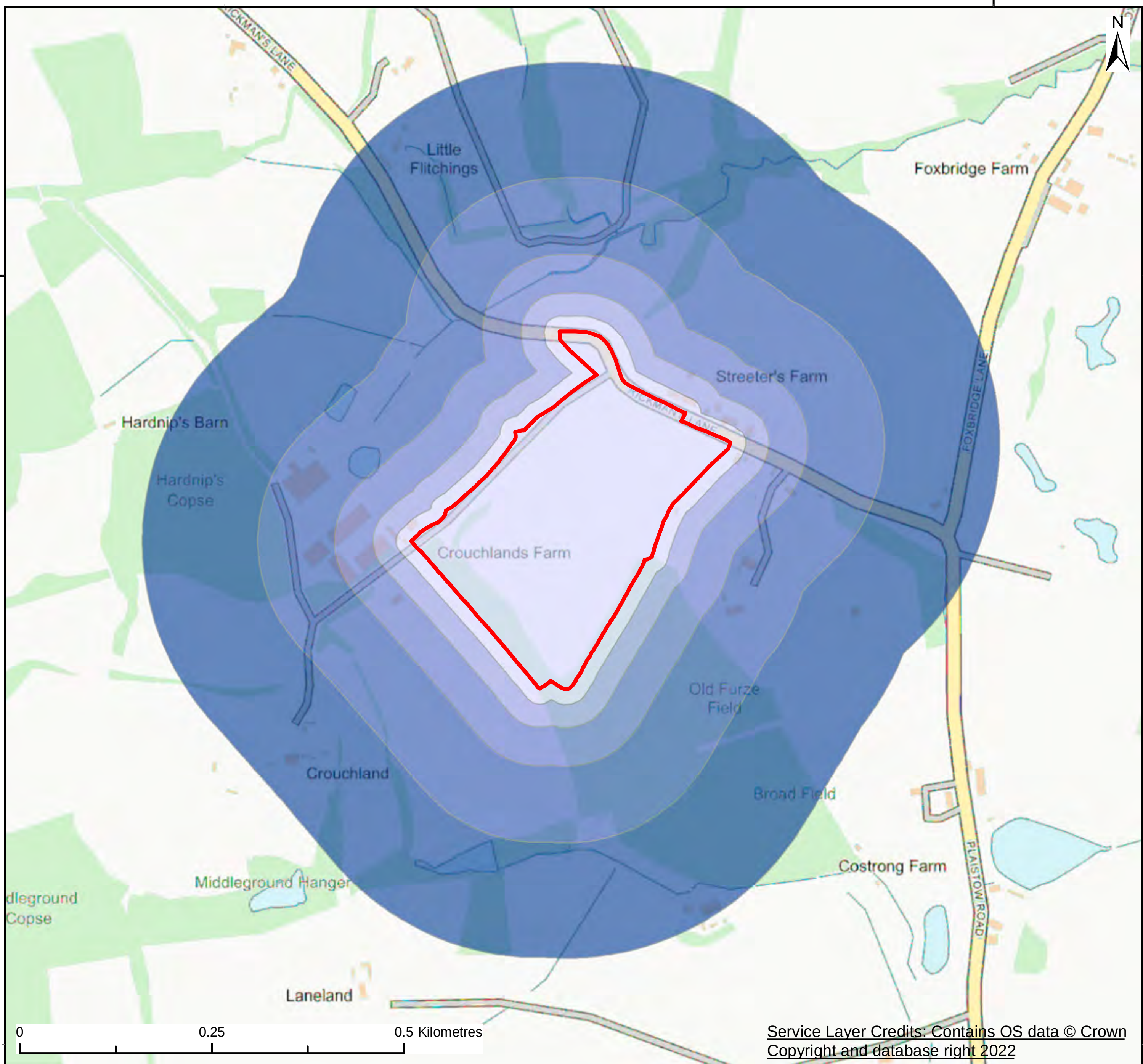
Table 9-13: Scenario 1: Dust emission magnitude for the site

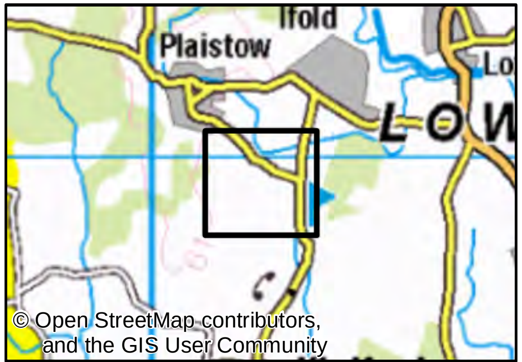
Construction Activity	Dust Magnitude	Justification
Demolition	n/a	The Site is undeveloped and therefore no demolition works are required.
Earthworks	Large	Total site area >10,000 m^2.
Construction	Medium	Phase 1 of the masterplan comprises the construction of 108 residential properties. The total building volume is estimated to be between 25,000 m^3 to 100,000 m^3.
Trackout	Large	There are anticipated to be between 10 to 50 outward HDVs in any one day. The Development Scenario 1 site is undeveloped therefore the unpaved internal road length will be >100 m.

The risk of potential impact of construction phase dust and PM_{10} emissions during earthworks, construction and trackout is used to recommend appropriate mitigation measures. The dust magnitude for construction activities was categorised as '**medium'** for construction and '**large**' for earthworks and trackout.

Step 2B: Define the Sensitivity of the Area

The sensitivity of human and ecological receptors to dust soiling and human health effects of PM_{10} associated with earthworks, construction and trackout activities during construction of Development Scenario 1 were determined and are summarised in **Table 9-14**.





Legend:

Rickman's Green Village Phase 1 Application Boundary

Construction Dust Distance Buffers (m)

- 20
- 50
- 100
- 200
- 350

Client:	Project:
Artemis Land and Agriculture Ltd	Rickman's Green Village Phase 1

Title:

Construction Phase Dust Distance Buffers

Figure: 9.1 | Drawing No: PC3820-101-001

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	24/11/2022	EW	CG	A4	1:7,500

Co-ordinate system: British National Grid

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Sensitivity of People to Dust Soiling

- Earthworks and construction: there are between 1 and 10 high sensitivity residential receptors within 20 m of the site boundary. The sensitivity is therefore **medium**.
- Trackout: there are between 1 and 10 high sensitivity residential receptors within 50 m of access roads, up to 500 m from the site. The sensitivity is therefore **low**.

Sensitivity of People to Health Effects of PM_{10}

- Earthworks and construction: the annual background PM_{10} concentration at the site is less than 24 $\mu g.m^{-3}$, and there are between 1 and 10 high sensitivity residential receptors within 20 m of the site boundary. The sensitivity is therefore **low**.
- Trackout: the annual background PM_{10} concentration at the site is less than 24 $\mu g.m^{-3}$, and there are between 1 and 10 high sensitivity residential receptors within 50 m of the routes that construction vehicles will use to access the site, up to 500 m from the site. The sensitivity is therefore **low**.

Sensitivity of Ecological Receptors to Dust Soiling

- Earthworks and construction: Ancient Woodland (AW) is located within the site which is classed as a locally designated site and therefore a low sensitivity receptor. The sensitivity is therefore **low**.
- Trackout: There are no designated sites within 500 m of the site access / exits which are within 50 m of the road. As such, there are not anticipated to be any impacts on these sites as a result of trackout.

Table 9-14: Scenario 1: Outcome of defining the sensitivity of the area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium	Medium	Low
Human Health	N/A	Low	Low	Low
Ecological Effects	N/A	Low	Low	N/A

Step 2C: Define the Risk of Impacts

The dust emission magnitude detailed in **Table 9-13** is combined with the sensitivity of the area detailed in **Sensitivity of *People to Dust Soiling***

- Earthworks and construction: there are between 1 and 10 high sensitivity residential receptors within 20 m of the site boundary. The sensitivity is therefore **medium**.
- Trackout: there are between 1 and 10 high sensitivity residential receptors within 50 m of access roads, up to 500 m from the site. The sensitivity is therefore **low**.

Sensitivity of People to Health Effects of PM10

- Earthworks and construction: the annual background PM10 concentration at the site is less than 24 μg.m-3, and there are between 1 and 10 high sensitivity residential receptors within 20 m of the site boundary. The sensitivity is therefore **low**.
- Trackout: the annual background PM10 concentration at the site is less than 24 μg.m-3, and there are between 1 and 10 high sensitivity residential receptors within 50 m of the routes that construction vehicles will use to access the site, up to 500 m from the site. The sensitivity is therefore **low**.

Sensitivity of Ecological Receptors to Dust Soiling

- Earthworks and construction: Ancient Woodland (AW) is located within the site which is classed as a locally designated site and therefore a low sensitivity receptor. The sensitivity is therefore **low**.

- Trackout: There are no designated sites within 500 m of the site access / exits which are within 50 m of the road. As such, there are not anticipated to be any impacts on these sites as a result of trackout.

Table 9-14 to determine the risk of impacts with no mitigation applied. The risks concluded for dust soiling, human health and ecological effects are provided in **Table 9-15**.

Table 9-15: Scenario 1: Summary dust risk table to define site-specific mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium risk	Medium risk	Low risk
Human Health	N/A	Low risk	Low risk	Low risk
Ecological Effects	N/A	Low risk	Low risk	N/A

The risk of dust soiling impacts and impacts on human health during the earthworks and construction phases were described as '**medium risk**' and for all activities. Step 3 and Step 4 of the guidance, which are the 'site specific mitigation' and 'determining the significant effects', are discussed in the following section.

9.6.1.3 Mitigation

Step 3: Site-Specific Mitigation

Step three of the IAQM (IAQM, 2016) guidance identifies appropriate site-specific mitigation. These measures are related to the site risk for each activity.

The dust assessment determined that there was a risk of impacts resulting from construction activities without the implementation of mitigation measures. The IAQM guidance document also suggests a number of dust mitigation measures which could be implemented to reduce potential adverse effects associated with high, medium and low risk sites. It is recommended that the good practice measures outlined in the IAQM guidance are followed. In addition, best practice measures relating to control of emissions from NRMM are also included, as specified in Defra technical guidance (Defra, 2022).

The recommendations below should be detailed in a Dust Management Plan (DMP) as part of the CEMP to prevent or minimise the release of dust and / or dust being deposited at nearby receptor locations, which will be conditioned post consent. Particular attention should be given to operations which shall unavoidably take place close to the site boundary. The effective implementation of the DMP will ensure that any potential dust releases associated with the construction phase will be reduced.

Highly Recommended Mitigation Measures

A list of mitigation measures that are highly recommended for a **medium risk** site, as determined by Step 2 of the dust assessment, by the IAQM are provided below.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

Dust Management

- Develop and implement a DMP, which may include measures to control other emissions, approved by the CDC. The level of detail will depend on the risk and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the CDC when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.

Monitoring

- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the CDC when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with CDC. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose screens or barriers around dusty activities of the site boundary that are at least as high as any stockpiles on site.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction (e.g., suitable local exhaust ventilation systems).
- Ensure an adequate water supply on the site for effective dust / particulate matter suppression / mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Avoid bonfires and burning of waste materials.

Measures Specific to NRMM

NRMM and plant would be well maintained. If any emissions of dark smoke occur, then the relevant machinery should stop immediately, and any problem rectified. In addition, the following controls should apply to NRMM:

- all NRMM should use fuel equivalent to ultralow sulphur diesel (fuel meeting the specification within EN590:2004);
- all NRMM should comply with the appropriate standards;
- all NRMM will be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting);
- the ongoing conformity of plant retrofitted with DPF, to a defined performance standard, should be ensured through a programme of onsite checks; and
- fuel conservation measures should be implemented, including instructions to (i) throttle down or switch off idle construction equipment; (ii) switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded and (iii) ensure equipment is properly maintained to ensure efficient fuel consumption.

Measures Specific to Construction

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Desirable Mitigation Measures

A list of desirable mitigation measures that are recommended for a **medium risk** site, as determined by Step 2 of the construction dust and particulate matter assessment, by the IAQM are provided below.

Dust Management

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to CDC when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100 m of site boundary, with cleaning to be provided if necessary.

Operating vehicle/machinery and sustainable travel

- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the CDC, where appropriate).
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

9.6.1.4 Residual Impact

Step 4: Determine Significant Effects

With the implementation of the above mitigation measures, the residual impacts from the construction phase of Development Scenario 1 are considered to be **not significant**, in accordance with IAQM guidance (IAQM, 2016).

9.7 Potential Environmental Effects During Construction – Development Scenario 2

Phase 2 of the masterplan is seeking outline planning permission for either:

- 412 homes and a two-form entry primary school; or
- 492 homes with no primary school.

The approach to the assessment of Development Scenario 2 has been to assess the worst-case scenario with regard to air quality and odour. This is set out below for each of the relevant impacts.

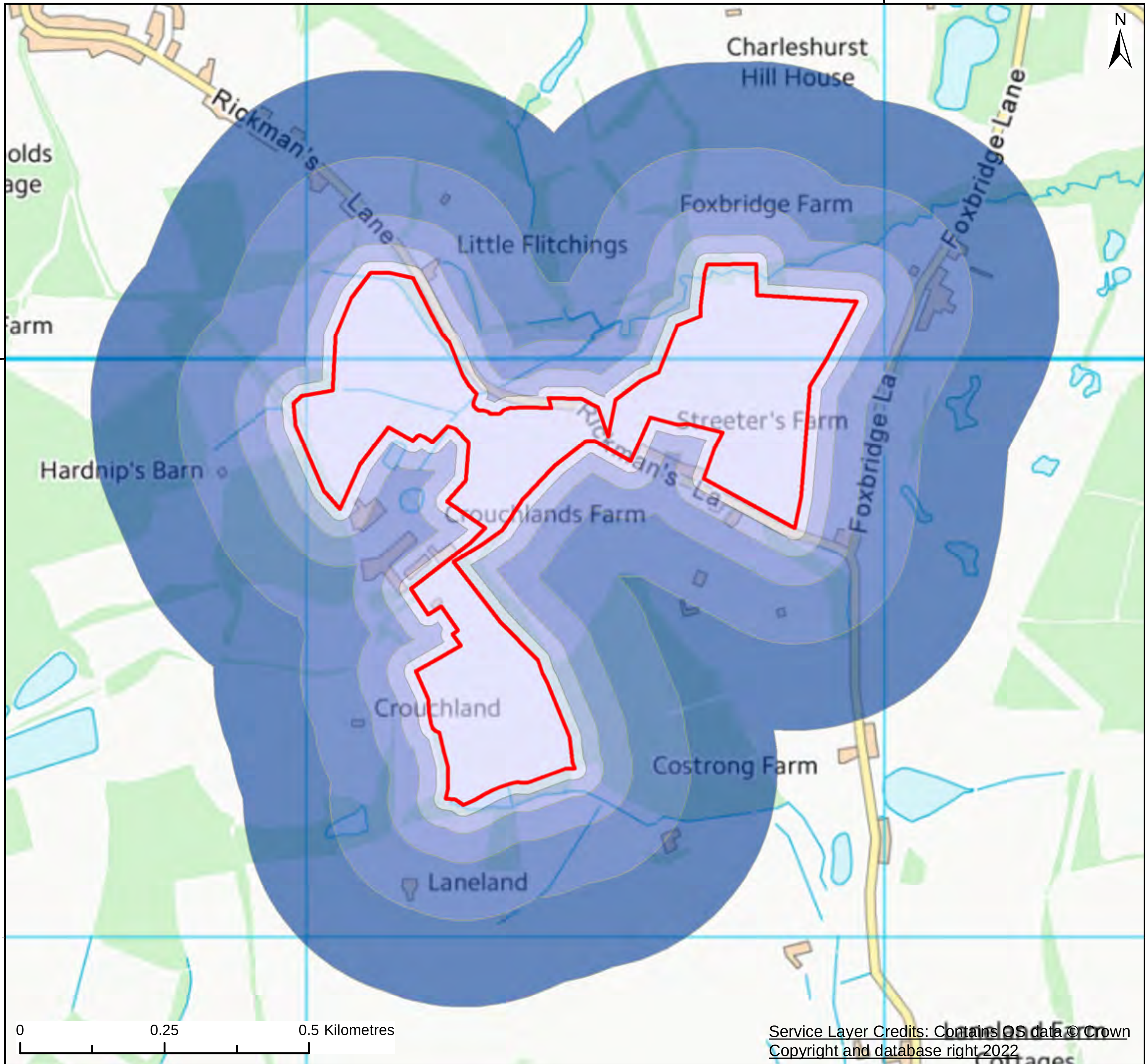
9.7.1 Impact 1: Construction Phase Dust and Fine Particulate Matter

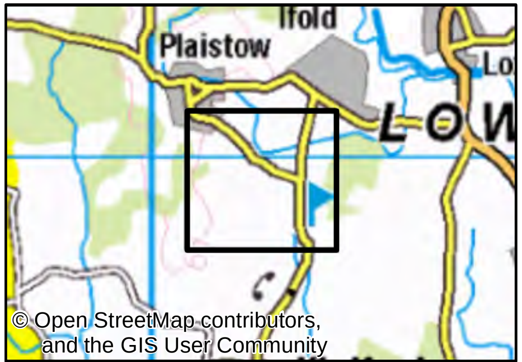
The following construction phase dust assessment qualitatively assesses the risks associated with this phase of the planning application in accordance with the IAQM guidance (IAQM, 2016). With regard to the assessment of construction dust, there is little difference in the overall magnitude of effect for either of the outline application options detailed above. As such, for the purposes of the assessment, the option of up to 520 homes and the primary school has been taken forward for the assessment.

9.7.1.1 Receptor Sensitivity

Step 1: Screen the need for a Detailed Assessment

There are a number of human receptors present within 350 m of the site boundary and ecological receptors adjacent to and within the site boundary associated with Scenario 2, therefore a Detailed Assessment was undertaken. The distance boundaries for the construction phase assessment are detailed in **Figure 9-2**.





Legend:

- Application Boundary
- 20
- 50
- 100
- 200
- 350

Client:	Project:
Artemis Land and Agriculture Ltd	Rickman's Green Village

Title:

Scenario 2 Construction Phase Dust Distance Buffers

Figure:	Drawing No:
9-2	PC3820-101-002

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	29/09/2022	EW	CG	A4	1:10,000

Co-ordinate system: British National Grid

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9.7.1.2 Magnitude of Effect

Step 2A: Define the Potential Dust Emission Magnitude

The dust magnitudes for each activity were determined from site plans and in accordance with the IAQM methodology and are summarised in **Table 9-16**. It is expected that the development would be constructed in phases; however, to provide a conservative assessment, the dust emission magnitude was determined based on the full development.

Table 9-16: Scenario 2: Dust emission magnitude for the site

Construction Activity	Dust Magnitude	Justification
Demolition	n/a	The Site is undeveloped and therefore no demolition works are required.
Earthworks	Large	Total site area >10,000 m^2.
Construction	Large	Phase 2 of the masterplan comprises the construction of up to 412 residential dwellings with a primary school. The total building volume was estimated to be over 100,000 m^3.
Trackout	Large	There are anticipated to be > 50 outward HDVs in any one day. The Development Scenario 2 site is undeveloped therefore the unpaved internal road length will be >100 m.

The risk of potential impact of construction phase dust and PM_{10} emissions during earthworks, construction and trackout is used to recommend appropriate mitigation measures. The dust magnitude for construction activities was categorised as '**large**' for all construction phases.

Step 2B: Define the Sensitivity of the Area

The sensitivity of human and ecological receptors to dust soiling and human health effects of PM_{10} associated with earthworks, construction and trackout activities during construction of Development Scenario 2 were determined and are summarised in **Table 9-17.**

It has been assumed Rickman's Green Village Phase 1 has been constructed to provide a reasonable worst-case assessment.

Sensitivity of People to Dust Soiling

- Earthworks and construction: there are between 10 and 100 high sensitivity residential receptors within 20 m of the site boundary. The sensitivity is therefore **high**.
- Trackout: As the site accesses are not known at this stage, the trackout route has been assessed from the edge of the site boundary in both directions along Rickman's Lane to produce a robust assessment. There are between 10 and 100 high sensitivity residential receptors within 20 m of access roads, up to 500 m from the site. The sensitivity is therefore **high**.

Sensitivity of People to Health Effects of PM_{10}

- Earthworks and construction: the annual background PM_{10} concentration at the site is less than 24 µg.m^{-3}, and there are between 10 and 100 high sensitivity residential receptors within 20 m of the site boundary. The sensitivity is therefore **low**.
- Trackout: the annual background PM_{10} concentration at the site is less than 24 µg.m^{-3}, and there are between 10 and 100 high sensitivity residential receptors within 20 m of the routes that construction vehicles will use to access the site, up to 500 m from the site. The sensitivity is therefore **low**.

Sensitivity of Ecological Receptors to Dust Soiling

- Earthworks and construction: Several AWs are located adjacent to the site which is classed as locally designated sites and therefore a low sensitivity receptor. The sensitivity is therefore **low**.
- Trackout: There are no designated sites within 500 m of the site access / exits which are within 50 m of the road. As such, there are not anticipated to be any impacts on these sites as a result of trackout.

Table 9-17: Scenario 2: Outcome of defining the sensitivity of the area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	High	High	High
Human Health	N/A	Low	Low	Low
Ecological Effects	N/A	Low	Low	N/A

Step 2C: Define the Risk of Impacts

The dust emission magnitude detailed in **Table 9-16** is combined with the sensitivity of the area detailed in **Table 9-17** to determine the risk of impacts with no mitigation applied. The risks concluded for dust soiling, human health and ecological effects are provided in **Table 9-18**.

Table 9-18: Scenario 2: Summary dust risk table to define site-specific mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	High risk	High risk	High risk
Human Health	N/A	Low risk	Low risk	Medium risk
Ecological Effects	N/A	Low risk	Low risk	N/A

The risk of dust soiling impacts was described as **'high risk'** for all phases. The impacts on human health and ecological sites were described as **'low risk'** for earthworks and construction and '**medium risk'** from trackout. Step 3 and Step 4 of the guidance, which are the 'site specific mitigation' and 'determining the significant effects', are discussed in the following section.

9.7.1.3 Mitigation

Step 3: Site-Specific Mitigation

The dust assessment determined that there was a risk of impacts resulting from construction activities without the implementation of mitigation measures. The IAQM guidance document also suggests a number of dust mitigation measures which could be implemented to reduce potential adverse effects associated with high, medium and low risk sites. It is recommended that the good practice measures outlined in the IAQM guidance are followed. In addition, best practice measures relating to control of emissions from NRMM are also included, as specified in Defra technical guidance (Defra, 2022).

The recommendations below should be detailed in a DMP as part of the CEMP to prevent or minimise the release of dust and / or dust being deposited at nearby receptor locations. Particular attention should be given to operations which shall unavoidably take place close to the site boundary. The effective implementation of the DMP will ensure that any potential dust releases associated with the construction phase will be reduced.

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Highly Recommended Mitigation Measures

A list of mitigation measures that are highly recommended for a **high risk** site, as determined by Step 2 of the dust assessment, by the IAQM are provided below.

Communications

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.

Dust Management

- Develop and implement a DMP, which may include measures to control other emissions, approved by CDC. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site.

Site Management

- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to CDC when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.
- Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes.

Monitoring

- Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to CDC when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of site boundary, with cleaning to be provided if necessary.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to CDC when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.
- Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with CDC. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences.

Preparing and maintaining the site

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose screens or barriers around dusty activities of the site boundary that are at least as high as any stockpiles on site.

- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.

Operating vehicle/machinery and sustainable travel

- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable.
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of CDC, where appropriate).
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing)

Operations

- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction (e.g., suitable local exhaust ventilation systems).
- Ensure an adequate water supply on the site for effective dust / particulate matter suppression / mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.

Waste management

- Avoid bonfires and burning of waste materials.

Measures Specific to NRMM

NRMM and plant would be well maintained. If any emissions of dark smoke occur, then the relevant machinery should stop immediately, and any problem rectified. In addition, the following controls should apply to NRMM:

- all NRMM should use fuel equivalent to ultralow sulphur diesel (fuel meeting the specification within EN590:2004);
- all NRMM should comply with the appropriate standards;
- all NRMM will be fitted with Diesel Particulate Filters (DPF) conforming to defined and demonstrated filtration efficiency (load/duty cycle permitting);
- the ongoing conformity of plant retrofitted with DPF, to a defined performance standard, should be ensured through a programme of onsite checks; and
- fuel conservation measures should be implemented, including instructions to (i) throttle down or switch off idle construction equipment; (ii) switch off the engines of trucks while they are waiting to access the site and while they are being loaded or unloaded and (iii) ensure equipment is properly maintained to ensure efficient fuel consumption.

Measures Specific to Earthworks

- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.
- Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable
- Only remove the cover in small areas during work and not all at once.

Measures Specific to Construction

- Avoid scabbling (roughening of concrete surfaces) if possible.
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

Measures Specific to Trackout

- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.
- Access gates to be located at least 10 m from receptors where possible.

Desirable Mitigation Measures

A list of desirable mitigation measures that are recommended for a **high risk** site, as determined by Step 2 of the construction dust and particulate matter assessment, by the IAQM are provided below.

Measures Specific to Construction

- For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust.

9.7.1.4 Residual Impact

Step 4: Determine Significant Effects

With the implementation of the above mitigation measures, the residual impacts from the construction phase of the Development Scenario 2 are considered to be **not significant**, in accordance with IAQM guidance (IAQM, 2016).

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9.8 Potential Environmental Effects During Construction – Development Scenario 3

9.8.1 Impact 1: Construction Phase Dust and Fine Particulate Matter

Development Scenario 3 would provide up to 600 homes or 520 homes and an educational facility. The following construction phase dust assessment qualitatively assesses the risks associated with this phase of the planning application in accordance with the IAQM guidance (IAQM, 2016).

9.8.1.1 Receptor Sensitivity

Step 1: Screen the need for a Detailed Assessment

There are a number of human receptors present within 350 m of the site boundary and ecological receptors adjacent to and within the site boundary associated with Scenario 3, therefore a Detailed Assessment was undertaken.

The distance boundaries for the construction phase assessment are detailed in **Figure 9-3.**

9.8.1.2 Magnitude of Effect

Step 2A: Define the Potential Dust Emission Magnitude

The dust magnitudes for each activity were determined from site plans and in accordance with the IAQM methodology, and are summarised in **Table 9-19**.

Table 9-19: Scenario 3: Dust emission magnitude for the site

Construction Activity	Dust Magnitude	Justification
Demolition	n/a	The Site is undeveloped and therefore no demolition works are required.
Earthworks	Large	Total site area >10,000 m^2.
Construction	Large	Phase 1 and Phase 2 comprises the construction of up to 600 residential dwellings or 520 dwellings and an educational facility. The total building volume was estimated to be over 100,000 m^3.
Trackout	Large	There are anticipated to be > 50 outward HDVs in any one day. The Development Scenario 3 site is undeveloped therefore the unpaved internal road length will be >100 m.

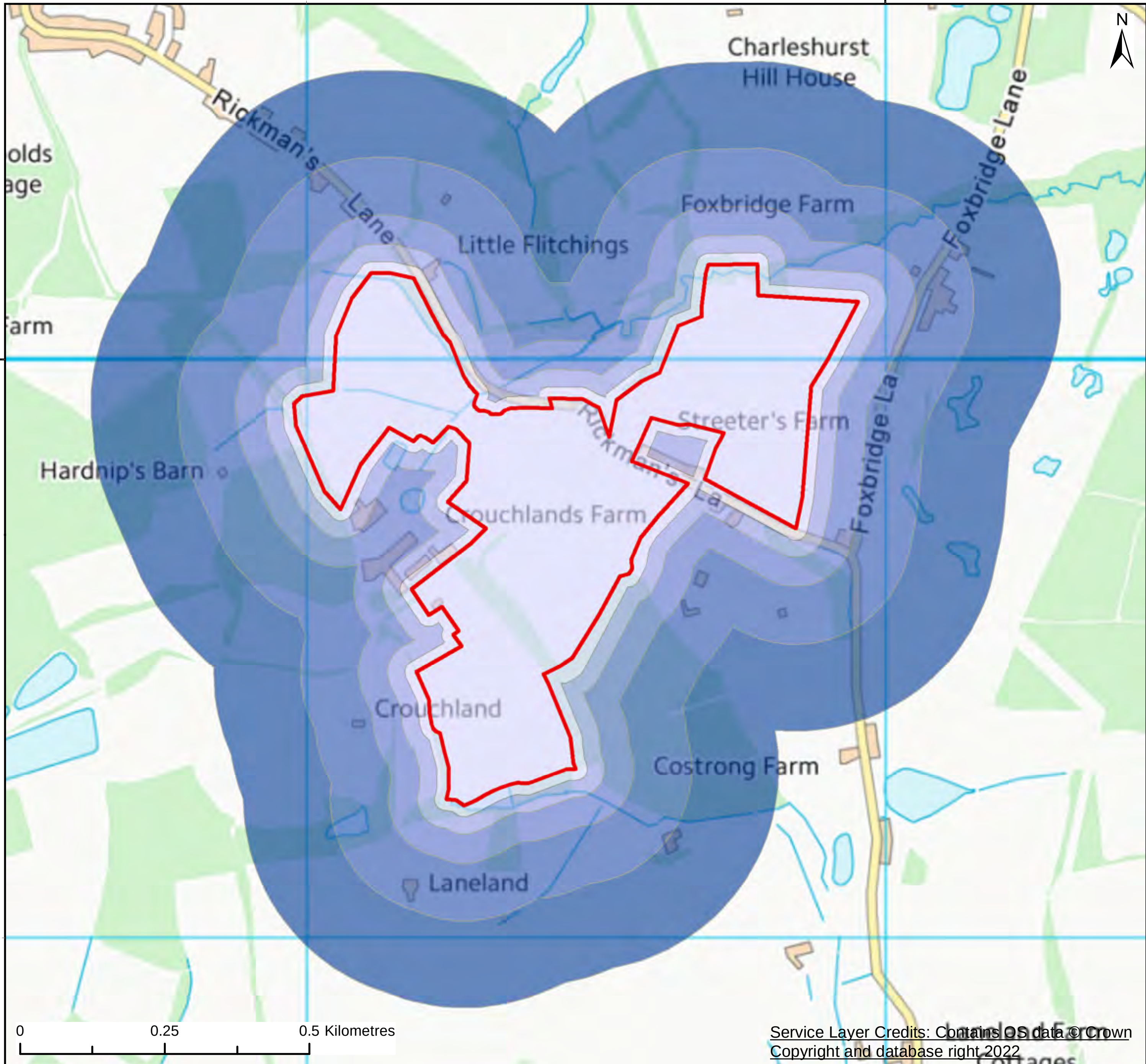
The risk of potential impact of construction phase dust and PM_{10} emissions during earthworks, construction and trackout is used to recommend appropriate mitigation measures. The dust magnitude for construction activities was categorised as '**large**' for all construction phases.

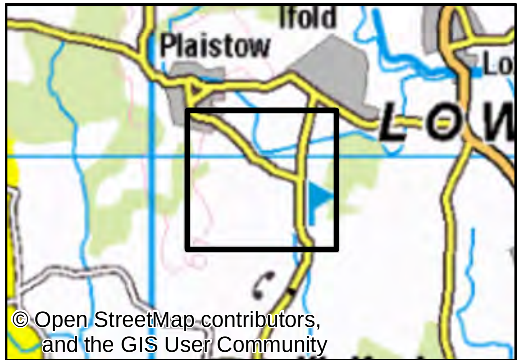
Step 2B: Define the Sensitivity of the Area

The sensitivity of human and ecological receptors to dust soiling and human health effects of PM_{10} associated with earthworks, construction and trackout activities during construction of Development Scenario 3 were determined and are summarised in **Table 9-20.**

Sensitivity of People to Dust Soiling

- Earthworks and construction: there are between 1 and 10 high sensitivity residential receptors within 20 m of the site boundary. The sensitivity is therefore **medium**.
- Trackout: As the site accesses are not known at this stage, the trackout route has been assessed from the edge of the site boundary in both directions along Rickman's Lane to produce a robust assessment. There are between 10 and 100 high sensitivity residential receptors within 20 m of access roads, up to 500 m from the site. The sensitivity is therefore **high**.





Legend:

Application Boundary

Construction Dust Distance Buffers (m)

- 20
- 50
- 100
- 200
- 350

Client:	Project:
Artemis Land and Agriculture Ltd	Rickman's Green Village

Title:

Scenario 3 Construction Phase Dust Distance Buffers

Figure:	9.3	Drawing No:	PC3820-101-002

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	29/09/2022	EW	CG	A4	1:10,000

Co-ordinate system: British National Grid

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Table 9-20: Scenario 3: Outcome of defining the sensitivity of the area

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium	Medium	High
Human Health	N/A	Low	Low	Low
Ecological Effects	N/A	Low	Low	N/A

Sensitivity of People to Health Effects of PM_{10}

- Earthworks and construction: the annual background PM_{10} concentration at the site is less than 24 µg.m^{-3}, and there are between 1 and 10 high sensitivity residential receptors within 20 m of the site boundary. The sensitivity is therefore **low**.
- Trackout: the annual background PM_{10} concentration at the site is less than 24 µg.m^{-3}, and there are between 10 and 100 high sensitivity residential receptors within 20 m of the routes that construction vehicles will use to access the site, up to 500 m from the site. The sensitivity is therefore **low**.

Sensitivity of Ecological Receptors to Dust Soiling

- Earthworks and construction: AWs are present within and adjacent to the site which is classed as locally designated sites and therefore a low sensitivity receptor. The sensitivity is therefore **low**.
- Trackout: There are no designated sites within 500 m of the site access / exits which are within 50 m of the road. As such, there are not anticipated to be any impacts on these sites as a result of trackout.

Step 2C: Define the Risk of Impacts

The dust emission magnitude detailed in **Table 9-19** is combined with the sensitivity of the area detailed in **Table 9-20** to determine the risk of impacts with no mitigation applied. The risks concluded for dust soiling, human health and ecological effects are provided in **Table 9-21.**

Table 9-21: Scenario 3: Summary dust risk table to define site-specific mitigation

Potential Impact	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	N/A	Medium risk	Medium risk	High risk
Human Health	N/A	Low risk	Low risk	Medium risk
Ecological Effects	N/A	Low risk	Low risk	N/A

The risk of dust soiling impacts from trackout was described as **'high risk'** and during earthworks and construction was described as '**medium risk**'. The impacts on human health and ecological sites were described as **'low risk'** for earthworks and construction and '**medium risk'** from trackout. Step 3 and Step 4 of the guidance, which are the 'site specific mitigation' and 'determining the significant effects', are discussed in the following section.

9.8.1.3 Mitigation

Step 3: Site-Specific Mitigation

The dust assessment determined that there was a risk of impacts resulting from construction activities without the implementation of mitigation measures. The IAQM guidance document also suggests a number of dust mitigation measures which could be implemented to reduce potential adverse effects associated with high, medium and low risk sites. It is recommended that the good practice measures outlined in the

IAQM guidance are followed. In addition, best practice measures relating to control of emissions from NRMM are also included, as specified in Defra technical guidance (Defra, 2022).

The recommendations below should be detailed in a DMP as part of the CEMP to prevent or minimise the release of dust and / or dust being deposited at nearby receptor locations. Particular attention should be given to operations which shall unavoidably take place close to the site boundary. The effective implementation of the DMP will ensure that any potential dust releases associated with the construction phase will be reduced.

Highly Recommended Mitigation Measures

A list of mitigation measures that are highly recommended for a **high risk** site are presented in **Section 9.7.1.3**.

9.8.1.4 Residual Impact

Step 4: Determine Significant Effects

With the implementation of the above mitigation measures, the residual impacts from the construction phase of Development Scenario 3 are considered to be **not significant**, in accordance with IAQM guidance (IAQM, 2016).

9.9 Potential Environmental Effects During Operation – Development Scenario 1

9.9.1 Impact 1: Operational Phase Odour Assessment

The Crouchlands Farm Hub is located to the northwest of Phase 1 of the masterplan and includes approximately 2,000 m^2 of refurbished agricultural buildings, and agricultural operations at Crouchlands Farm. The Farm Hub has been purposely designed for a low intensity livestock operation, which, depending on the activity, may produce odour. A risk-based assessment was undertaken to determine the potential odour effects of the Farm Hub operations in accordance with IAQM guidance (IAQM, 2018).

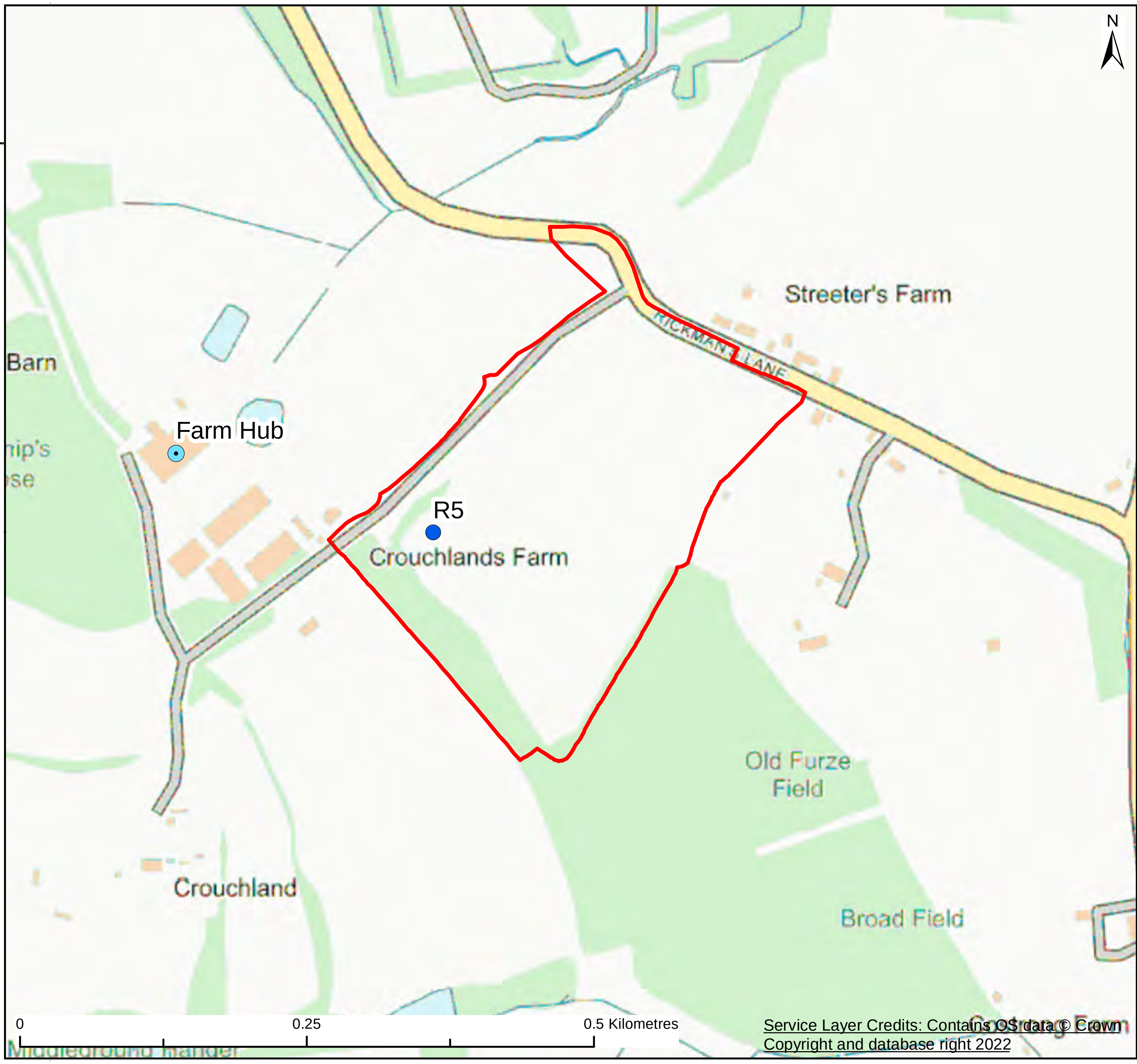
9.9.1.1 Receptor Sensitivity

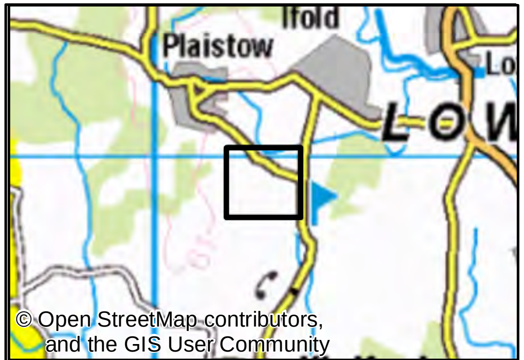
The odour assessment considered the closest receptors within Phase 1 of the masterplan. As Development Scenario 1 comprises the construction of 108 residential properties, all proposed receptors are classed as high sensitivity. Development Scenario 1 is located to the south-east of the Farm hub with the nearest receptor located approximately 200 m to the south-east.

9.9.1.2 Magnitude of Effect

The first step of the assessment requires an estimation of the odour-generating potential of the site activities, taking into account the magnitude of release, how inherently odorous the release is and the relative pleasantness/unpleasantness of the odour (hedonic tone).

The principal source of odour as a result of Farm Hub will be from the livestock; however, the effect would be sporadic depending on the activity (e.g., mucking out), the time of day and the duration. Given that Development Scenario 1 is located within a rural environment, with several farms in the vicinity, it is expected that odours associated with the Farm Hub would not be distinct from the existing odour character of the area, particularly as the site is currently used for agricultural practices. Furthermore, given the scale of the activities and that they would be high-welfare and low intensity, it is not anticipated that significant odour would be generated.





Legend:

Legend

- Rickman's Green Village Phase 1 Application Boundary
- Farm_Hub
- Odour Receptors

Client:	Project:
Artemis Land and Agriculture Ltd	Rickman's Green Village Phase 1

Title:

Nearest Receptors to Farm Hub

Figure:	9.4	Drawing No:	PC3820-101-002

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
02	24/11/2022	EW	CG	A4	1:5,000

Co-ordinate system: British National Grid

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Given the above, the potential for odours is short-lived and intermittent, the overall source odour potential is considered to be **small** based on the nature of the odour and character of the area.

The second step of the assessment requires consideration of the effectiveness of the odour pathway. As detailed in **Section 9.9.1.1**, the closest receptors to the Farm Hub within Phase 1 of the masterplan are residential properties approximately 200 m to the south-east, as shown in **Figure 9-4**. Within the UK, the prevailing wind is from the south-west; as such, these receptors would be upwind of the odour source. The odour pathway is therefore considered **Ineffective** at the Development Scenario 1.

The source odour potential is then combined with the pathway effectiveness to determine the risk of odour effect, using the matrix provided in **Table 9-10**. The sensitivity of the receptor is then included to determine the likely odour effect at each receptor, as detailed in **Table 9-11**. This is summarised in **Table 9-22**.

Table 9-22: Scenario 1: Summary of likely odour effects at receptors

Receptor ID	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
R1	Low	Ineffective pathway	Negligible risk	High sensitivity	Negligible effect

9.9.1.3 Impact Significance

The assessment identified that there would be a negligible effect of odour impact at the closest receptor within Development Scenario 1. As such, the overall effect is considered to be **not significant.**

9.9.1.4 Mitigation

The impact assessment showed that there would be a negligible effect of odour at all receptors. As such, mitigation measures are not considered to be required.

9.9.1.5 Residual Impact

As mitigation measures are not considered to be necessary based on the negligible impacts experienced, the residual impact is **not significant**.

9.9.2 Impact 2: Release of gaseous and liquid contaminants from Lagoon 3

This section considers the potential risks to air quality, odour and associated public health that could arise from emissions to atmosphere from Lagoon 3, located 725 m to the west of Development Scenario 1. The assessment has taken into consideration the results of the Human Health chapter contained within the ES submitted for the Crouchlands Farm, Whole Farm Plan application (planning ref: 22/01735/FULEIA). Chapter 14 of the Crouchlands Farm Whole Farm Plan ES should therefore be read in conjunction with this Chapter.

9.9.2.1 Receptor Sensitivity

Development Scenario 1 will introduce additional human receptors approximately 725 m to the east of the existing Lagoon 3 site which has the potential to result in air quality and odour impacts should failure of the containment system occur. The future residential users of the site are classed as high sensitivity as people are expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.

9.9.2.2 Magnitude of Effect

For the Crouchlands Farm, Whole Farm Plan application, a qualitative assessment was initially undertaken to establish the current condition of Lagoon 3 as well as to identify the potential risk scenarios associated with failure of the containment system. This was used to inform a Source-Pathway-Receptor (S-P-R) analysis of the risk of Lagoon 3 on Rickman's Green Village Phase 1. Following this, the quantitative

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assessment completed for Crouchlands Farm Whole Farm Plan was used to further inform the likely impact of emissions to air from Lagoon 3 on Development Scenario 1.

Step 1: Qualitative Assessment
Summary of Source Emission Potential

The scenarios considered as part of the assessment were as follows:

- **Lagoon 3 Scenario 1**: Minor leak – a small puncture of the gas membrane resulting in a minor loss of gas containment (a hole of 0.1 x 0.1 m);
- **Lagoon 3 Scenario 2**: Major leak – a large puncture of the gas membrane resulting in a major loss of gas containment (a hole of 5 x 5 m); and
- **Lagoon Scenario 3**: Major leak plus failure of bund - loss of liquid and gas containment.

A literature review undertaken as part of the Crouchlands Farm Whole Farm Plan ES concluded the main pollutants of concern are CH_4, H_2S, CO_2 and H_2S-related odour. Based on the likely volume of gases and digestate contained within Lagoon 3, in the event of failure of the lagoon's containment system, it was considered there is a potential risk to future users of the site. The impact of CH_4, H_2S, CO_2 and odour on receptors was therefore assessed for all of the above scenarios.

From the findings of the previous reports carried out on Lagoon 3, it was concluded there is a possibility for failure of the containment system in the future. The Joint Incident Response Plan concluded the risk of failure to harm existing human receptors is considered to be unlikely. The meetings held between the Multi-agency Incident Group concluded 'The likelihood of release of gas remains very low. The potential impact from loss of containment of gas remains low' (discussed in Section 14.2.4.2 of the Whole Farm Plan ES).

In addition, it was confirmed within the meeting held in March 2021 that the gas membrane is not under great pressure (slightly above atmospheric pressure). A site inspection carried out in September 2021 observed that the bund slips had not progressed further signifying that the bunds have stabilised. On this basis, it can be concluded the risk of occurrence of Lagoon 3 Scenarios 2 and 3 are very low.

It can therefore be determined that if failure of the containment system was to occur, it would most likely be through a small puncture of the gas membrane (Lagoon 3 Scenario 1).

Pathway Effectiveness

The location, significance, and severity of an impact from air pollution is dependent *inter alia* on the prevailing weather conditions. 'Worst-case' conditions will occur during stable atmospheric conditions with low wind speeds or calm conditions, which result in poor dispersion and dilution of gases released into the atmosphere. Receptors close to the source in all directions can be affected under these conditions. When conditions are not calm, it will be the downwind receptors that are affected. Overall, therefore, receptors that are downwind with respect to the prevailing wind direction tend to be at higher risk of impact.

Within the UK, the prevailing wind is from the south-west; as such Development Scenario 1 is not immediately downwind of the development.

The underlying geology comprises impermeable Weald Clay. Therefore, in the event of breach of the bund, the digestate will not penetrate deep into the ground so will travel further from the lagoon. Spill modelling was completed for the Crouchlands Farm Whole Farm Plan ES which identified the likely flow path of digestate in the event of breach of the bunds (a description of the technique and results are contained within Appendix 14.1 of the report).

Digestate released from the failure of the northern or eastern bunds runs in a downward north-easterly direction towards the location of the Farm Hub, 200 m to the north-west of the Rickman's Green Village Phase 1. Whereas, in the event of failure of the western and southern bunds, digestate runs away from Development Scenario 1 to the south-west. The 'worst-case' scenarios for impacts on Rickman's Green Village Phase 1 are therefore failure of the northern or eastern bunds.

In the event of breach of the northern or eastern bunds, it is predicted that the majority of digestate which escapes from Lagoon 3 will have passed beyond Rickman's Green Village Phase 1 to the north-east in approximately 1.5 minutes; however, small volumes of digestate would pool around the location of the Farm Hub to the north-west.

As Rickman's Green Village Phase 1 is not located downwind and is at distance from Lagoon 3 it is considered the pathway for emissions resulting from a leak of gases from Lagoon 3 to impact Development Scenario 1 is **ineffective**; however, in the event of a bund failure is it considered the pathway for emissions from digestate to impact Rickman's Green Village is **effective,** due to the proximity of the Farm Hub to Development Scenario 1.

Sensitivity of Receptors

As detailed in **Section 9.9.2.1**, Development Scenario 1 will introduce residential receptors approximately 750 m to the east of Lagoon 3 which are classed as high sensitivity.

Summary

Although the risk of failure of the Lagoon 3 containment system is considered to be low, in the event of failure, gases and digestate contained within could cause adverse effects upon human health or create a nuisance. As human receptors are proposed to be introduced within 750 m downhill of the lagoon, there is the potential for impact on future users of the site.

Step 2: Quantitative Assessment

The second stage of the human health assessment for Crouchlands Farm Whole Farm Plan comprised of a dispersion modelling exercise to quantify to level of risk that emissions of gas and odour from Lagoon 3 pose on future users of Phase 1 of the masterplan. Receptor ER4 included in the Whole Farm Plan assessment is located approximately 50 m to the west of Phase 1 of the masterplan and is considered most representative of Development Scenario 1. Therefore, results from this receptor have been used to inform this assessment. As ER4 is located in closer proximity to Lagoon 3 than Development Scenario 1 the assessment is considered robust.

Results and Impact Assessment

The summary of results reported within the Human Health chapter of the Crouchlands Farm Whole Farm Plan have been modified and included within this chapter to represent impacts of emissions from Lagoon 3 on Phase 1 of the masterplan.

Table 9-23: Scenario 1: Summary of exceedances of the assessment criteria in each modelled scenario (receptor ER4)

Pollutant	Concentration by volume within Lagoon 3 (%)	Scenario 1 – Minor Leak		Scenario 2 – Major Leak
		0.1 m/s exit velocity	1 m/s exit velocity	
CO_2	47	No	No	No
CH_4	50	No	No	No
H_2S	0.1	No	No	Yes
	0.5	No	No	Yes
	3	No	No	Yes

9.9.2.3 Impact Significance

With reference to **Table 9-23**, there is considered to be no risk to human health from CO_2 or of explosion from CH_4 in any of the assessed scenarios. As such, these impacts are not considered to be significant.

With reference to the Whole Farm Plan ES, based on the inspection reports on Lagoon 3, it was considered very unlikely that failure of the containment system resulting in loss of gas or digestate will occur. However, should this occur, it was deemed the most likely failure scenario would be a small puncture to the gas membrane (Lagoon 3 Scenario 1). From the modelled results, there is considered to be no risk to residents of Development Scenario 1 from H_2S even in the absolute worst-case sensitivity test (3 % by volume H_2S concentration with an exit velocity of 1 m/s). Therefore, there is not deemed to be a significant risk to human health in the event of a small puncture to the gas membrane.

In the unlikely event of a major leak of gas from the lagoon occurring in the worst-case event of a major failure of the gas membrane and/or bund (Lagoon 3 Scenario 2 and 3), there is an exceedance of the environmental assessment level for H_2S at ER4. However, even with a 3 % by volume concentration, the concentration predicted at ER4 is indicated to cause eye irritation. It should be noted the likelihood of Lagoon 3 Scenarios 2 or 3 taking place is considered to be 'very low' based on the results of recent inspections (as discussed in Section14.2.4.2 of the Whole Farm Plan ES). Nevertheless, in the event of a major failure of the gas membrane and/or the lagoon bund, effects on human health in relation to concentrations of H_2S may occur.

It is considered the odour threshold will be exceeded across the site in the unlikely event of Scenario 2 and 3; however, as it does not pose a risk to health and would be of a short-term duration it is not considered significant.

9.9.2.4 Mitigation

The only mitigation measure to prevent the potential adverse effects that could arise on infrastructure and users of Development Scenario 1, should there be emissions of gas to atmosphere resulting from a failure of the surface liner, or a failure of the lagoon bund, would be to remediate Lagoon 3 and remove the source. However, Lagoon 3 sits outside the red line boundary of Development Scenario 1 and is outside of the applicant's ownership. As such, it is not the applicant's responsibility to undertake the remediation works.

Measures can be put in place to limit the likelihood of exposure. These measures would only be temporary as they would only be in place until Lagoon 3 and its contents are removed in line with the enforcement notice. The measures recommended within the Crouchlands Farm Whole Farm Plan assessment, which are of relevance to this assessment, include:

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- Continuous monitoring of CO_2, CH_4 and H_2S immediately to the north of Lagoon 3 to provide an early warning system to indicate possible failures of the containment system.
- Preparation of a response plan in the event of detection of pollutants which includes the person(s) responsible for the repair of the membrane and the potential evacuation of the site.

It is noted that a Planning Enforcement Notice, which required the removal of the Lagoon, expired in May 2021 but the Lagoon remains. It is therefore incumbent on the Local Planning Authority to ensure and expedite its removal which would therefore obviate the need for such mitigation measures.

9.9.2.5 Residual Impact

As the only mitigation measure to prevent potential adverse effects is outside of the applicant's control, the residual impact remains the same as reported in **Section 9.9.2.3**.

9.10 Potential Environmental Effects During Operation – Development Scenario 2

9.10.1 Impact 1: Operational Phase Odour Assessment

The Farm Hub is located to the west of Rickman's Green Village Phase 2. As detailed in **Section 9.9.1**, the Farm Hub has been purposely designed for a low intensity livestock operation, which, depending on the activity, may produce odour. A risk-based assessment was undertaken to determine the potential odour effects of the Farm Hub operations in accordance with IAQM guidance (IAQM, 2018).

9.10.1.1 Receptor Sensitivity

The odour assessment considered the closest receptors within Rickman's Green Village Phase 2 in all directions from the Farm Hub activities, as detailed in **Table 9-24**. As the application for Rickman's Green Village Phase 2 is in outline, receptors have been selected in worst-case locations (i.e., closest location to the Farm Hub) to provide a robust assessment.

Table 9-24: Scenario 2: Nearest receptors to the Farm Hub

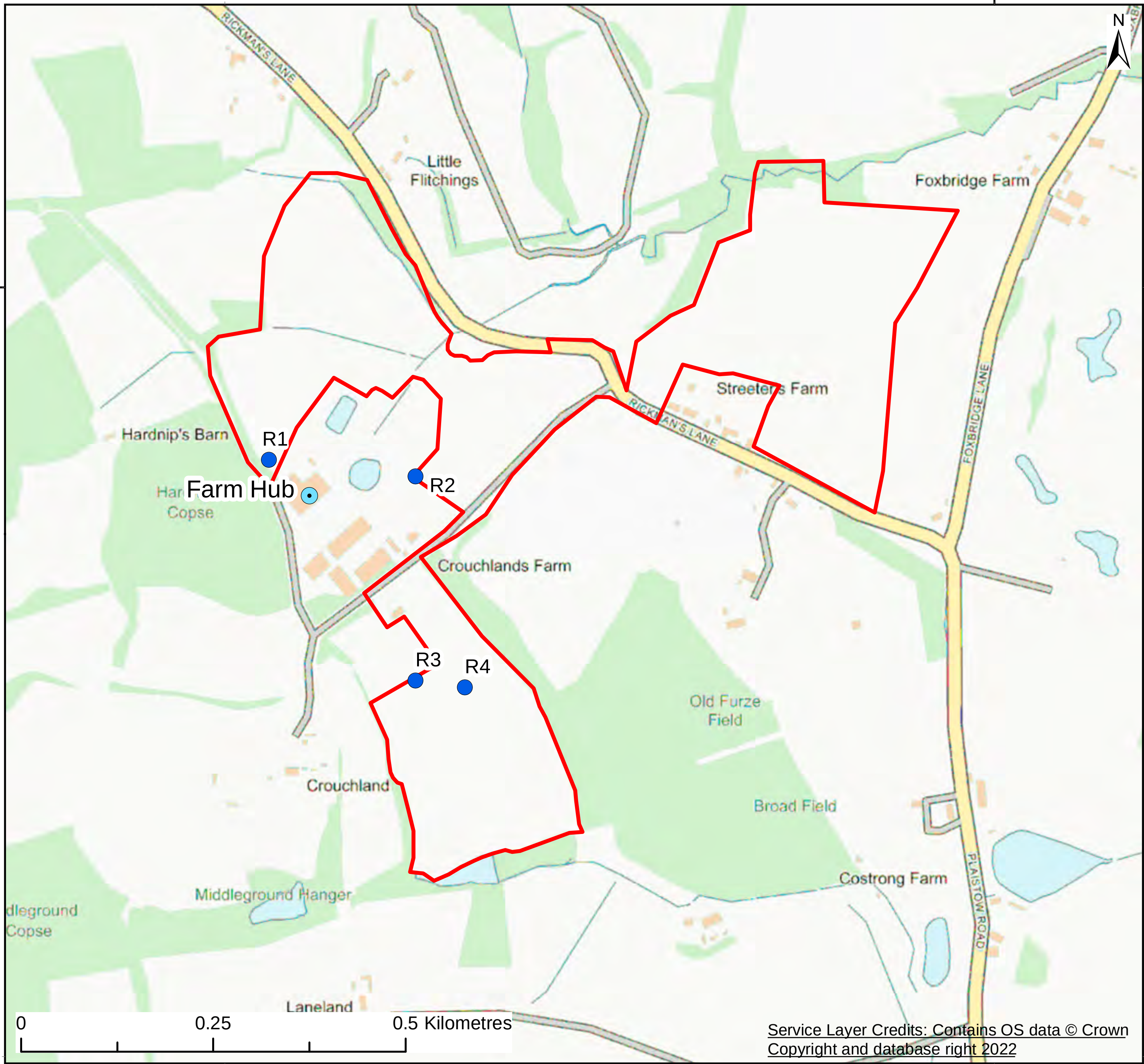
Receptor ID	Type	Receptor Sensitivity	Approximate Distance to Farm Hub	Direction from Farm Hub
R1	Residential	High	50 m	North
R2	Residential	High	150 m	East
R3	Playing/recreation fields	Medium	250 m	South
R4	School	High	325 m	South

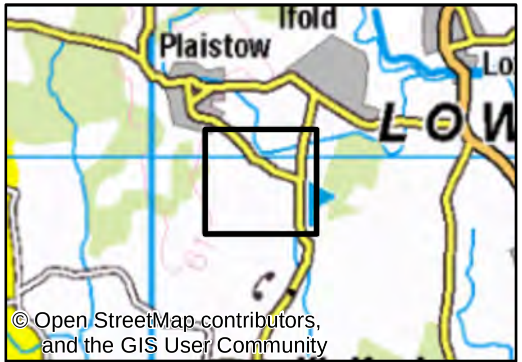
9.10.1.2 Magnitude of Effect

The first step of the assessment requires an estimation of the odour-generating potential of the site activities, taking into account the magnitude of release, how inherently odorous the release is and the relative pleasantness/unpleasantness of the odour (hedonic tone).

As detailed in **Section 9.9.1.2**, the potential for odours associated with the Farm Hub is short-lived and intermittent, therefore the overall source odour potential is considered to be **small** based on the nature of the odour and character of the area.

The second step of the assessment requires consideration of the effectiveness of the odour pathway. The closest receptors to Development Scenario 2 were identified and presented in **Table 9-24** and **Figure 9-5**.





Legend:

- Application Boundary
- Farm_Hub
- Odour Receptors

Client:	Project:
Artemis Land and Agriculture Ltd	Rickman's Green Village

Title: Scenario 2: Nearest Receptors to Farm Hub

Figure: 9-5 Drawing No: PC3820-101-005

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	29/09/2022	EW	CG	A4	1:7,500

Co-ordinate system: British National Grid

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As shown in **Table 9-24** and **Figure 9-5**, the closest receptor is R1 located to the north of the Farm Hub. Within the UK, the prevailing wind is from the south-west; as such, this receptor would be downwind of the odour source. Receptors R2, R3 and R4 are situated further from the odour source, and upwind of the odour source. The odour pathway is considered to be **Moderately Effective** at receptor R1 due to its proximity and location downwind of the source. All other receptors are situated upwind of the Farm Hub and therefore the odour pathway is considered **Ineffective** at these receptors.

The source odour potential is then combined with the pathway effectiveness to determine the risk of odour effect, using the matrix provided in **Table 9-10**. The sensitivity of the receptor is then included to determine the likely odour effect at each receptor, as detailed in **Table 9-11**. This is summarised in **Table 9-25**.

Table 9-25: Scenario 2: Summary of likely odour effects at receptors

Receptor ID	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
R1	Low	Moderately effective pathway	Negligible risk	High sensitivity	Negligible effect
R2	Low	Ineffective pathway	Negligible risk	High sensitivity	Negligible effect
R3	Low	Ineffective pathway	Negligible risk	Medium sensitivity	Negligible effect
R4	Low	Ineffective pathway	Negligible risk	High sensitivity	Negligible effect

9.10.1.3 Impact Significance

The assessment identified that there would be a negligible effect of odour impact at the closest receptors within Development Scenario 2. As such, the overall effect is considered to be **not significant.**

9.10.1.4 Mitigation

The impact assessment showed that there would be a negligible effect of odour at all receptors. As such, mitigation measures are not considered to be required.

9.10.1.5 Residual Impact

As mitigation measures are not considered to be necessary based on the negligible impacts experienced, the residual impact is **not significant**.

9.10.2 Impact 2: Release of gaseous and liquid contaminants from Lagoon 3

This section considers the potential risks to air quality, odour and associated public health that could arise from emissions to atmosphere from Lagoon 3, located 550 m to the west of Phase 2 of the masterplan at its closest point. The results of the Human Health assessment contained within the ES submitted for the Crouchlands Farm, Whole Farm Plan were used to inform this assessment. Chapter 14 of the Crouchlands Farm Whole Farm Plan should be read in conjunction with this Chapter.

9.10.2.1 Receptor Sensitivity

Phase 2 of the masterplan will introduce human receptors within 1 km of Lagoon 3. Receptors have been selected in worst-case locations (i.e., closest locations to Lagoon 3) to provide a robust assessment, as summarised in **Table 9-26**. The future receptors considered most at risk of impact from Lagoon 3 are the residential receptors located to the north-east due to their location downwind of the prevailing wind direction.

Table 9-26: Scenario 2: Sensitive receptors surrounding Lagoon 3

Receptor Type	Receptor Sensitivity	Approximate distance to Lagoon 3 (m)	Direction from Lagoon 3	Crouchlands Farm Whole Farm Plan representative receptor
Residential	High	550	North-east	FR5
Residential	High	650	North-east	ER4
School	High	575	East	FR8 and FR9

The future residential and school users of the site are classed as high sensitivity as people are expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.

9.10.2.2 Magnitude of Effect

The Human Health chapter Crouchlands Farm, Whole Farm Plan was used to inform the analysis of the risk of Lagoon 3 on Phase 2 of the masterplan.

Step 1: Qualitative Assessment

Summary of Source Emission Potential

As detailed in **Section 9.9.2**, it can be determined that if failure of the containment system was to occur, it would most likely be through a small puncture of the gas membrane (Lagoon 3 Scenario 1).

Pathway Effectiveness

As detailed in **Section 9.9.2.2**, receptors that are downwind with respect to the prevailing wind direction tend to be at higher risk of impact.

As the prevailing wind is from the south-west, the residential properties located to the north-east of Lagoon 3 are downwind of the development. The residential properties and the school to the east are not located downwind.

Digestate released from the failure of the northern or eastern bunds runs in a downward north-easterly direction towards the location of the Farm Hub, and would pass through the boundary of Rickman's Green Village Phase 2 beyond the Farm Hub. Whereas, in the event of failure of the western and southern bunds, digestate runs away from Development Scenario 2 to the south-west. The 'worst-case' scenarios for impacts on Rickman's Green Village Phase 2 are therefore failure of the northern or eastern bunds.

In the event of breach of the northern or eastern bunds, it is predicted that the majority of digestate which escapes from Lagoon 3 will have passed beyond Rickman's Green Village Phase 2 in approximately 1.5 minutes. However, small volumes of digestate would pool around the location of the Farm Hub to the west.

The pathway for emissions from Lagoon 3 to impact Rickman's Green Village Phase 2 is therefore considered to be **effective**.

Sensitivity of Receptors

As detailed in **Section 9.10.2.1**, Development Scenario 2 will introduce high sensitivity receptors downwind of Lagoon 3.

Summary

Although the risk of failure of the Lagoon 3 containment system is considered to be low, in the event of failure, gases and digestate contained within could cause adverse effects upon human health or create a nuisance. As human receptors are proposed to be introduced downwind and downhill of the lagoon, there is the potential for impact on future users of the site.

Step 2: Quantitative Assessment

Table 9-26 includes the receptors modelled in the Crouchlands Farm Whole Farm Plan assessment which are representative of the future users of Rickman's Green Village Phase 2. The results from these receptors have been used to inform this assessment.

Results and Impact Assessment

The summary of results reported within the Human Health chapter of the Whole Farm Plan were modified and included in **Table 9-27** to represent impacts of Lagoon 3 on Phase 2 of the masterplan.

Table 9-27: Scenario 2: Summary of exceedances of the assessment criteria in each modelled scenario (all receptors)

Pollutant	Concentration by volume within Lagoon 3 (%)	Scenario 1 – Minor Leak		Scenario 2 – Major Leak
		0.1 m/s exit velocity	1 m/s exit velocity	
CO_2	47	No	No	No
CH_4	50	No	No	No
H_2S	0.1	No	No	Yes
	0.5	No	No	Yes
	3	No	No	Yes

9.10.2.3 Impact Significance

With reference to **Table 9-27**, there is considered to be no risk to human health from CO_2 or of explosion from CH_4 in any of the assessed scenarios. As such, these impacts are not considered to be significant.

With reference to the Whole Farm Plan ES, based on the inspection reports on Lagoon 3, it was considered very unlikely that failure of the containment resulting in loss of gas or digestate will occur. However, should this occur, it was deemed the most likely failure scenario would be a small puncture to the gas membrane (Lagoon 3 Scenario 1). From the modelled results, there is considered to be no risk to users of Rickman's Green Village Phase 2 from H_2S even in the absolute worst-case sensitivity test (3 % by volume H_2S concentration with an exit velocity of 1 m/s). Therefore, there is not deemed to be a significant risk to human health in the event of a small puncture to the gas membrane.

In the unlikely event of a major leak of gas from the lagoon occurring in the worst-case event of a major failure of the gas membrane and/or bund (Lagoon 3 Scenario 2 and 3), there is an exceedance of the environmental assessment level for H_2S at all receptors. However, even with a 3 % by volume concentration, the maximum predicted concentration is indicated to cause eye irritation. It should be noted the likelihood of Lagoon 3 Scenarios 2 or 3 taking place is considered to be 'very low' based on the results of recent inspections (as discussed in Section 14.2.4.2 of the Whole Farm Plan ES). Nevertheless, in the event of a major failure of the gas membrane and/or the lagoon bund, effects on human health in relation to concentrations of H_2S may occur.

It is considered the odour threshold will be exceeded across the site in the unlikely event of Scenario 2 and 3; however, as it does not pose a risk to health it is not considered significant.

9.10.2.4 Mitigation

The only mitigation measure to prevent the potential adverse effects that could arise on infrastructure and users of Development Scenario 2, should there be emissions of gas to atmosphere resulting from a failure of the surface liner, or a failure of the lagoon bund, would be to remediate Lagoon 3 and remove the source.

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However, Lagoon 3 sits outside the red line boundary of Development Scenario 2 and is outside of the applicant's ownership. As such, it is not the applicant's responsibility to undertake the remediation works.

Measures can be put in place to limit the likelihood of exposure. These measures would only be temporary as they would only be in place until Lagoon 3 and its contents are removed in line with the enforcement notice. The measures recommended as part of the Crouchlands Farm Whole Farm Plan assessment, and of relevance to this assessment include:

- Continuous monitoring of CO_2, CH_4 and H_2S immediately to the north of Lagoon 3 to provide an early warning system to indicate possible failures of the containment system.
- Preparation of a response plan in the event of detection of pollutants which includes the person(s) responsible for the repair of the membrane and the potential evacuation of the site.

It is noted that a Planning Enforcement Notice, which required the removal of the Lagoon, expired in May 2021 but the Lagoon remains. It is therefore incumbent on the Local Planning Authority to ensure and expedite its removal which would therefore obviate the need for such mitigation measures.

9.10.2.5 Residual Impact

As the only mitigation measure to prevent potential adverse effects is outside of the applicant's control, the residual impact remains the same as reported in **Section 9.10.2.3**.

9.11 Potential Environmental Effects During Operation – Development Scenario 3

The Farm Hub is located to the west of the combined developments. A risk-based assessment was undertaken to determine the potential odour effects of the Farm Hub operations in accordance with IAQM guidance (IAQM, 2018).

9.11.1.1 Receptor Sensitivity

The odour assessment considered the closest receptors within the combined developments in all directions from the Farm Hub activities, as detailed in **Table 9-28**. The receptors representing Phase 2 of the masterplan were selected in worst-case locations (i.e., the closest locations to the Farm Hub) to provide a robust assessment.

Table 9-28: Scenario 3: Nearest receptors to the Farm Hub

Receptor ID	Type	Receptor Sensitivity	Approximate Distance to Farm Hub	Direction from Farm Hub
R1	Residential	High	50 m	North
R2	Residential	High	150 m	East
R3	Playing/recreation fields	Medium	250 m	South
R4	School	High	325 m	South
R5	Residential	High	200 m	South-east

9.11.1.2 Magnitude of Effect

The first step of the assessment requires an estimation of the odour-generating potential of the site activities, taking into account the magnitude of release, how inherently odorous the release is and the relative pleasantness/unpleasantness of the odour (hedonic tone).

As detailed in **Section 9.9.1.2**, the potential for odours associated with the Farm Hub is short-lived and intermittent, therefore the overall source odour potential is considered to be **small** based on the nature of the odour and character of the area.

The second step of the assessment requires consideration of the effectiveness of the odour pathway. The closest receptors to Development Scenario 3 were identified and presented in **Table 9-28** and **Figure 9-6**.

As shown in **Table 9-28** and **Figure 9-6**, the closest receptor is R1 located to the north of the Farm Hub. As the prevailing wind is from the south-west; this receptor would be downwind of the odour source. The rest of the receptors are situated further from odour source, and upwind of the odour source. The odour pathway is considered to be **Moderately Effective** at receptor R1 due to their proximity and location downwind of the source. All other receptors are situated upwind of the Farm Hub and therefore the odour pathway is considered **Ineffective** at these receptors.

The source odour potential is then combined with the pathway effectiveness to determine the risk of odour effect, using the matrix provided in **Table 9-10**. The sensitivity of the receptor is then included to determine the likely odour effect at each receptor, as detailed in **Table 9-11**. This is summarised in **Table 9-29**.

Table 9-29: Scenario 1: Summary of likely odour effects at receptors

Receptor ID	Source Odour Potential	Pathway Effectiveness	Odour Exposure	Receptor Sensitivity	Likely Odour Effect
R1	Low	Moderately effective pathway	Negligible risk	High sensitivity	Negligible effect
R2	Low	Ineffective pathway	Negligible risk	High sensitivity	Negligible effect
R3	Low	Ineffective pathway	Negligible risk	Medium sensitivity	Negligible effect
R4	Low	Ineffective pathway	Negligible risk	High sensitivity	Negligible effect
R5	Low	Ineffective pathway	Negligible risk	High sensitivity	Negligible effect

9.11.1.3 Impact Significance

The assessment identified that there would be a negligible effect of odour impact at the closest receptor within Development Scenario 3. As such, the overall effect is considered to be **not significant.**

9.11.1.4 Mitigation

The impact assessment showed that there would be a negligible effect of odour at all receptors. As such, mitigation measures are not considered to be required.

9.11.1.5 Residual Impact

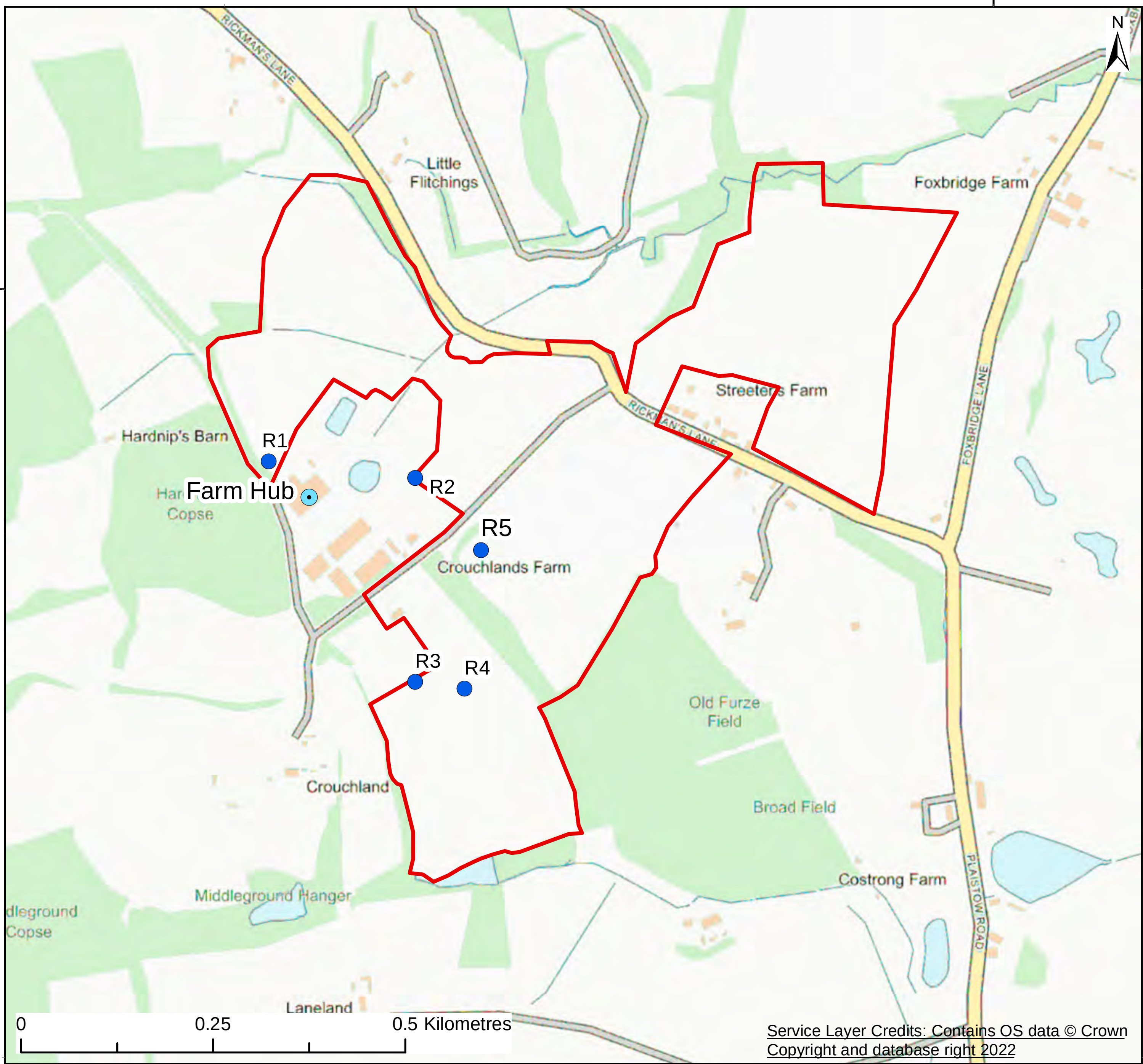
As mitigation measures are not considered to be necessary based on the negligible impacts experienced, the residual impact is **not significant**.

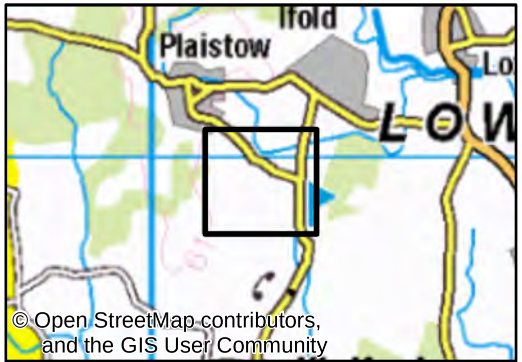
9.11.2 Impact 2: Release of gaseous and liquid contaminants from Lagoon 3

This section considers the potential risks to air quality, odour and associated public health that could arise from emissions to atmosphere from Lagoon 3, located 550 m to the west of the combined developments at its closest point. The assessment utilised the results of the Human Health chapter contained within the ES submitted for the Crouchlands Farm, Whole Farm Plan. Chapter 14 of the Crouchlands Farm Whole Farm Plan should therefore be read in conjunction with this Chapter.

9.11.2.1 Receptor Sensitivity

The combined developments will introduce human receptors within 1 km of Lagoon 3. Receptors have been selected in worst-case locations (i.e., closest location to Lagoon 3) to provide a robust assessment, as summarised in **Table 9-30**. The future receptors considered most at risk of impact from Lagoon 3 are the residential receptors located to the north-east due to their location downwind of the prevailing wind direction.





Legend:

- Application Boundary
- Farm_Hub
- Odour Receptors

Client:	Project:
Artemis Land and Agriculture Ltd	Rickman's Green Village

Title:

Scenario 3: Nearest Receptors to Farm Hub

Figure: 9-6 | Drawing No: PC3820-101-006

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
01	29/09/2022	EW	CG	A4	1:7,500

Co-ordinate system: British National Grid

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Table 9-30: Scenario 3: Sensitive receptors surrounding Lagoon 3

Receptor Type	Receptor Sensitivity	Approximate distance to Lagoon 3 (m)	Direction from Lagoon 3	Crouchlands Farm Whole Farm Plan representative receptor
Residential	High	550	North-east	FR5
Residential	High	650	North-east	ER4
Residential	High	725	East	ER4
School	High	575	East	FR8 and FR9

The future residential and school users of the site are classed as high sensitivity as people are expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.

9.11.2.2 Magnitude of Effect

The Human Health chapter Crouchlands Farm, Whole Farm Plan has been used to inform the analysis of the risk of Lagoon 3 on Phase 2 of the masterplan.

Step 1: Qualitative Assessment

Summary of Source Emission Potential

As detailed in **Section 9.9.2**, it can be determined that if failure of the containment system was to occur, it would most likely be through a small puncture of the gas membrane (Lagoon 3 Scenario 1).

Pathway Effectiveness

As detailed in **Section 9.9.2.2**, receptors that are downwind with respect to the prevailing wind direction tend to be at higher risk of impact.

As the prevailing wind is from the south-west, the residential properties located to the north-east of Lagoon 3 are downwind of the development. The residential properties and the school to the east are not located downwind.

Digestate released from the failure of the northern or eastern bunds runs in a downward north-easterly direction towards the location of the Farm Hub, and pass through Rickman's Green Village Phase 2 beyond the Farm Hub. Whereas, in the event of failure of the western and southern bunds, digestate would run away from Development Scenario 3 to the southwest. The 'worst-case' scenarios for impacts on Rickman's Green Village Phase 2 are therefore failure of the northern or eastern bunds.

In the event of breach of the northern or eastern bunds, it is predicted that the majority of digestate which escapes from Lagoon 3 will have passed beyond Rickman's Green Village Phase 2 in approximately 1.5 minutes. However, small volumes of digestate would pool around the location of the Farm Hub to the west.

The pathway for emissions from Lagoon 3 to impact Phase 2 of the masterplan is therefore considered to be **effective**.

Sensitivity of Receptors

As detailed in **Section 9.11.2.1**, Development Scenario 3 will introduce high sensitivity receptors downwind of Lagoon 3.

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Summary

Although the risk of failure of the Lagoon 3 containment system is considered to be low, in the event of failure, gases and digestate contained within could cause adverse effects upon human health or create a nuisance. As human receptors are proposed to be introduced downwind and downhill of the lagoon, there is the potential for impact on future users of the site.

Step 2: Quantitative Assessment

Table 9-30 includes the receptors modelled in the Whole Farm Plan assessment which are representative of the future users of the combined developments. The results from these receptors have been used to inform this assessment.

Results and Impact Assessment

The summary of results reported within the Human Health chapter of the Crouchlands Farm Whole Farm Plan have been modified and included in **Table 9-31** to represent impacts of Lagoon 3 on the combined developments.

Table 9-31: Scenario 3: Summary of exceedances of the assessment criteria in each modelled scenario (all receptors)

Pollutant	Concentration by volume within Lagoon 3 (%)	Scenario 1 – Minor Leak		Scenario 2 – Major Leak
		0.1 m/s exit velocity	1 m/s exit velocity	
CO_2	47	No	No	No
CH_4	50	No	No	No
H_2S	0.1	No	No	Yes
	0.5	No	No	Yes
	3	No	No	Yes

9.11.2.3 Impact Significance

With reference to **Table 9-31**, there is considered to be no risk to human health from CO_2 or of explosion from CH_4 in any of the assessed scenarios. As such, these impacts are not considered to be significant.

With reference to the Whole Farm Plan ES, based on the inspection reports on Lagoon 3, it was considered very unlikely that failure of the containment resulting in loss of gas or digestate will occur. However, should this occur, it was deemed the most likely failure scenario would be a small puncture to the gas membrane (Lagoon 3 Scenario 1). From the modelled results, there is considered to be no risk to users of Development Scenario 3 from H_2S even in the absolute worst-case sensitivity test (3 % by volume H_2S concentration with an exit velocity of 1 m/s). Therefore, there is not deemed to be a significant risk to human health in the event of a small puncture to the gas membrane.

In the unlikely event of a major leak of gas from the lagoon occurring in the worst-case event of a major failure of the gas membrane and/or bund (Lagoon 3 Scenario 2 and 3), there is an exceedance of the environmental assessment level for H_2S at all receptors. However, even with a 3 % by volume concentration, the maximum predicted concentration is indicated to cause eye irritation. It should be noted the likelihood of Scenarios 2 or 3 taking place is considered to be 'very low' based on the results of recent inspections (as discussed in Section 14.2.4.2 of the Whole Farm Plan ES). Nevertheless, in the event of a major failure of the gas membrane and/or the lagoon bund, effects on human health in relation to concentrations of H_2S may occur.

It is considered the odour threshold will be exceeded across the site in the unlikely event of Lagoon 3 Scenario 2 and 3; however, as it does not pose a risk to health it is not considered significant.

9.11.2.4 Mitigation

The only mitigation measure to prevent the potential adverse effects that could arise on infrastructure and users of Development Scenario 3, should there be emissions of gas to atmosphere, resulting from a failure of the surface liner, or a failure of the lagoon bund, would be to remediate Lagoon 3 and remove the source. However, Lagoon 3 sits outside the red line boundary of Development Scenario 3 and is outside of the applicant's ownership. As such, it is not the applicant's responsibility to undertake the remediation works.

Measures can be put in place to limit the likelihood of exposure. These measures would only be temporary as they would only be in place until Lagoon 3 and its contents are removed in line with the enforcement notice. The recommended measures within the Crouchlands Farm Whole Farm Plan assessment, and of relevance to Development Scenario 3, include:

1. Continuous monitoring of CO_2, CH_4 and H_2S immediately to the north of Lagoon 3 to provide an early warning system to indicate possible failures of the containment system.
2. Preparation of a response plan in the event of detection of pollutants which includes the person(s) responsible for the repair of the membrane and the potential evacuation of the site.

It is noted that a Planning Enforcement Notice, which required the removal of the Lagoon, expired in May 2021 but the Lagoon remains. It is therefore incumbent on the Local Planning Authority to ensure and expedite its removal which would therefore obviate the need for such mitigation measures.

9.11.2.5 Residual Impact

As the only mitigation measure to prevent potential adverse effects is outside of the applicant's control, the residual impact remains the same as reported in **Section 9.11.2.3**.

9.12 Summary

This Chapter was prepared as part of a planning application for the Rickman's Green Village. The assessment considered the potential for Phases 1 and 2 of the masterplan to impact on local air quality during its construction and operation.

The impact of the construction of each phase was considered separately and together in accordance with the latest guidance available from the Institute of Air Quality Management (IAQM, 2016). The assessment defined the sensitivity of the area and the risk of the construction of the development to cause dust and particulate matter impacts. Site-specific mitigation was recommended for each scenario and with the implementation of this mitigation, the residual impacts from construction activities were considered to be **not significant** in accordance with IAQM guidance for all phases.

At this stage of the project, the trip generation for the outline elements of the development proposals has not been finalised, and therefore the assessment of road traffic emissions for the full and outline planning applications will be provided as a forthcoming Air Quality Addendum under separate cover. At this stage, the chapter sets out the methodology that will be used for the assessment.

A Lagoon 3 Risk Assessment was prepared as part of a planning application for the proposed development at Crouchlands Farm, Plaistow (planning ref: 22/01735/FULEIA). This assessment was used to inform the consideration of the potential risks to air quality, odour and associated public health that could arise from emissions to atmosphere from Lagoon 3 located to the west of Rickman's Green Village. The assessment concluded there is no significant impact from CO_2 (asphyxiation) or CH_4 (explosion) to future users of

Rickman's Green Phase 1 and 2 in the event of loss of gases and digestate from Lagoon 3. There is potential for impact to human health from H_2S in the worst-case event of a major failure of the gas membrane and/or bund. However, the maximum predicted concentration is indicated to cause eye irritation, and the likelihood of a major failure of the bund or gas membrane is considered to be very low. A number of recommendations were made for the Crouchlands Farm Whole Farm Plan, including deployment of continuous monitors to the north of Lagoon 3 to provide an early warning system of potential failure of the lagoon's liner and monitoring of the lagoon contents, which would be applicable to Rickman's Green Village. It is understood that these measures would be temporary.

Operational phase odour emissions from the Farm Hub were considered using the risk-based assessment methodology detailed in IAQM guidance (IAQM, 2018). Given the nature and scale of the odour source, the existing character of the area and location of receptors with regard to prevailing wind conditions, the effect of any potential odour was considered to be **not significant** for all scenarios**.**

10 Noise and Vibration

10.1 Introduction

This chapter of the ES considers the likely effects of Rickman's Green Village with respect to noise and vibration, and how this could affect human noise sensitive receptors (NSRs). It describes the methods used to assess potential effects, the baseline conditions currently existing within the Rickman's Green Village footprint and surrounding area. The mitigation measures required to prevent, reduce or off-set any significant adverse effects are presented together with the likely residual effects after these measures have been adopted. The identified potential effects of the development, which comprise the scope of this assessment, are as follows:

- increase in noise and vibration levels at existing and proposed NSRs due to the construction activities;
- introduction of proposed NSRs with the potential to be disturbed by baseline/future (i.e. with development) noise levels, referred to as an assessment of 'site suitability';
- increase in noise levels at existing NSRs due to fixed plant associated with the new school (if education provision is required); and
- increase in noise levels at existing NSRs due to the traffic associated with construction and operation.

At this stage of the project the trip generation for the outline elements of the scheme has not been finalised, and therefore the assessment of road traffic noise impacts for the full and outline planning applications will be provided as a forthcoming Noise Addendum under separate cover. At this stage, the chapter sets out the methodology that will be used for the assessment.

10.2 Legislation, Planning Policy and Guidance

10.2.1 Legislation

10.2.1.1 Environmental Protection Act 1990

The Environmental Protection Act 1990 defines statutory nuisance with regard to noise and determines that local planning authorities have a duty to detect such nuisances in their area.

Section 79 of the Act requires local authorities to investigate any public complaints of noise. No statutory noise limits exist for determining a nuisance; therefore, the local authority can take account of various guidance documents and existing case law when investigating complaints. Lower noise level limits are generally applied when considering the acceptability of a planning permission than those which would be used when considering whether an existing noise source amounts to a statutory nuisance.

If the local authority is satisfied that a statutory nuisance exists, or is likely to occur or recur, they must serve a noise abatement notice on the person responsible, under the powers provided in Section 80. The notice requires either the abatement of the nuisance; works to abate the nuisance to be carried out; or it prohibits or restricts the activity. Contravention of a notice without reasonable excuse is an offence. A right of appeal to the Magistrates Court exists within 21 days of the service of a noise abatement notice.

Demonstrating the use of "Best Practicable Means" (BPM) to minimise noise levels is an accepted defence against a noise abatement notice. The Act defines the concept of BPM as:

- " *'practicable' means reasonably practicable having regard among other things to local conditions and circumstances, to the current state of technical knowledge and to the financial implications;*

- *the means to be employed include the design, installation, maintenance and manner and periods of operation of plant and machinery, and the design, construction and maintenance of buildings and structures;*
- *the test is to apply only so far as compatible with any duty imposed by law; and*
- *the test is to apply only so far as compatible with safety and safe working conditions, and with the exigencies of any emergency or unforeseeable circumstances.*"

When considering a planning application, local authorities should consider whether the development under consideration has the potential to cause a statutory nuisance and to use the planning process to avoid this outcome if possible.

10.2.1.2 The Control of Pollution Act 1974

The Control of Pollution Act 1974 (CoPA) requires that Best Practicable Means (BPM) (as defined in Section 72 of CoPA) are adopted to control construction noise on any given site as far as reasonably practicable. Sections 60 and 61 of the CoPA provide the main legislation regarding enabling works and construction site noise and vibration. If noise complaints are received, a Section 60 notice may be issued by the local authority with instructions to cease work until specific conditions to reduce noise have been adopted.

Section 61 of the CoPA provides a means to apply for prior consent to carry out noise generating activities during construction. The 'prior consent' is agreed between the local authority and the contractor and may contain a range of agreed working conditions, noise limits and control measures designed to minimise or prevent the occurrence of noise nuisance from construction activities. Once prior consent has been agreed under Section 61, a Section 60 notice cannot be served provided the agreed conditions are maintained on-site.

10.2.2 Planning Policy

10.2.2.1 National Planning Policy Framework

National policy guidance with respect to noise is found in the National Planning Policy Framework (NPPF).

Paragraph 174 of the NPPF states planning policies and decisions should contribute to and enhance the natural and local environment by:

> *"……preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution……".*

Furthermore, Paragraph 185 of the NPPF states:

> *"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:*
>
> *a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life;*
>
> *b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason;*

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10.2.2.2 Noise Policy Statement for England, 2010

The Noise Policy Statement for England (NPSE) document was published by Defra in 2010 and paragraph 1.7 states three policy aims:

"Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *avoid significant adverse impacts on health and quality of life;*
- *mitigate and minimise adverse impacts on health and quality of life; and*
- *where possible, contribute to the improvement of health and quality of life*."

The Explanatory Note contained within the NPSE introduces the following concepts to aid in the establishment of significant effects:

- No Observed Effect Level (NOEL): the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established.
- Lowest Observable Adverse Effect Level (LOAEL): the level above which adverse effects on health and quality of life can be detected.
- Significant Observed Adverse Effect Level (SOAEL): the level above which significant adverse effects on health and quality of life occur.

The aims of the NPSE can therefore be interpreted as follows (within the context of Government policy on sustainable development):

- The first aim is to avoid noise levels above the SOAEL.
- To consider situations where noise levels are between the LOAEL and SOAEL. In such circumstances, all reasonable steps should be taken to mitigate and minimise the effects. However, this does not mean that such adverse effects cannot occur.

The NPSE states: "*It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations*". (Paragraph 2.22, NPSE, March 2010).

Furthermore, paragraph 2.22 of the NPSE acknowledges that: "*Further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise*".

10.2.2.3 National Planning Practice Guidance

The National Planning Practice Guidance (NPPG) web-based resource was originally launched by the Department for Communities and Local Government (DCLG) on 6 March 2014[4], to support the NPPF and make it more accessible. The overall aim of the guidance, tying in with the principles of the NPPF and the Explanatory Note of the Noise Policy Statement for England[5], is to '*identify whether the overall effect of noise exposure is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.'*

A summary of the effects of noise exposure associated with both noise generating developments and noise sensitive developments is presented within the NPPG and reproduced in **Table 10-1**.

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[4] Ministry now responsible for update of guidance is the Ministry of Housing, Communities and Local Government
[5] Department for Environment, Food and Rural Affairs (DEFRA), Noise Policy Statement for England (NPSE), March 2010, DEFRA, UK

Table 10-1: Noise exposure hierarchy

Response	Examples of outcomes	Increasing effect level	Action
No Observed Effect Level (NOEL)			
Not present	No Effect	No Observed Effect	No Specific Measures Required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No Specific Measures Required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to closing windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. having to keep windows closed most of the time, avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect (SOAE)	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect (UAE)	Prevent

10.2.2.4 Chichester Local Plan: Key Policies 2014-2029

The currently adopted Chichester Local Plan (CLP) outlines development management policies relating to or include clauses incorporating noise. The most relevant policies and sections within are detailed below.

Policy 40, Clause 10
The reduction of impacts associated with traffic or pollution (including air, water, noise and light pollution) will be achieved, including but not limited to the promotion of car clubs and facilities for charging electric vehicles.

10.2.2.5 Planning Noise Advice Document: Sussex (March 2021)

This document is adopted by CDC and provides noise-related advice for developers to assist in making a planning application. This document outlines the appropriate British Standard or guidance document for various noise source types to be employed in the assessment and the criteria accepted by CDC.

10.2.3 Guidance

10.2.3.1 IEMA Guidelines for Environmental Noise Impact Assessment (2014)

The Institute of Environmental Management and Assessment 'Guidelines for Environmental Noise Impact Assessment' (IEMA Guidelines) provide guidance on how to undertake a noise impact assessment, with particular focus on the context of an EIA. They describe the process of scoping, defining a baseline, prediction of noise level changes and determination of the significance of the effect. They aim to apply to all types of proposed development.

10.2.3.2 BS 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise

Part 1 of BS 5228 provides recommendations for basic methods of noise and vibration control relating to construction and open sites where work activities/operations generate significant noise and/or vibration levels. It also provides guidance on methods of predicting and measuring noise and assessing its impact on those exposed to it.

10.2.3.3 BS 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 2: Vibration

Part 2 of BS 5228 gives recommendations for basic methods of vibration control on construction and open sites, where work activities generate significant vibration levels. It also provides guidance on predicting and assessing vibration levels from construction and a database of measured vibration levels during piling activities.

10.2.3.4 ProPG Planning and Noise: New Residential Development

As required by the Planning Noise Advice Document: Sussex, this assessment has been based on the guidance in the ProPG Planning and Noise: New Residential Development (ProPG). The ProPG is intended to supplement the NPPF and provide guidance on a recommended approach to the management of noise within the planning system in England for new residential development. The scope of the document is restricted to developments that are exposed predominantly to airborne noise from transport sources.

It proposes a 2-stage approach for assessing the suitability of a site using an initial site noise risk assessment followed by a systematic consideration of:

- Good Acoustic Design Process;
- Noise Level Guidelines;
- External Amenity Area Noise Assessment; and
- Other Relevant Issues.

10.2.3.5 British Standard (BS) 8233:2014 – Guidance on Sound Insulation and Noise Reduction for Buildings

BS 8233 provides guidance on for the control of noise in and around a variety of building types. It recommends criteria for noise levels in different room types, depending on the proposed usage, and for sound insulation performance between room types. It provides a methodology to calculate the noise levels entering a building through facades and façade elements and details of appropriate measures for sound insulation between dwellings.

10.2.3.6 BB93 Acoustic design of schools – performance standards

This document, last revised in February 2015, supersedes Section 1 of the Building Bulletin 93 (BB93) published in 2003. According to the document, it: "*sets out minimum performance standards for the acoustics of school buildings and describes the normal means of demonstrating compliance with the*

Building Regulations. It also provides guidance in support of the School Premises Regulations (2012) and the Independent School Standards (2013)".

This document along with BB101: Guidelines on ventilation, thermal comfort, and indoor air quality in schools sets out the internal noise conditions for both teaching and auxiliary areas within primary and secondary schools.

10.2.3.7 Acoustics of Schools: a design guide

This guidance, written by the Institute of Acoustics (IOA) and the Acoustics and Noise Consultants (ANC), accompanies the BB93 Acoustic design of schools – performance standards document as it revises Sections 2 – 7 of the superseded BB93 guidance originally published in 2003.

The document provides supporting guidance to the performance standards guidance and provides recommendations on the acoustic design of new and refurbished schools in terms of internal ambient noise levels, reverberation time and sound insulation. It also provides guidance on external areas (both for teaching and amenity) and the suitability of land for the provision of a school.

10.2.3.8 British Standard 4142:2014+A1:2019 – Method for Rating and Assessing Industrial and Commercial Sound

BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be outside a dwelling or premises used for residential purposes upon which sound is incident.

10.2.3.9 Calculation of Road Traffic Noise 1988

The Calculation of Road Traffic Noise (CRTN) provides a method for assessing noise from road traffic in the UK and a method of calculating noise levels from the Annual Average Weekday Traffic (AAWT) flows and from measured noise levels. Since publication on 1988 this document has been the nationally accepted standard in predicting noise levels from road traffic. The calculation methods take account of variables including percentage of heavy goods vehicles (HGV), road surfacing, gradient, screening by barriers and relative height of source and receiver.

10.2.3.10 Design Manual for Roads and Bridges – LA 111 Noise and Vibration, Revision 2

The Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration provides guidance on the assessment of construction and operational noise and vibration impacts from road schemes. It contains advice and information on transport related noise and vibration, which has relevance to the construction and operational traffic impacts affecting sensitive receptors adjacent to road networks. It also provides guideline significance criteria for assessing traffic related noise impacts.

10.3 Consultation

Consultation was undertaken with the CDC Environmental Health Officer via email to agree on the methodologies for the baseline noise survey and noise impact assessment for the proposed Crouchlands Farm Whole Farm Plan development. The agreed approach was to assess the potential noise sources in accordance with the guidance outlined in Annex 1 of the Planning Noise Advice Document: Sussex. The baseline survey undertaken to inform this assessment adopted the same approach used for the Crouchlands Farm Whole Farm Plan development EIA. The Crouchlands Farm Whole Farm Plan development baseline survey was undertaken during the COVID-19 pandemic, hence, it was deemed valuable to repeat the survey as part of this assessment, to determine whether the baseline sound levels had changed. Given that the same survey and assessment procedures used for the Crouchlands Farm Whole Farm Plan development EIA have been used for this assessment, no further consultation was deemed necessary.

10.4 Assessment Methodology

Chapter 5 Approach to EIA provides a summary of the general impact assessment methodology applied to Rickman's Green Village. The following sections confirm the methodology used to assess the potential impacts on noise and vibration.

The assessment of magnitude of impact is based on comparison with the relevant noise and vibration criteria depending on the specific impact being considered

10.4.1 Receptor Sensitivity

In accordance with the IEMA Guidelines, the sensitivity of receptors to noise or vibration has been classified. This has been done based on their usage, using professional judgement, as defined in **Table 10-2**.

Table 10-2: Definitions of the different receptor sensitivity levels to noise and/or vibration impacts

Sensitivity	Definition	Examples
Very high	Receptors where noise or vibration level changes may significantly affect their usage.	Certain hospital wards (e.g. operating theatres or high dependency units), auditoria, laboratories with highly vibration sensitive equipment or buildings which are structurally unsound or identified as requiring special protection by cultural specialists (for example some historical/listed buildings or scheduled monuments).
High	Receptors where noise and/or vibration level changes may cause disturbance, protection is required but some tolerance is expected.	Residential accommodation, private gardens, hospital wards, care homes, schools, universities, research facilities and national parks (during the day).
Medium	Receptors where noise and/or vibration level changes may cause some distraction or disturbance.	Offices, shops (including cafes), outdoor amenity areas during the day (including recreation, public amenity space/play areas), long distance footpaths (including PRoW, dog walking routes, bird watching areas, footpaths and other walking routes, visitor attractions, cycling routes including rural roads), doctor's surgeries, sports facilities and places of worship.
Low	Receptors where noise and/or vibration level changes are not expected to be detrimental.	Warehouses, light industry, car parks, and agricultural land.

10.4.2 Magnitude of Impact

10.4.2.1 Construction Noise

In order to quantify the likely noise from construction works in accordance with the methods and guidance in BS 5228, it is necessary to define the various activities to be undertaken and the equipment to be used, based upon the anticipated construction works programme. At this stage, before a contractor is appointed, detailed information regarding construction activities and plant requirements is not available. Therefore, a qualitative discussion of potential construction noise impacts is provided, based upon professional judgement.

Annex E of BS 5228-1 contains a number of example methodologies for identifying significant construction noise effects based on fixed thresholds or noise level changes. For the purposes of this assessment the 'ABC' method has been used for assessment of impacts on residential receptors. This approach is based on setting the threshold for the onset of potentially significant adverse effects (i.e. the SOAEL) depending on the existing ambient noise level. Receptors with low existing ambient noise levels (Category A) have a lower threshold than those with high existing ambient noise levels (Category C). Higher thresholds are set for normal daytime construction working hours, compared to the more sensitive evening/weekend and night time periods. As a conservative approach, the threshold for the onset of any adverse effect (i.e. the LOAEL) is set at a construction noise level equal to the existing ambient noise level. Construction noise levels between the LOAEL and the SOAEL have the potential to result in adverse effects but would not normally be classed as significant adverse effects. However, noise mitigation measures would still be considered/ applied in such locations to seek to keep all effects to a minimum, as per the second aim of the NPSE. **Table 10-3**, which is adapted from Table E.1 in BS 5228, sets out the construction noise SOAEL and LOAEL for the assessment of impacts on residential receptors.

Table 10-3: Construction noise SOAEL and LOAEL for all receptors levels based on the ABC method (BS 5228-1)

Time of day	SOAEL LAeq,T dB			LOAEL $L_{Aeq,T}$ dB
	Category A [(a)]	Category B [(b)]	Category C [(c)]	
Daytime (07:00 – 19:00) and Saturdays (07:00 – 13:00)	65	70	75	Existing ambient
Evenings and weekends (d)	55	60	65	
Night-time (23:00 to 07:00)	45	50	55	

NOTE 1 A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.
NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise
NOTE 3 Applied to residential receptors only.
Category A: Threshold values to use when the ambient noise levels (when rounded to the nearest 5dB) are less than these values.
Category B: Threshold values to use when the ambient noise levels (when rounded to the nearest 5dB are the same as Category A values.
Category C: Threshold values to use when the ambient noise levels (when rounded to the nearest 5dB) are higher than the Category A values.
19:00 – 23:00 weekdays, 132:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays

BS 5228-1 states that: "*If the site noise level exceeds the appropriate category [threshold] value, then a potential significant effect is indicated. The assessor then needs to consider other project-specific factors, such as the number of receptors affected and the duration and character of the impact, to determine if there is a significant effect*." The following demonstrates how these other factors can be considered to determine the effect significance:

- the predicted construction noise level and change in noise level during the works at the receptor
- the duration and magnitude of the impact. Construction noise levels above the Threshold Value (for residential receptors) for less than one month would not normally be considered significant, to accord with the 5 dB change method in BS 5228-1. However, predicted construction noise levels above the Category C values for a period of at least 10-days (or 10-evenings/weekends or nights) in any 15, or 40-days (or 40 evenings/weekends or nights) in any 6-month period, would be considered significant as these imply potential eligibility for noise insulation in accordance with BS 5228-1;
- the timing of the impact, night time impacts being more likely to be considered significant than daytime impacts;
- the location of the impact at the NVSR, for example, a receptor may contain areas which are more or less sensitive than others, for example in a school, office spaces or kitchens would be considered less sensitive than classrooms; and
- the nature, times of use and design of the receptor, for example a NSR which is not used at night would not be considered sensitive to night-time construction works.

10.4.2.2 Construction Vibration

Ground-borne vibration can result from construction works and may lead to perceptible levels of vibration at nearby receptors, which at higher levels can cause annoyance to residents. High vibration levels generally

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arise from ‘heavy’ construction works such as piling or dynamic ground compaction. In extreme cases, cosmetic or structural building damage can occur, but only at extremely high magnitude vibration levels and such cases are rare.

The vibration level and effects presented in **Table 10-4** are taken from Table B-1 of BS 5228-2. These levels and effects are based on human perception of vibration in residential environments. These are presented in terms of the peak particle velocity (PPV).

Table 10-4 Impact Magnitude Construction Vibration

Vibration Limit PPV (mms-^{1})	Interpreted Significance to Humans	Impact Magnitude
≤0.14	Vibration unlikely to be perceptible	No Impact
0.14 to 0.3	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction	Negligible
0.3 to 1.0	Vibration might just be perceptible in residential environments	Minor
1.0 to ≤10.0	It is likely that vibration at this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents	Moderate
≥10	Vibration is likely to be intolerable for any more than a brief exposure to this level	Major

Construction vibration levels at receptors which exceed a value of 1 mm/s have the potential to result in a significant effect. However, the same additional project-specific factors which can influence the construction noise effect significance are considered relevant to vibration impacts. Hence, the same process for considering these other factors should be undertaken to determine the vibration effect significance.

In addition to human annoyance, building structures may be damaged by high levels of vibration. The levels of vibration that may cause building damage are far in excess of those that may cause annoyance. Consequently, if vibration levels are controlled to those specified by annoyance then it is highly unlikely that buildings will be damaged by construction vibration.

10.4.2.3 Construction Traffic

Once the required traffic data are available, construction traffic noise impacts along existing roads will be estimated based on the Calculation of Road Traffic Noise (CRTN) methodology for the calculation of the Basic Noise Level (BNL) at a reference distance of 10m from the nearside carriageway. Predictions will be undertaken for both the ‘with’ and ‘without’ construction traffic scenarios for the peak construction year, for each road link in the construction traffic model.

Details of the road network study area for the construction phase traffic assessment will be provided by the traffic EIA specialists, along with AAWT 18hr flows, % HGVs and speed data for each road link. These data will be used to undertake the BNL calculations. The Transport Research Laboratory (TRL) publication ‘Converting the UK traffic noise level $L_{A10,18h}$ to EU noise indices for noise mapping’ (Transport Research Laboratory, 2002) will be used to determine night-time traffic noise levels.

If the provided traffic flow data indicate that traffic flows are below the validated CRTN range (<1000 vehicles per 18hrs), the alternative calculation method detailed in 'A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq}, Report by a Working Party for the Technical Sub-committee of the Noise Advisory Council' (NAC) will be used. This alternative methodology predicts the noise level at 10m from the nearside carriageway edge, similar to CRTN methodology. The NAC alternative methodology will be applied for both ‘with development construction phase flows' and 'without development construction phase flows' noise level predictions, where the flow in either case falls outside the range of validity for CRTN (for each of the scenarios being assessed). Following this approach ensures that the resulting noise level change is determined based on following the same calculation approach i.e. CRTN without development and CRTN with development, NAC without development and NAC with development.

In order to determine impacts, the assessment of construction traffic noise compares the calculated BNLs with and without the construction traffic. Any changes in day or night-time noise levels due to a corresponding change in volume and composition will be assessed using the impact magnitude criteria detailed in **Table 10-5**, which is reproduced from Table 3.17 of DMRB.

Table 10-5: Traffic Noise Magnitude of Impact at Receptors

Magnitude of Impact	Increase in Basic Noise Level of closest public road used for construction traffic (dB)
Negligible	Less than 1.0
Minor	Greater than or equal to 1.0 and less than 3.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Major	Greater than or equal to 5.0

The LOAEL and SOAELs for construction traffic noise are defined in DMRB. These thresholds are detailed in **Table 10-6.**

Table 10-6: LOAELs and SOAELS at NSRs for Road Traffic

Time Period	LOAEL	SOAEL
Day	55dB $L_{A10,18hr}$ facade	68dB $L_{A10,18hr}$ facade
Night	40dB $L_{night,\ outside}$ free-field	55dB $L_{night,\ outside}$ free-field

The calculated BNLs used to determine the change in road traffic noise levels are the noise level at 10m from the carriageway edge, depending on traffic flow parameters only i.e. total flow, vehicle speed and %HGV. They do not account for actual distance to the receptor, the presence of screening, angle of view or road gradient. Therefore, these BNLs cannot be compared directly with the LOAELs and SOAELs in **Table 10-6**. Where a comparison with the LOAEL and SOAEL criteria is required, a simplified calculation will be undertaken to determine a potential L_{Aeq} road traffic noise level, based on the distance to the closest identified NSR to each link.

The same analysis undertaken for assessing potential effect significance for construction noise will be used to determine the effect significance for construction traffic noise impacts.

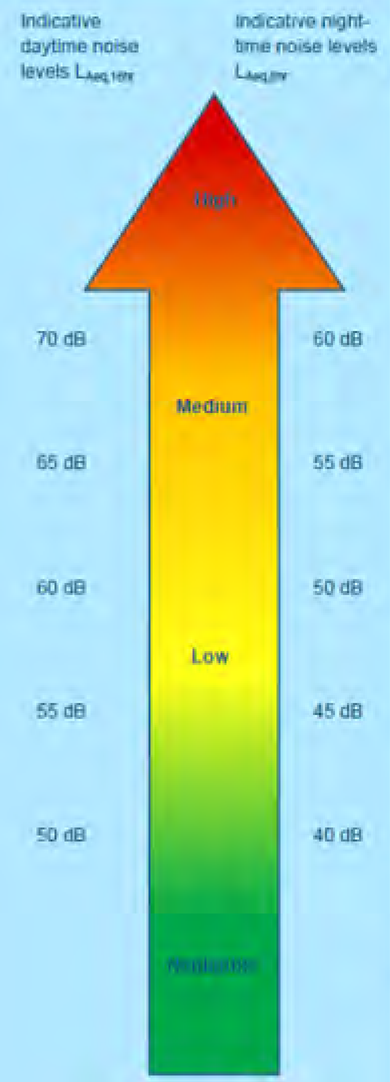
10.4.2.4 Site Suitability for Residential Development

The assessments of site suitability do not follow the standard EIA process of combining receptor sensitivity and magnitude of impact to determine significance of effect. Instead, appropriate external and internal noise level criteria have been identified. If these are exceeded, a potentially significant effect on the occupants of the development is identified.

The site suitability due to potential noise impacts on proposed residential NSRs has been undertaken in line with the guidance set out in the ProPG and BS 8233.

Recommendations on undertaking an initial site noise risk assessment are provided in ProPG (Section 2, Figure 1). Noise level thresholds for daytime and night-time shown in ProPG, Figure 1, are reproduced in **Table 10-7**.

Table 10-7 Initial site noise risk assessment levels – ProPG

Noise Risk Assessment	Potential effect without noise mitigation	Pre-planning application advice
	Increasing risk of adverse effect	High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS. Applicants are strongly advised to seek expert advice.
		As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.
		At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and is demonstrated in an ADS which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development.
	No adverse effect	These noise levels indicate that the development site is likely to be acceptable from a noise perspective, and the application need not normally be delayed on noise grounds

ProPG details that if there is an indication there may be more than 10 noise events during the night-time with L_{AFmax} > 60 dB, then the site should not be considered as negligible risk.

BS8233 provides recommended internal noise levels which apply to the Rickman's Green Village development as shown in **Table 10-8**.

Table 10-8 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00 hrs	23:00 to 07:00 hrs
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

The standard also highlights the potential impact of noise events on sleep with the following statement:

"NOTE 4 Regular individual noise events (for example, scheduled aircraft or passing trains) can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$*, depending on the character and number of events per night. Sporadic noise events could require separate values."*

The internal noise levels inside the proposed buildings have been calculated using the simple methdology in BS 8233.

On external noise, the standard states the following:

"*For traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB* $L_{Aeq,T}$*, with an upper guideline value of 55 dB* $L_{Aeq,T}$ *which would be acceptable in noisier environments. However, it is also recognized that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited."*

Where good acoustic design has been applied and the target noise levels in outdoor amenity areas are not achievable, ProPG provides advice on how impacts may be offset. Where a good acoustic design process has been followed, exceedances of the upper threshold may be partially off-set if the residents are provided with access to:

- "*a relatively quiet façade (containing openable windows to habitable rooms) or a relatively quiet externally ventilated space (i.e. an enclosed balcony) as part of their dwelling; and/or*
- *a relatively quiet alternative or additional external amenity space for sole use by a household (e.g. a garden, roof garden or large open balcony in a different, protected location); and/or*
- *a relatively quiet, protected nearby, external amenity space for sole use by a limited group of residents as part of the amenity of their dwellings; and/or*
- *a relatively quiet, protected, publically accessible, external amenity space (e.g. a public park or a local green space designated because of its tranquillity) that is nearby (e.g. within a 5 minutes walking distance)*."

10.4.2.5 Site Suitability for Education Provision

At this stage it is not known whether a new school will be required or where in the indicated area (as shown in the site location plan – Appendix A1) it will be located. The details of this will designed by West Sussex County Council be at reserved matters stage. Hence, an indicative assessment has been undertaken of the site's suitability for a new school. Once details of the massing of buildings and locations of external teaching areas are available, further assessment to determine compliance with the relevant guidance should be undertaken.

The measured baseline sound levels have been compared with the guidance document "Acoustics of Schools: a design guide" which, at Section 2.2, states that:

"*For new schools, 60dB* $L_{Aeq,30min}$ *should be regarded as an upper limit for external noise at the boundary of external areas used for formal and informal outdoor teaching and recreation…where used for teaching, for example sports lessons, outdoor ambient noise levels have a significant impact on communication in an environment which is already acoustically less favourable than most classrooms. Noise levels in unoccupied* *playgrounds, playing fields and other outdoor areas should not exceed 55dB $L_{Aeq,30min}$ and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50dB $L_{Aeq,30min}$."*

10.4.2.6 Fixed Plant Operational Noise

Operational noise from fixed plant has been assessed using the guidance set out in BS 4142 which is the accepted UK standard for rating and assessing the impact of sound of an industrial and/or commercial nature. The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a residential dwelling upon which sound is incident.

The basis of BS 4142 is a comparison between the background sound level in the vicinity of residential locations and the rating level of the noise source under consideration. The relevant parameters in this instance are as follows:

- *Background sound level* – $L_{A90,T}$ – defined in the Standard as the 'A' weighted sound pressure level that is exceeded by the residual sound at the assessment location for 90% of a given time interval, T, measured using time weighting F (Fast) and quoted to the nearest whole number of decibels;
- *Specific sound level* – $L_{Aeq,Tr}$ – the equivalent continuous 'A' weighted sound pressure level produced by the specific sound source at the assessment location over a reference time interval, T_r (1 hour during the daytime hours (07:00 to 23:00 hours) and 15 minutes during night-time hours (23:00 to 07:00 hours));
- *Residual Sound Level* - $L_{Aeq,T}$ - the equivalent continuous 'A' weighted sound pressure level at the assessment location in the absence of the specific sound source under consideration, over a given time interval, T; and
- *Rating level* – $L_{Ar,Tr}$ – the *specific sound level* plus any adjustment made for the characteristic features of the noise such as tonality, impulsivity and intermittency.

When comparing the background and the rating sound levels, the standard states that:

- "*A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around + 5dB is likely to be an indication of an adverse impact, depending on the context.*
- *The lower the rating level relative to the measured background sound level the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context*".

When assessing the noise from a source, it is necessary to have regard to the acoustic features that may be present in the source noise at the receptor. Section 9.1 of BS 4142 states: *"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."*

Sufficient details are not available at this stage to predict plant noise levels at NSRs; hence target noise levels have been recommended based on the measured background/ambient noise level and in accordance with relevant policy.

The magnitude of impact is based on a quantitative assessment of noise impact using BS 4142, as shown in **Table 10-9**. Separate assessments have been undertaken of day and night-time impacts, the overall magnitude of impact is based on the worst-case time period.

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Table 10-9: Operational Noise Magnitude of Impact Criteria

Rating level dB $L_{Ar,Tr}$	Magnitude of Impact
= Measured L_{A90}	Negligible
L_{A90} + up to 5 dB	Minor
Measured L_{A90} + >5 dB to <10dB	Moderate
Measured L_{A90} + ≥10 dB	Major

The BS 4142 methodology is interpreted to mean that a difference between the background sound level and rating level of 5 dB equates to the LOAEL and a difference of 10 dB equates to the SOAEL. In accordance with BS 4142, a suitable operational noise limit is that the *rating level* does not exceed the *background sound level* by more than 5 dB, as this is the threshold at which adverse impacts are anticipated.

Operational noise effects may be considered significant depending on the margin by which the *rating level* of the specific sound source exceeds the *background sound level* and also the context in which the sound occurs. Magnitude of impacts described as moderate or major in **Table 10-9** may be considered significant, depending on the context.

10.4.2.7 Operational Traffic Noise

The operation of Rickman's Green Village may result in noise impacts in the short-term (i.e. immediately on opening) and in the long-term (once the development is complete and occupied). Short-term impacts will be calculated using the using the forecast traffic flows (18-hour AAWT) on opening year, compared with the baseline flows without Rickman's Green Village. Long-term impacts will be calculated using the using the forecast traffic flows once the development is fully occupied, compared with the without development flows. Opening year operational traffic noise impacts will be assessed using the criteria in **Table 10-5**. Long-term impact magnitude criteria for operational traffic (also taken from Table 3.17 of the DMRB), are displayed in **Table 10-10**.

Table 10-10: Magnitude Criteria for Long-term Road Traffic Noise Level Changes

Magnitude of impact	Increase in BNL of closest public road used for long-term traffic noise level changes (dB)
Major	≥5.0
Moderate	≥3.0 to <5.0
Minor	≥1.0 to <3.0
Negligible	<1.0

10.4.3 Effect Significance

Effect significance is determined by a combination of magnitude of impact and sensitivity of receptor, using the significance matrix provided in **Table 10-11**.

Table 10-11: Significance of effect matrix

		Magnitude of Impact			
Sensitivity		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

Typically, only moderate or major effects are considered significant and minor or neutral effects are not significant. However, professional judgement can also be used, details of this are provided in relation to each impact in **Section 10.4.2**.

10.5 Baseline Conditions

Consideration of the prevailing noise environment was initially conducted by undertaking a desk-based study of available geographical information (including aerial and satellite photography, mapping data and masterplans for the Rickman's Green Village) to identify the nearest NSRs and noise sources. The immediate surrounding area comprises agricultural land and residential dwellings.

From the desk-based study and consultation with CDC, the existing NSR locations outlined in **Table 10-12** were identified, as shown in **Figure 10-1.**

Table 10-12 Existing residential NSR locations

Receptor ID	X	Y	Description
NSR1	501088	129376	Crouchland House
NSR2	501186	129069	Laneland
NSR3	501651	129560	Redlands Farm
NSR4	501582	129839	Properties adjacent to Streeter's Farm
NSR5	501249	129670	Moore's Green Cottage
NSR6	501062	130263	Nuthurst Cottage
NSR7	500163	130038	Rumbolds Farm
NSR8	501668	129759	Orchard Cottage

10.5.1 Baseline Noise Survey Procedures

To establish the baseline conditions, unattended noise measurements were conducted at three locations from 23rd to 28th June 2022.

In addition, attended measurements were undertaken at five locations between 23rd and 24th June 2022. Attended measurement positions ST1 – ST3 and ST5 were used to measure baseline noise levels and identify the contributing noise sources which could impact upon the Rickman's Green Village development. Attended measurement position ST4 was located at the nearest residential properties to the proposed development boundary. The purpose of this location was to determine daytime noise levels and existing sources of noise at the closest existing receptors.

The following were observed to be the dominant noise sources on the proposed development site:

- agricultural activities (livestock, associated farm vehicles);
- road traffic noise from Rickman's Lane; and
- overhead aircraft likely associated with Gatwick Airport.

The measurement locations are detailed in **Table 10-13** and shown in **Figure 10-2.**

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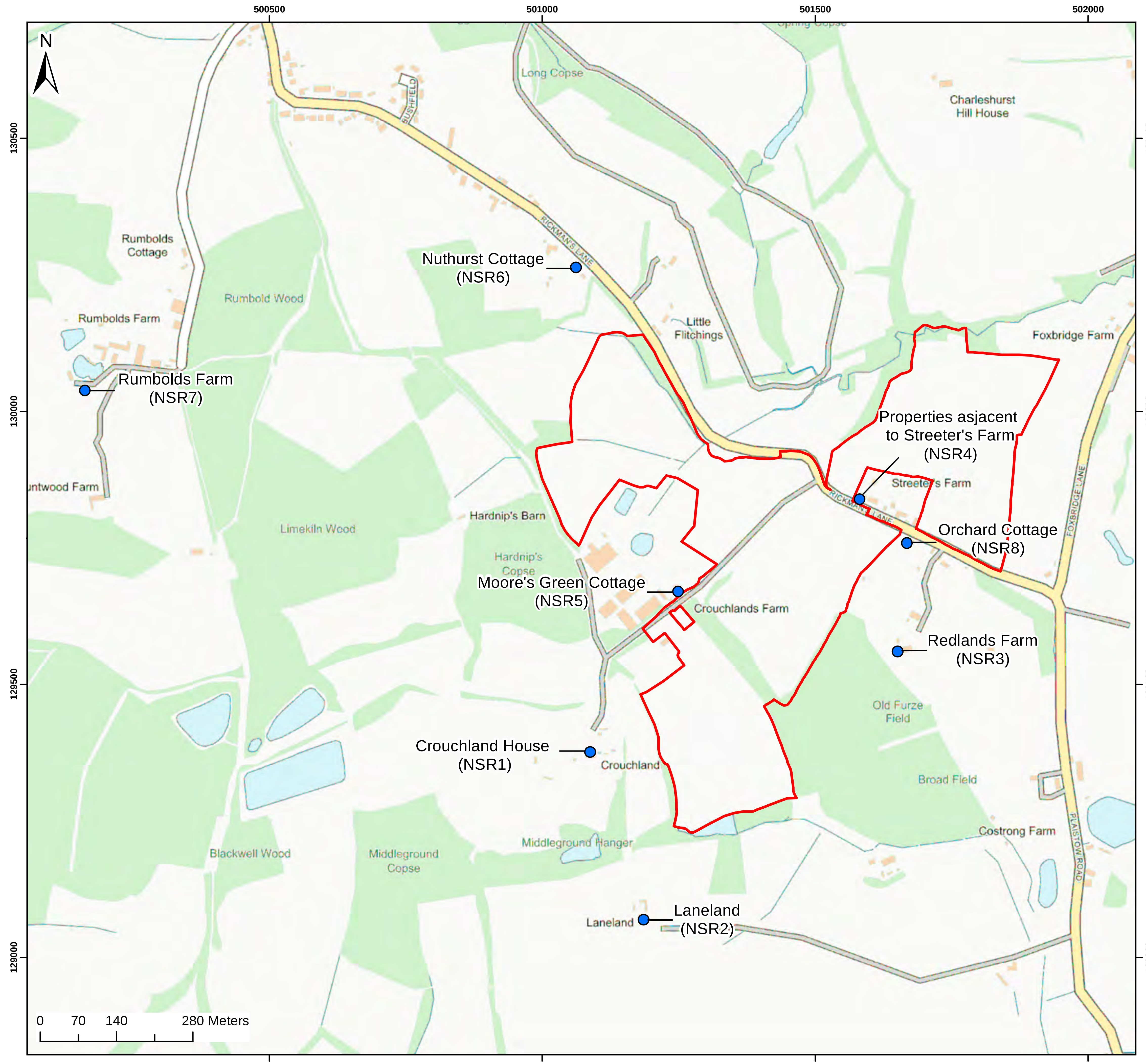

Legend:

Rickman's Green Village Combined Application Boundary

Residential NSR Locations

Source: © Haskoning DHV UK Ltd, 2022; Contains OS data © Crown copyright and database right, 2022. © OpenStreetMap (and) contributors, CC-BY-SA Contains OS data © Crown Copyright and database right 2022

Client:	Project:
Artemis Land and Agriculture Ltd.	Rickman's Green

Title:

Existing Residential NSR Locations

Figure:	10.1	Drawing No:	PC3820-RHD-ZZ-XX-DR-GS-0003		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
00	07/10/2022	ND	AG	A3	1:5,000

Co-ordinate system: British National Grid

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Legend:

- Development Location
- Unattended Noise Monitoring Position
- Attended Noise Monitoring Position

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Client:	Project:
Artemis Land and Agriculture Ltd.	Rickman's Green

Title:

Rickman's Green Proposed Noise Measurement Survey Positions

Figure:	10.2	Drawing No:	PC3820-RHD-ZZ-XX-DR-GS-0002		
Revision:	Date:	Drawn:	Checked:	Size:	Scale:
00	16/06/2022	JR	HM	A3	1:6,000

Co-ordinate system: British National Grid

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Table 10-13 Baseline noise survey locations

Measurement ID	Approximate Location Co-ordinates	Description
LT1	501531, 129638	Unattended measurement located between the proposed residential /school sites and Rickman's Lane.
LT2	501181, 129995	Unattended measurement to the north-west of the site (within the outline development boundary area).
LT3	501832, 129713	Unattended measurement to the east of the site, within the outline development boundary area east of Rickman's Lane. Approximately 23 m back from the closest edge of Rickman's Lane and therefore representative of the closest proposed properties to Rickman's Lane.
ST1	501356, 129663	Attended measurement to the south of the existing Crouchlands Farm buildings
ST2	501061, 129812	Attended measurement to the north of the existing Crouchlands Farm buildings
ST3	501464, 129906	Attended measurement within land parcel adjacent to Crouchlands Farm access road.
ST4	501586, 129835	Attended measurement along Rickman's Lane, north of residential properties facing Crouchlands Farm.
ST5	501906, 130076	Attended measurement to the east of Rickman's Lane, near Foxbridge Road

The noise measurements were undertaken using the instrumentation detailed in **Table 10-14**.

Table 10-14 Noise survey instrumentation

Instrument	Measurement Location	Type	Serial number
Sound Level Meter	Attended Measurements	Rion NL-52	00864982
Sound Level Meter	LT1	Rion NL-52	00864983
Sound Level Meter	LT2	Svantek SV-307	116173
Sound Level Meter	LT3	Svantek SV-307	116190
Calibrator	All	Rion NC-75	35081041

The sound level meters (SLMs) were calibrated within the last two years and the calibrators within the last 12 months. The SLMs satisfy the requirements for a 'Class 1' SLM as defined in BS EN 61672-1:2013 – *Electroacoustics – Sound level Meters Part 1: Specifications*[6].

The SLMs were set to record L_{Aeq}, L_{A90}, L_{A10} and L_{AFmax} data with a 'fast' time constant in contiguous 5-minute intervals. At LT2, LT3 and all attended measurement locations, sound pressure levels were also logged every 1s.

The noise measurements were conducted in accordance with the SLM mounted on a tripod at heights between 1.2m and 1.5m above ground level and 3.5m away from any reflecting surface other than the ground, i.e. in free-field conditions (as specified in BS 7445-2:1991 'Description and measurement of environmental noise — Part 2: Guide to the acquisition of data pertinent to land use'[7]).

[6] British Standards Institution (2013) BS EN 61672-1:2013 Electroacoustics - Sound level Meters Part 1: Specifications. BSI, London.
[7] British Standards Institution (1991) BS 7445-2: 1991 'Description and measurement of environmental noise — Part 2: Guide to the acquisition of data pertinent to land use'. BSI, London.

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Weather conditions (temperature, humidity, air pressure, average and gust wind speed and direction, and rainfall) were monitored throughout the unattended noise measurement using a weather station located near to LT1. The weather conditions were favourable for noise measurements (as specified in BS 7445-2) with wind speeds of less than 5m/s and one short period of very light rainfall; hence, all measured data has been used in the analysis.

The SLMs were calibrated on site immediately before and after the survey using the portable calibrator with a maximum drift of 0.1 dB noted. Additional measurement data, and the equipment calibration certificates from the baseline survey, are available on request.

10.5.2 Measured Baseline Noise Data

Measured baseline noise levels are presented in **Table 10-15** and **Table 10-16** for the unattended and attended measurement surveys, respectively.

Table 10-15 Unattended measurement summary

Measurement location	Start Date and Time (dd/mm/yy hh:mm)	End Date and Time (dd/mm/yy hh:mm)	Time Period	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	L_{A10}* (dB)	L_{A90}* (dB)
LT1	23/06/2022 15:25	28/06/2022 10:24	Daytime	47	77	47	34
			Night-time	41	72	34	21
LT2	23/06/2022 16:28	28/06/2022 09:38	Daytime	46	76	46	34
			Night-time	38	66	34	23
LT3	23/06/2022 17:49	28/06/2022 11:09	Daytime	53	80	50	33
			Night-time	45	77	34	22

* displayed as the arithmetic mean of the measured parameter over the indicated time period

Table 10-16 Attended measurement summary

Measurement location	Time Period	Date and Start Time	Duration (Minutes)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	L_{A10}* (dB)	L_{A90}* (dB)
ST1	Daytime	24/06/2022 13:15	15	44	63	48	34
	Evening	23/06/2022 19:35	15	45	65	43	27
	Night-time	24/06/2022 00:00	15	25	45	26	21
ST2	Daytime	24/06/2022 13:40	15	41	57	44	34
	Evening	23/06/2022 19:05	15	55	76	53	32
	Night-time	24/06/2022 00:50	15	32	51	35	23
ST3	Daytime	24/06/2022 12:20	15	48	62	49	35
	Evening	23/06/2022 20:05	15	45	65	48	27
	Night-time	24/06/2022 00:20	15	23	60	28	17
ST4	Daytime	24/06/2022 12:00	15	55	75	53	34
	Daytime	24/06/2022 12:55	15	57	77	56	35

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Measurement location	Time Period	Date and Start Time	Duration (Minutes)	$L_{Aeq,T}$ (dB)	L_{AFmax} (dB)	L_{A10}* (dB)	L_{A90}* (dB)
	Daytime	24/06/2022 14:05	15	55	78	53	37
ST5	Daytime	23/06/2022 18:10	15	39	53	42	29
	Evening	23/06/2022 20:40	15	32	48	35	26
	Night-time	23/06/2022 23:10	15	29	46	33	19

*calculated from the measured 1s levels

10.5.3 Background Sound Level Analysis

In order to assess potential noise impacts in accordance with BS 4142 the 'typical' existing background sound level, L_{A90}, has been determined. It is anticipated that any building services plant associated with the proposed school will only operate during the daytime. Therefore, only the daytime reference period is considered in the BS 4142 assessment.

Statistical analysis, including the arithmetic average, modal distribution and median are presented in **Table 10-17** for the daytime reference period. The lowest of these values has been used in the assessment to represent a reasonable worst-case.

Table 10-17 Background sound level statistical analysis

Measurement location	Period	Most repeated (mode) L_{A90} (dB)	Mean average L_{A90} (dB)	Median L_{A90} (dB)	L_{A90} used in assessment (dB)
LT1	Weekday daytime	38	34	35	34
	Weekend daytime	37	35	37	35
LT2	Weekday daytime	35	33	34	33
	Weekend daytime	39	35	37	35
LT3	Weekday daytime	33	33	34	33
	Weekend daytime	39	34	36	34

10.5.4 Maximum Noise Level (L_{AFmax}) Analysis

It is recommended in *ProPG: Planning and Noise* that the good acoustic design can be used so that individual noise events do not normally exceed 45 dB L_{AFmax} more than 10 times a night, when measured in bedrooms. Further analysis of the of maximum noise events measured during the survey was conducted to determine the L_{AFmax} which is not normally exceeded more than 10 times during the night. The ProPG does not state the time base to apply for this assessment; however, the Planning Noise Advice Document states that "*Consideration should be had to the influence of individual $L_{A\,max}$ levels which should be obtained by measurement using short 5 or 1 minute periods as agreed with the LPA.*"

At locations LT2 and LT3, the 1s measurement data were used to derive $L_{AFmax,1min}$ for this assessment. At LT1, the measured $L_{AFmax,5min}$ has been used.

Table 10-18 presents the number of times a given maximum noise level was measured during the unattended survey. The average number of times per night is also presented, as only whole numbers of events can occur, these have been rounded up to the next whole number.

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Table 10-18 Maximum noise level analysis

L_{AFmax} (dB)	Number of times this L_{AFmax} level was measured during the night over the survey duration			Number of times the measured night-time L_{AFmax} was at least this value over the survey duration			Average number of times per night the measured L_{AFmax} was at least this value		
	LT1	LT2	LT3	LT1	LT2	LT3	LT1	LT2	LT3
81	0	0	2	0	0	2	0	0	1
80	0	1	2	0	1	4	0	1	1
79	0	0	0	0	1	4	0	1	1
78	1	0	0	1	1	4	1	1	1
77	0	0	4	1	1	8	1	1	2
76	0	0	2	1	1	10	1	1	2
75	1	0	15	2	1	25	1	1	5
74	0	0	17	2	1	42	1	1	9
73	1	0	15	3	1	57	1	1	12
72	1	0	28	4	1	85	1	1	17
71	5	0	21	9	1	106	2	1	22
70	6	2	6	15	3	112	3	1	23
69	2	2	20	17	5	132	4	1	27
68	3	2	7	20	7	139	4	2	28
67	4	0	6	24	7	145	5	2	29
66	4	0	7	28	7	152	6	2	31
65	7	4	8	35	11	160	7	3	32
64	13	6	6	48	17	166	10	4	34
63	8	0	8	56	17	174	12	4	35
62	13	4	8	69	21	182	14	5	37
61	12	6	10	81	27	192	17	6	39
60	9	2	8	90	29	200	18	6	40

From **Table 10-18**, levels of 65 dB $L_{AFmax,5min}$, 60 dB $L_{Afmax,1min}$ and 74 dB $L_{AFmax,1min}$ are deemed unlikely to be exceed more than 10 times per night at LT1, LT2 and LT3 respectively; hence, these have been used in the subsequent assessment. The time-histories of the measured L_{AFmax} have been analysed and the elevated levels are observed to most commonly occur between 23:00 and 01:00 hrs and from 04:30 to 07:00 hrs. The sources of the elevated L_{AFmax} are likely to be a combination of occasional vehicles on Rickman's Lane and birdcall, in particular the dawn chorus (between 04:30 and 06:00 hrs).

10.6 Potential Environmental Effects During Construction – Development Scenario 1

10.6.1 Impact 1: Construction Noise

Noise associated with the construction of Phase 1 of the masterplan has the potential to impact upon nearby existing residential receptors. It is also possible that, depending on the eventual construction phasing, construction noise impacts could occur at residential receptors introduced by the development.

10.6.1.1 Receptor Sensitivity

The existing and proposed NSRs with the potential to be impacted by construction noise are all residential dwellings; hence, their sensitivity is high according to **Table 10-2**. The measured daytime baseline sound levels at all locations are below 60 dB(A); hence, the entire site is considered to fall into Category A according to the 'ABC' method in BS 5228-1. Hence, the applicable daytime construction noise Threshold Value is 65 dB L_{Aeq}.

10.6.1.2 Magnitude of Impact

The noise levels generated by construction activities and experienced by nearby NSRs, such as residential properties, depend upon several variables, the most important of which are:

- the noise generated by plant or equipment used on site, generally expressed as sound power levels;
- the periods of operation of the plant on the site, known as its 'on-time';
- the distance between the noise source and the receptor;
- the attenuation due to ground absorption, air absorption and barrier effects; and
- the existing noise environment and noise levels at the time of the works.

The main construction activities are described in **Section 3.1**. The worst-case impacts are most likely to occur during the proposed earthworks.

Construction activities are expected to take four months from the start of the works to first home completion date. During the construction period, noise impacts will vary significantly depending on the variables outlined above. When the works are close to sensitive receptors, there is the potential for some disturbance; however, this is likely to be relatively short-term. The redline boundary for Phase 1 of the Masterplan is shared with land belonging to existing residential properties, including those on the north side of Rickman's Lane (NSR4), Orchard Cottage (NSR8) and Moore's Green Cottage (NSR2). The minimum distance to the actual property at these locations is around 10 m.

Construction noise impacts will be controlled via a condition of planning consent which will require a CEMP to be produced. The CEMP shall include the proposed working hours and measures for controlling site noise, including the BPM and any further measures deemed necessary, as described in **Section 10.6.1.4**.

The LPA also has powers outside the planning process to control construction noise impacts under the CoPA as described in **Section 10.2.1.2**; hence, if complaints regarding construction noise levels are received, these can be dealt with using these powers.

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10.6.1.3 Effect Significance

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, construction noise effects are considered not significant.

10.6.1.4 Mitigation

The application of best practice measures through the implementation of the CEMP will minimise construction noise and vibration impacts. CoPA states that in determining whether Best Practicable Means has been employed, regard should be given to any relevant Code of Practice approved under Section 71 of CoPA. BS5228 has been approved as a Code of Practice by the Secretary of State under Section 71 of CoPA. Best practicable means (as adapted from BS 5228-1) therefore includes the following:

- modern plant should be selected which complies with the latest EC noise emission requirements;
- proper use of plant with respect to minimising noise and vibration emissions and regular maintenance. All vehicles and mechanical plant used for the purpose of the works should be fitted with effective exhaust silencers and should be maintained in good efficient working order;
- selection of inherently quiet plant where appropriate. Electrical plant items (as opposed to diesel powered plant items) should be used wherever practicable. All major compressors should be 'sound reduced' models fitted with properly lined and sealed acoustic covers which should be kept closed whenever the machines are in use. All ancillary pneumatic percussive tools should be fitted with mufflers or silencers of the type recommended by the manufacturers;
- machines in intermittent use should be shut down in the intervening periods between work or throttled down to a minimum;
- the loading and unloading of materials should take place away from residential properties, ideally in locations which are acoustically screened from nearby noise sensitive receptors;
- materials should be handled with care and be placed, not dropped. Materials should be delivered during normal working hours;
- all ancillary plant such as generators, compressors and pumps should be positioned to cause minimum noise disturbance, i.e. furthest from receptors or behind close boarded noise barriers. If necessary, acoustic enclosures should be provided and/or acoustic shielding;
- good community relations should be established and maintained throughout the construction process. This should include informing residents on progress and ensuring measures are put in place to minimise noise and vibration impacts.
- construction contractors should be obliged to adhere to the codes of practice for construction working and piling given in BS 5228 and the guidance given therein minimising noise and vibration emissions from the site;
- site operations and vehicle routes should be organised to minimise the need for reversing movements, and to take advantage of any natural acoustic screening present in the surrounding topography;
- no employees, subcontractors and persons employed on the site should cause unnecessary noise from their activities e.g. excessive 'revving' of vehicle engines, music from radios, shouting and general behaviour etc. All staff inductions at the site should include information on minimising noise and reminding them to be considerate of the nearby residents;
- measures should be put in place to ensure that employees know that minimisation of noise and vibration will be important at the site; and
- reference should be made to the Building Research Establishment, BRE 'Pollution Control' guidelines, Parts 1-5 (BRE, 2003).

10.6.1.5 Residual Effect

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, residual construction noise effects are considered not significant.

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10.6.2 Impact 2: Construction Vibration

10.6.2.1 Receptor Sensitivity

The existing and proposed NSRs with the potential to be impacted by construction noise are all residential dwellings; hence, their sensitivity is high according to **Table 10-2**.

10.6.2.2 Magnitude of Impact

Research by the Transport and Road Research Laboratory (Martin, 1977) found that the levels of groundborne vibration from tracked earth moving equipment (such as a bulldozer or excavator) are imperceptible to humans at a distance of approximately 20 m, and those generated by vehicles with rubber tyres (e.g. a heavy lorry or dump truck) would be imperceptible at more than 10 m from the haul road. Mobile plant may occasionally come within 10 or 20 m of an identified sensitive receptor; hence vibration may be perceptible but is highly unlikely to be of a magnitude that could cause complaint.

The only proposed construction activities associated with the potential to emit high levels of vibration are ground compaction and piling, if required. **Table 10-19** lists the minimum set-back distances at which the vibration level criteria relevant to the potential for human annoyance and cosmetic building damage (for transient vibration at a frequency of 4 Hz) may occur for this activity. Set back distances were derived using the calculation methods provided in BS 5228-2.

The calculations for impacts upon humans (i.e. PPV levels 0.3 to 10 $mm.s^{-1}$) assume a frequency independent vibration transfer function (level multiplied by 1.8) between outdoors and indoors, based upon measurements by Martin (1980) described in the TRRL report 'Ground vibrations from impact pile driving during road construction'[8].

Table 10-19 Predicted Distances at Which Vibration Levels May Occur

Activity	Set-back distance at which vibration level (PPV) occurs			
	0.3 $mm.s^{-1}$	1.0 $mm.s^{-1}$	10 $mm.s^{-1}$	15 $mm.s^{-1}$
Vibratory compaction (start-up)	123m*	48m	7.2m	2.8m
Vibratory compaction (steady state)	87m	38m	7.3m	3.2m
Impact piling	336m*	135m*	23m	11m
Vibratory piling	292m*	116m*	20m	9m
* equation only validated to a set-back distance of up to around 110m; hence, these values are only estimates				

The location of any compaction or piling works (if required) is not known at this stage. If these works are required and to be undertaken within the distances specified in **Table 10-19**, then mitigation is required.

As with the construction noise impacts, whether significant effects will occur due to the predicted moderate adverse effects depends on other factors, such as the duration of the works, which are not currently known. Such information will only be available once a construction contractor has been appointed to undertake the works and developed a construction schedule; therefore, the assessment is based on a worst-case scenario.

As with construction noise, vibration impacts will be controlled via a condition of planning consent which will require a CEMP to be produced. The CEMP shall include the proposed working hours and measures for

[8] *Martin D.J. (1980). Ground vibrations from impact pile driving during road construction. Transport and Road Research Laboratory, TRRL Supplementary Report 544. Crowthorne, UK.*

controlling site vibration, including the BPM and any further measures deemed necessary, as described in **Sections 10.6.1.4** and **10.6.2.4**.

The same powers available to LPA to control construction noise impacts under the CoPA are also relevant to construction vibration; hence, if complaints regarding construction vibration levels are received, these can be dealt with using these powers.

10.6.2.3 Effect Significance

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, construction vibration effects are considered not significant.

10.6.2.4 Mitigation

The CEMP will outline BPM for vibration mitigation including, but not limited to:

- using non-vibratory ground compaction methods at distances of 8m or less from a receptor;
- choosing alternative, lower impact equipment or methods wherever possible;
- scheduling the use of vibration-causing equipment to the least sensitive time of day;
- routing, operating or locating high vibration sources as far away from sensitive areas as possible;
- sequencing operations so that vibration-causing activities do not occur simultaneously;
- isolating the equipment causing the vibration on resilient mounts; and
- keeping equipment well maintained.

10.6.2.5 Residual Effect

Following the implementation of best practice measures, the residual construction vibration effects are expected to be not significant.

10.6.3 Impact 3: Construction Traffic

10.6.3.1 Receptor Sensitivity

The existing and proposed NSRs with the potential to be impacted by construction noise are all residential dwellings; hence, their sensitivity is high according to **Table 10-2**.

10.6.3.2 Magnitude of Impact

As discussed in **Section 10.1**, the assessment of road traffic noise impacts for the full and outline planning applications will be provided as a forthcoming Noise Addendum under separate cover. The methodology that will be used for the assessment has been set out but it is not possible to assess the magnitude of impact or effect significance at this stage.

10.6.3.3 Mitigation

Mitigation of road traffic noise impacts, if required, will relate to best practice traffic management, which will be described in the Construction Traffic Management Plan.

10.7 Potential Environmental Effects During Construction – Development Scenario 2

Phase 2 of the masterplan is seeking outline planning permission for the following options:

1. 412 homes and a two-form entry primary school; or
2. 492 homes with no primary school.

The potential worst-case construction phase impacts of Phase 2 of the masterplan are expected to occur if Option 1 is taken forwards; hence, the assessment has been based on this option.

10.7.1 Impact 1: Construction Noise

10.7.1.1 Receptor Sensitivity

The existing NSRs with the potential to be impacted by construction noise are all residential dwellings, whilst the proposed NSRs include residential dwellings and a school. All these receptors have a high sensitivity according to **Table 10-2**.

10.7.1.2 Magnitude of Impact

As with Phase 1 of the masterplan, the worst-case construction noise impacts are most likely to occur during the proposed earthworks. Construction activities are expected to take five months from the start of the works to first home completion date. When the works are close to sensitive receptors, there is the potential for some short-term disturbance. As with Phase 1 of the masterplan, the redline boundary for Phase 2 of the masterplan is shared with land belonging to existing residential properties, including NSR4 and NSR5. The minimum distance to the actual property at these locations is around 5 m.

The same discussion provided in **Section 10.6.1.2** regarding control of impacts using a CEMP and the availability of alternative powers under CoPA is applicable to construction noise impacts from Phase 2 of the masterplan.

10.7.1.3 Effect Significance

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, construction noise effects are considered not significant.

10.7.1.4 Mitigation

The same mitigation measures described in **Section 10.6.1.4** are applicable to mitigation of construction noise from Phase 2 of the masterplan.

10.7.1.5 Residual Effect

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, residual construction noise effects are considered not significant.

10.7.2 Impact 2: Construction Vibration

10.7.2.1 Receptor Sensitivity

The receptor sensitivity is high as per **Section 10.7.1.1**.

10.7.2.2 Magnitude of Impact

As with Phase 1 of the masterplan, vibration from mobile plant may occasionally be perceptible but is highly unlikely to be of a magnitude that could cause complaint. In addition, the same vibration causing activities and set back distances in **Table 10-19** are applicable. If these works are needed and to be undertaken within the distances specified in **Table 10-19**, then mitigation is required.

The same discussion provided in **Section 10.6.1.2** regarding control of impacts using a CEMP and the availability of alternative powers under CoPA is applicable to construction vibration impacts from Phase 2 of the masterplan.

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10.7.2.3 Effect Significance

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, construction vibration effects are considered not significant.

10.7.2.4 Mitigation

The mitigation methods outlined in **Section 10.6.2.4** are applicable to the control of vibration from Phase 2 of the masterplan.

10.7.2.5 Residual Effect

Following the implementation of best practice measures, the residual construction vibration effects are expected to be not significant.

10.7.3 Impact 3: Construction Traffic

As per **Section 10.6.3**, the significance of the impact of construction traffic noise due to Phase 2 of the masterplan will also be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm Whole Farm Plan.

10.8 Potential Environmental Effects During Construction – Development Scenario 3

Development Scenario 3 comprises Phases 1 and 2 of the masterplan, providing up to 600 homes or 520 homes and the opportunity for an educational facility.

10.8.1 Impact 1: Construction Noise

10.8.1.1 Receptor Sensitivity

As per Scenario 2, the existing NSRs are all residential dwellings, whilst the proposed NSRs include residential dwellings and a school, all of which have a high sensitivity to noise impacts.

10.8.1.2 Magnitude of Impact

As with Phases 1 and 2 of the masterplan, the worst-case construction noise impacts are most likely to occur during the proposed earthworks. The construction phase for Development Scenario 3 is longer than for Development Scenarios 1 or 2; however, the first home occupation date for Phase 1 of the masterplan (October 2025) is almost two years before Phase 2 of the masterplan construction works are predicted to start. The earthworks for each Phase would be undertaken prior to first home occupation and are therefore not anticipated to overlap; however, there is the potential for the noise from the Phase 2 of the masterplan earthworks to impact upon occupied NSRs introduced by Phase 1 of the masterplan.

As with Phases 1 and 2 of the masterplan, short-term disturbance is likely due to construction noise, when the works are close to sensitive receptors. The redline boundary for the combined application is shared with land belonging to existing residential properties, including those on the north side of Rickman's Lane, Orchard Cottage (on the south side of Rickman's Lane) and Crouchlands Farm. The minimum distance to the actual property at these locations is around 5 m.

The same discussion provided in **Section 10.6.1.2**, regarding control of impacts using a CEMP and the availability of alternative powers under CoPA, is applicable to construction noise impacts from Development Scenario 3.

10.8.1.3 Effect Significance

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, construction noise effects are considered not significant.

10.8.1.4 Mitigation

The same mitigation measures described in **Section 10.6.1.4** are applicable to mitigation of construction noise from the combined application.

10.8.1.5 Residual Effect

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, residual construction noise effects are considered not significant.

10.8.2 Impact 2: Construction Vibration

10.8.2.1 Receptor Sensitivity

The receptor sensitivity is high as per **Section 10.7.1.1**.

10.8.2.2 Magnitude of Impact

As with Phases 1 and 2 of the masterplan, vibration from mobile plant may occasionally be perceptible but is highly unlikely to be of a magnitude that could cause complaint. In addition, the same vibration causing activities and set back distances in **Table 10-19** are applicable. If these works are needed and to be undertaken within the distances specified in **Table 10-19**, then mitigation is required.

The same discussion provided in **Section 10.6.1.2** regarding control of impacts using a CEMP and the availability of alternative powers under CoPA is applicable to construction vibration impacts from Phase 2 of the masterplan.

10.8.2.3 Effect Significance

On the basis of the qualitative assessment outlined above, including an assumption that BPM is implemented, construction vibration effects are considered not significant.

10.8.2.4 Mitigation

The mitigation methods outlined in **Section 10.6.2.4** are applicable to the control of vibration from Phase 2 of the masterplan.

10.8.2.5 Residual Effect

Following the implementation of best practice measures, the residual construction vibration effects are expected to be not significant.

10.8.3 Impact 3: Construction Traffic

As per **Section 10.6.3**, the significance of the impact of construction traffic noise due to the combined application will also be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm Whole Farm Plan.

10.9 Potential Environmental Effects During Operation – Development Scenario 1

10.9.1 Impact 1: Site Suitability for Residential Development

Based on the measured L_{Aeq} during the site survey, at the area closest to Rickman's Lane the measurements at LT3 (representative of the proposed development's boundary closest to Rickman's Lane) indicate a low to negligible risk during the daytime and night-time periods. The measurements at LT1, which is representative of halfway across the proposed development area, indicates a negligible risk in terms of both daytime and night-time noise levels; however as shown in **Table 10-18,** the measured L_{AFmax} exceeded 60 dB more than 10 times per night at both locations; hence, this site cannot be negligible risk. Therefore, the proposed development area is considered as being of low noise risk during the daytime and night time periods.

ProPG states that *'At low noise levels, the site is likely to be acceptable from a noise perspective provided that a good acoustic design process is followed and demonstrated in an ADS* [Acoustic Design Statement] *which confirms how the adverse impacts of noise will be mitigated and minimised in the finished development'*

10.9.1.1 Internal Noise Assessment

Internal noise level calculations have been undertaken based on the simple calculation procedure in BS 8233. BS 8233 states that, when windows are open, the internal sound levels will be 15 dB below the external free-field level. When windows are closed, a closed double-glazed window and open trickle ventilators will provide a sound reduction of around 26 dB R_w. The calculated internal noise levels with windows closed and open are provided in **Table 10-20**.

Table 10-20 Indoor noise level calculation results

Reference Location	Daytime $L_{Aeq,16h}$ (dB)			Night-time $L_{Aeq,8h}$ (dB)			Night-time L_{AFmax} (dB)		
	Outdoor	Open Window	Closed Window	Outdoor	Open Window	Closed Window	Outdoor	Open Window	Closed Window
LT1	47	32	21	41	26	15	60	45	34
LT3	53	38	27	45	30	19	74	59	48

The worst-affected proposed properties are those closest to Rickman's Lane. At this location, the $L_{Aeq,T}$ noise levels with windows closed, during the daytime and night-time, will not exceed the internal noise criteria set out in BS 8233. With windows open, the daytime criterion is exceeded by 3 dB, but the night-time criterion is not. Internal daytime noise levels with windows open are expected to exceed the criterion of 35 dB $L_{Aeq,16h}$ at proposed properties which are no more than 45 m from Rickman's Lane. There are six proposed properties within this distance. At these locations, it will be necessary to close the windows to achieve appropriate internal daytime L_{Aeq} noise levels.

The night-time L_{AFmax} noise levels at the same location will exceed the internal noise criteria with windows closed, and so additional noise mitigation is required to achieve suitable internal maximum noise levels; however, only those properties closest to Rickman's Lane will require the highest level of mitigation, as the screening they will provide will decrease the noise levels away from Rickman's Lane, across the proposed development site.

10.9.1.2 External Noise Assessment

Disregarding the effect of any fencing, based on the measured free-field noise levels at LT1, the daytime external noise levels within the proposed development are below the desirable level of 50 dB $L_{Aeq,16h}$ in BS 8233.

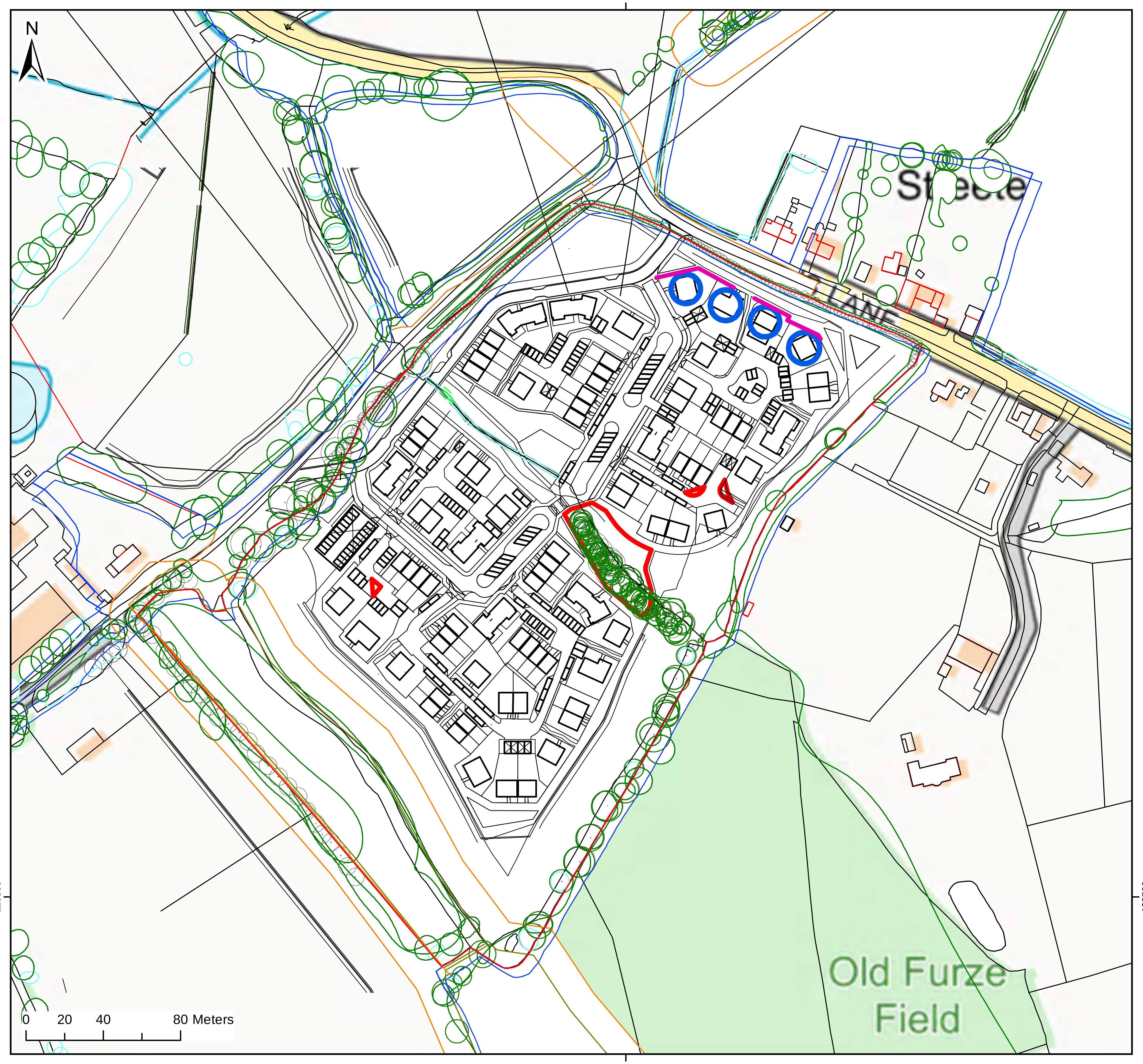
LT3 was around 23 m from the edge of Rickman's Lane, whereas the gardens of two of the proposed properties will only be around 16 m away and are not screened by the proposed building. This means that the outdoor L_{Aeq} noise levels in these locations will be around 2 dB higher than measured. Without screening, the daytime external noise levels in these worst-case gardens are expected to be around 55 dB $L_{Aeq,16h}$ which, according to BS 8233, is "*acceptable in noisier environments*". In those gardens which are less than 45 m from the road edge, the external noise levels are calculated to be less than 50 dB $L_{Aeq.}$ Three other proposed gardens are within this 45 m distance; however, these gardens are screened from the road by the proposed building. In this case, noise levels in the amenity area would be around 10 dB lower than measured i.e. below 50 dB $L_{Aeq,16h}$.

10.9.1.3 Mitigation

A good acoustic design process has been followed, comprising orientation of buildings so that windows to noise sensitive rooms face away from noise sources and/or are screened by less sensitive building elements. In addition, outdoor noise sensitive areas, such as rear gardens, have been located where possible such that proposed or existing buildings provide screening to identified noise sources.

Two gardens have been identified where, without screening, external daytime noise levels are expected to be around 55 dB $L_{Aeq,16h}$. At these locations (shown in **Figure 10-3**), it is proposed that the garden fence is upgraded. To provide effective mitigation, the amount of noise transmitted through the fence must be significantly less than what passes over the top (and round the edges). The effectiveness of a material to prevent the transmission of noise is determined by the thickness and surface density of the material used to construct the barrier. A minimum surface density of 15 kg/m^2 is recommended. Assuming timber fences are used, panels must be overlapping or close boarded with no air gaps between them or at the bottom. Sound 'leaks', due to holes, slits, cracks or gaps through or beneath a noise barrier can seriously reduce the barrier performance and must be avoided. With these fences in place, it is likely that the internal daytime noise levels with windows open would be reduced by around 5 dB i.e. compliant with the criterion in BS 8233.

Measurement location LT3 was approximately 23 m away from the edge of Rickman's Lane and the criterion of 45 dB L_{Amax} was exceeded by 3 dB. This means that, for the proposed dwellings with an unscreened view of Rickman's Lane which are less than 36 m from the road edge, the limit of 45 dB L_{Amax} is expected to be exceeded. There are four proposed properties on the northern edge of the site which meet these criteria, these are highlighted in **Figure 10-3**. At these dwellings, the glazing in the windows of the bedrooms facing Rickman's Lane will need to be upgraded. The approximate minimum performance of the glazing is 36 dB R_w; however, at this stage in the development design, sufficient information is not available to undertake detailed internal noise level calculations.



Legend:

Acoustic_Fencing

Upgraded Ventilation Locations

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Client:	Project:
Artemis Land and Agriculture Ltd.	Rickman's Green

Title:

Noise Mitigation Plan

Figure: 10.3	Drawing No: PC3820-RHD-ZZ-XX-DR-GS-0003

Revision:	Date:	Drawn:	Checked:	Size:	Scale:
00	10/10/2022	ND	AG	A3	1:5,000

Co-ordinate system: British National Grid

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10.9.1.4 Residual Effect

With the proposed mitigation (upgraded garden fencing), daytime noise levels in all outdoor amenity areas are likely to be below the desirable level of 50 dB $L_{Aeq,16h}$. Internal noise levels will also be below the adopted criteria. Windows will need to be closed in 6 of the proposed properties to achieve an internal daytime noise level not exceeding 35 dB L_{Aeq}; however, with windows open, the internal noise levels are only anticipated to exceed the daytime L_{Aeq} by 3 dB. BS 8233:2014 states that "*Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.*" Windows will need to be closed to achieve an internal night-time noise level not exceeding 45 dB L_{Amax}, and in four of the proposed properties, upgraded glazing has been recommended as mitigation.

According to the criteria from the NPSE in **Table 10-1**, the worst-case residual noise effects are considered to between the LOAEL and SOAEL, i.e. not significant. All reasonable measures have been adopted to minimise these effects, in compliance with the requirements of the NPSE.

10.9.2 Impact 2: Fixed Plant Operational Noise

No fixed plant is proposed as part of the operation of Phase 1 which could result in audible noise levels at existing or proposed NSRs. Hence, significant effects are not anticipated.

10.9.3 Impact 3: Road Traffic Noise

The significance of the impact of operational traffic noise due to Phase 1 of the Masterplan will be assessed in a Noise Addendum. This will include consideration of cumulative effects with CFWFP.

10.10 Potential Environmental Effects During Operation – Development Scenario 2

10.10.1 Impact 1: Site Suitability for Residential Development

Based on the measured L_{Aeq} during the site survey, the following conditions were ascertained:

- The area closest to Rickman's Lane the measurements at LT3 (representative of noise levels east of Rickman's Lane) indicate a low to negligible risk during the daytime and night-time periods.
- The measurements at LT1, which is representative of halfway between Rickman's Lane and the proposed development area, indicate a negligible risk in terms of both daytime and night-time noise levels.
- The noise levels measured at LT2, which represent the northern part of the proposed development area, also indicate a negligible risk in terms of both daytime and night-time noise levels.

As shown in **Table 10-18,** the measured L_{AFmax} exceeded 60 dB more than 10 times per night at all locations; hence, this site cannot be negligible risk. Therefore, the proposed development area is considered as being of low noise risk during the daytime and night time periods.

10.10.1.1 Internal Noise Assessment

The calculated internal noise levels with windows closed and open are provided in **Table 10-20**.

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Table 10-21 Indoor noise level calculation results

Reference Location	Daytime			Night-time L			Night-time L_{AFmax} (dB)		
	Outdoor	Open Window	Closed Window	Outdoor	Open Window	Closed Window	Outdoor	Open Window	Closed Window
LT1	47	32	21	41	26	15	60	45	34
LT2	46	31	20	38	23	12	65	50	39
LT3	53	38	27	45	30	19	74	59	48

The worst-affected proposed properties are those closest to Rickman's Lane. At this location, the $L_{Aeq,T}$ noise levels with windows closed, during the daytime and night-time, will not exceed the internal noise criteria set out in BS 8233. With windows open, the daytime criterion is exceeded by 3 dB, but the night-time criterion is not. Internal daytime noise levels with windows open are expected to exceed the criterion of 35 dB $L_{Aeq,16h}$ at proposed properties which are no more than 45 m from Rickman's Lane. There are six proposed properties within this distance. At these locations, it will be necessary to close the windows to achieve appropriate internal daytime L_{Aeq} noise levels.

The night-time L_{AFmax} noise levels at the same location will exceed the internal noise criteria with windows closed, and so additional noise mitigation is required to achieve suitable internal maximum noise levels; however, only those properties closest to Rickman's Lane will require the highest level of mitigation, as the screening they will provide will decrease the noise levels away from Rickman's Lane, across the proposed development site.

10.10.1.2 External Noise Assessment

Disregarding the effect of any fencing, based on the measured free-field noise levels at LT1 and LT2, the daytime external noise levels within the proposed development area are below the desirable level of 50 dB $L_{Aeq,16h}$ in BS 8233. At LT3, the daytime external noise levels at the closest approach of the proposed development area to Rickman's Lane are less than 55 dB $L_{Aeq,16h}$ which, according to BS 8233, is "*acceptable in noisier environments*"; however, it would be typical for the properties closest to Rickman's Lane to have a rear garden which is screened from the road by the building. In this case, noise levels in the amenity area would be around 10 dB lower than measured, i.e. below 50 dB $L_{Aeq,16h}$.

10.10.1.3 Mitigation

As per **Section 10.9.1.3**, a good acoustic design process shall be followed for the residential development. Where possible and required, outdoor noise sensitive areas shall be screened by the proposed building from the dominant noise source, this is likely to reduce noise levels from that source by around 10 dB.

Where necessary, the adverse impacts of noise will be mitigated and minimised using upgraded glazing and ventilation systems and barriers to provide screening from sources of noise (i.e. Rickman's Lane). The mitigation necessary will be determined once a finalised layout design is available.

Should barriers be required to achieve appropriate external noise levels in amenity areas, it is likely that the internal daytime noise levels with windows open in the relevant properties would be reduced by around 5 dB i.e. compliant with the criterion in BS 8233.

10.10.1.4 Residual Effect

The internal noise level assessment indicates that during the day and night-time the noise levels will meet the criteria set out in BS 8233; however, the night-time L_{AFMax} will exceed these criteria and will therefore require mitigation. Mitigation measures have been recommended which will allow these to be controlled to suitable levels, the final mitigation package will be determined once the design has been finalised.

The measured external noise levels are below the 55 dB $L_{Aeq,16h}$ upper guideline value in BS 8233. With the incorporation of good acoustic design principles, noise levels in outdoor amenity areas are likely to be below the desirable level of 50 dB $L_{Aeq,16h}$.

The worst-case residual noise effects are considered to between the LOAEL and SOAEL i.e. not significant. All reasonable measures have been adopted to minimise these effects, in compliance with the requirements of the NPSE.

10.10.2 Impact 2: Site Suitability for a School

At this stage it is not known whether a new school will be required or where in the indicated area (as shown **Figure 3-2**) it will be located. As the details of this will be confirmed by West Sussex County Council be at reserved matters stage, the assessment below is indicative and is to demonstrate site suitability for the general area. Once details of the massing of buildings and locations of external teaching areas are available, further assessment to confirm the findings below will be carried out.

Section 2.2 of the IOA guidance document "Acoustics of Schools: a design guide" states that:

"*For new schools, 60dB $L_{Aeq,30min}$ should be regarded as an upper limit for external noise at the boundary of external areas used for formal and informal outdoor teaching and recreation…where used for teaching, for example sports lessons, outdoor ambient noise levels have a significant impact on communication in an environment which is already acoustically less favourable than most classrooms. Noise levels in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55dB $L_{Aeq,30min}$ and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50dB $L_{Aeq,30min}$.*"

Using the measured $L_{Aeq,5min}$ at LT1 (closest measurement location to the proposed new school), sequential $L_{Aeq,30min}$ noise levels were calculated. The range of $L_{Aeq,30min}$ over a school day (08:00 – 17:00, Monday – Friday) was 52 to 41 dB.

This result demonstrates that the area is suitable for provision of a new school, and that there would be areas suitable for outdoor teaching.

10.10.3 Impact 3: Fixed Plant Operational Noise

If the school is incorporated into the development, noise from fixed plant has the potential to impact on existing or proposed NSRs. As the proposed development design is not sufficiently progressed, it has not been possible to predict plant noise levels; hence, suitable noise limits have been identified to avoid significant effects.

10.10.3.1 Receptor Sensitivity

The receptor sensitivity is high as per **Section 10.7.1.1**.

10.10.3.2 Magnitude of Impact

According to **Table 10-9**, worst-case minor magnitude operational plant noise impacts are predicted where the plant sound *rating level* is no more than 5 dB above the *background sound level.* On this basis, the following limits are proposed to the plant sound at existing or proposed residential NSRs in proximity to the measurement locations:

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- LT1: rating level not exceeding 39 dB $L_{Ar,1h}$ during the weekday daytime or 40 dB $L_{Ar,1h}$ during the weekend daytime
- LT2: rating level not exceeding 38 dB $L_{Ar,1h}$ during the weekday daytime or 40 dB $L_{Ar,1h}$ during the weekend daytime
- LT2: rating level not exceeding 38 dB $L_{Ar,1h}$ during the weekday daytime or 39 dB $L_{Ar,1h}$ during the weekend daytime

10.10.3.3 Effect Significance

It is proposed that fixed plant operational noise impacts shall be controlled via a condition of planning consent limiting the *rating level* of the fixed plant sound at the nearby NSRs, cumulative with any fixed plant noise from the Crouchlands Farm Whole Farm Plan, to no greater than the limits in **Section 10.10.3.2**. Assuming that this condition is complied with, the effect of the mechanical services noise impacts will be no worse than minor, i.e. not significant.

10.10.3.4 Mitigation

The noise of mechanical services is straightforward to mitigate using the following principal mitigation options which will be used as required by the designers to ensure the noise level limits are not exceeded:

- selection of quiet plant;
- select fans to operate as near as possible to rated peak efficiency when handling the required airflow and static pressure;
- design system layout to move noisy items (e.g. plant, air inlets and outlets) away from NVSRs and/or to introduce screening to NVSRs;
- design the system to minimise flow resistance and turbulence;
- install silencers in the ductwork system;
- install acoustic louvres or barriers; and
- vibration isolate all reciprocating and rotating equipment and ducts and pipes for at least the first 15m from vibration-isolated equipment.

10.10.3.5 Residual Effect

Residual operational plant noise effects will be not significant.

10.10.4 Impact 4: Road Traffic Noise

The significance of the impact of operational traffic noise due to Phase 2 of the masterplan will be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm Whole Farm Plan.

10.11 Potential Environmental Effects During Operation – Development Scenario 3

10.11.1 Impacts 1 and 2: Site Suitability

The site suitability for Phases 1 and 2 of the masterplan has been assessed under Development Scenarios 1 and 2. Scenario 3 does not change the site suitability for each Phase of the masterplan, as reported under Development Scenarios 1 and 2.

10.11.2 Impact 3: Fixed Plant Operational Noise

The potential impact of fixed plant operational noise under Development Scenario 3 is the same as that identified under Development Scenario 2, as described in **Section 10.10.3**; hence, effects will be not significant.

10.11.3 Impact 4: Road Traffic Noise

The significance of the potential impact of operational traffic noise due to the combined application will be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm Whole Farm Plan.

10.12 Summary

This Chapter has assessed the potential for Phases 1 and 2 of the masterplan and the combined Phases to result in significant noise and vibration effects during construction and operation.

The potential construction noise and vibration impacts of each phase were considered qualitatively, both separately and together, in accordance with BS5228. The earthworks stage is likely to generate the highest noise levels. Construction noise and vibration impacts will be controlled via a condition of planning consent requiring preparation of, and compliance with, a CEMP. Compliance with the CEMP will ensure that construction noise and vibration effects are not significant.

At this stage, the trip generation for the outline elements of Rickman's Green Village has not been finalised, and therefore the assessment of construction and operational road traffic noise impacts for the full and outline planning applications will be provided as a forthcoming Noise Addendum under separate cover. At this stage, the chapter sets out the methodology that will be used for the assessment.

The suitability of each of the proposed development sites (i.e. Phases 1 and 2 of the masterplan and the combined Phases) (i.e. residential and/or educational) has been assessed. The initial site noise risk assessment, in accordance with ProPG, concluded that most of the site is negligible risk; however, there are areas of the site that are low risk. Mitigation has been recommended which will ensure that internal and external noise levels are compliant with the requirements of BS 8233 (for residential development) and 'Acoustics of Schools: a design guide'.

Suitable noise limits have been identified to control noise from building services plant to within acceptable criteria. Consequently, operational plant noise is considered to be negligible (not significant).

The potential for cumulative noise and vibration effects of the Rickman's Green Village and the Crouchlands Farm Whole Farm Plan development have also been assessed (see **Section 14.3.2**).

If the construction schedules of the two developments overlap, it will be necessary for the relevant contractors to liaise to minimise the potential for noisy works to be conducted in similar locations at similar times. It is not anticipated that there would be significant cumulative effects associated with construction phase noise and vibration impacts from Rickman's Green Village and the Crouchlands Farm Whole Farm Plan development.

The potential for cumulative effects on the suitability of the sites for Rickman's Green Village have also been determined (see **Section 14.3.2**). The operational phase noise sources of the Crouchlands Farm Whole Farm Plan have been identified and, where sufficient details are available, their impact on the NSRs introduced by Rickman's Green Village have been assessed. The assessed noise sources are the equestrian centre loudspeakers, building services plant and road traffic. Significant cumulative noise effects with the Crouchlands Farm Whole Farm Plan and the site suitability of Rickman's Green Village are not anticipated.

There is potential for cumulative effects to arise as a result of mechanical services plant noise generated by the Crouchlands Farm Whole Farm Plan (see **Section 14.3.2**); hence, cumulative limits for the building services plant noise levels associated with the proposed school and the Crouchlands Farm Whole Farm Plan have been identified. Assuming that these limits are complied with, the cumulative noise effects will be not significant.

11 Nature Conservation and Biodiversity

11.1 Introduction

This Chapter of the ES considers the likely effects of Rickman's Green Village with respect to Nature and Conservation and Biodiversity, and how this could affect existing habitats and the protected/notable species supported by them. It describes the methods used to assess potential effects, the baseline conditions currently existing within the Rickman's Green Village footprint and surrounding area. The mitigation measures required to avoid/prevent or reduce any significant adverse effects are presented together with the likely residual effects after these measures have been adopted. Finally, where applicable, mitigation measures are detailed to off-set any residual significant adverse effects.

This chapter is supported by the following reports:

- P2645. EcIA, Rickman's Green Village (Ecology Co-op, 2022a)
- Crouchlands Farm. Bat trapping, Radio-tagging and Roost Count Survey report (Ecology Co-op, 2022c).
- Biodiversity Net Gain Report (Ecology Co-op 2022d).

11.2 Legislation, Planning Policy and Guidance

11.2.1 Legislation

The legal protection applying to relevant bird, mammal, herpetofauna and invertebrate species, and current nature conservation planning policy used to steer this assessment includes:

- The 'Birds Directive', 'Habitats Directive' and 'Natura 2000 Sites';
- The 'Habitats Regulations' (2017) as amended;
- Wildlife and Countryside Act (1981) as amended;
- Natural Environment and Rural Communities (NERC) Act (2006);
- Protection of Badgers Act (1992);
- UK Post-2010 Biodiversity Framework;
- Birds of Conservation Concern (BoCC); and
- Environment Act 2021.

11.2.2 Planning Policy and Guidance

11.2.2.1 National Planning Policy Framework

The NPPF sets out the Government's view on how planners should balance nature conservation with development and helps ensure that Government meets its biodiversity commitments with regards to the operation of the planning system.

Paragraph 174d, states that council policies and decisions should:

- "*contribute to and enhance the natural and local environment by: minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures*".

Paragraph 179b, states that local plans should:

- "*promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection and recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity*".

Paragraph 180d states that when determining planning applications:

- "*development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to improve biodiversity in and around developments should be integrated as part of their design, especially where this can secure measurable net gains for biodiversity or enhance public access to nature where this is appropriate*".

Circular 06/2005 provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

In accordance with the NPPF, it is important that developments should contribute to local policies that enhance the natural environment by:

- minimising impacts on existing biodiversity and habitats and designated features;
- establishing coherent ecological networks that are more resilient to current and future pressures; and
- providing net gains in biodiversity and habitats, wherever possible.

11.2.2.2 Chichester District Council Local Plan 2014–2029

Table 11-1: Chichester District Council Local Plan 2014 - 2019

Policy Number/Title	Policy Summary
Policy 40 - Sustainable design and construction	The developer must evidence for dwellings and non-domestic buildings, that the development will protect and enhance the natural environment. The natural environment/biodiversity will be protected and where appropriate provisions should be made for green infrastructure and biodiversity areas.
Policy 45 -Development in the countryside	Outside settlement boundaries, development will be granted if it is small-scale and locally needed or cannot be added to existing settlements.
Policy 49 - Biodiversity	Planning permission will be granted where it is demonstrated that: the biodiversity of the site is safeguarded, damage to protected species and habitats is mitigated, the proposal has incorporated features that enhance biodiversity as part of a good design and sustainable development, it enhances and manages the District's network of ecology, biodiversity and geological sites and the corridors which connect them.

11.3 Consultation

11.4 Assessment Methodology

Chapter 5 Approach to EIA provides a summary of the general impact assessment methodology applied to Rickman's Green Village. The following sections confirm the methodology used to assess the potential impacts on ecology.

The following sections describe the methods used in the desk study and protected species/habitat surveys. All survey methods are in accordance with current best practice guidance for the respective species/taxonomic group and any limitations encountered during the survey are explained in **Section 11.5.11.**

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11.4.1 Impact Assessment Methodology and Mitigation

The assessment of ecological impacts and mitigation recommendations in this report follow CIEEM Guidelines for Ecological Impact Assessment (EcIA). This involves evaluating the importance of an 'ecological feature' (habitat, vegetation community, population of a single species or assemblages of species) in terms of nature conservation priority, followed by the application of the 'mitigation hierarchy'.

11.4.1.1 Importance of Ecological Features

A level of importance was assigned to all existing ecological features through consideration of the rarity and distribution of a habitat or species, the population size, ecological function and trends (declining/expanding), together with any designations, legal status, or conservation policies. CIEEM recommend that the importance of an ecological feature, in terms of nature conservation priority, should be considered within a defined geographical context:

- international and European;
- national;
- regional;
- county;
- local or parish; and
- site/negligible.

Where protected species are present and there is the potential for a breach of the legislation as a result of the development proposals, those species are considered as 'important' features and included in the EcIA. However, the level of importance assigned to the affected population of a protected species will vary depending on contextual information about the population size, distribution, abundance and trends across the range of geographical scales.

Similarly, irreplaceable habitats such as ancient broadleaved woodland are considered as important features and included in the EcIA. The level of importance will vary depending on the size of the habitat parcel, its condition, distribution and abundance at different geographical scales.

Features that are considered to be important at site level only or are of negligible importance (such as paved ground) are excluded from this EcIA and it should be reasonable to assume that if a feature is not mentioned, it is not ecologically important.

11.4.1.2 Significance of Effects

In accordance with the ES (**Section 5.6.6**), the significance established using the CIEEM criteria has been equated with the following categories:

- Major Beneficial: the effect is of a magnitude likely to permanently benefit a nationally/internationally valued ecological receptor;
- Moderate Beneficial: the effect is of a magnitude likely to permanently benefit a borough/metropolitan and/or locally valued ecological receptor;
- Minor Beneficial: the effect is of a magnitude likely to benefit a borough/metropolitan and/or locally valued ecological receptor, but there will be no permanent effect on its integrity/conservation status;
- Negligible: no significant effects to any receptor, or significant effects to receptors valued only in the immediate vicinity;
- Minor Adverse: the effect is of a magnitude likely to be adverse to a borough/metropolitan and/or locally valued ecological receptor, but there will be no permanent effect on its integrity/conservation status;

- Moderate Adverse: the effect is of a magnitude likely to be adverse to a borough/metropolitan and/or locally valued ecological receptor permanently affecting its integrity; and
- Major Adverse: the effect is of a magnitude likely to be adverse to a nationally/internationally valued ecological receptor.

11.4.1.3 The Mitigation Hierarchy

The assessment of the significance of an effect is made initially in the absence of mitigation. This is followed by a sequential process of determining the most appropriate way to remove or minimise significant effects. The preferred option is to avoid impacts in the first place, for example by redesigning the scheme to retain an important area of habitat, or timing works sensitively. Mitigation measures such as translocation or displacement of populations is only applied as a last resort where significant effects are unavoidable.

When residual significant adverse effects remain after all practicable measures to avoid and/or minimise these have been applied, compensation measures are required. Compensation measures include habitat creation in alternative locations that offset unavoidable habitat loss.

Finally, enhancements are proposed that do not relate to a specific impact and effect but provide net gains in biodiversity – taking advantage of opportunities in the design and operation of the development. These measures are intended to ensure that the Proposed Development contributes towards national and local biodiversity objectives.

11.4.2 Desk Studies

A search for pre-existing records of protected species, priority species for conservation and invasive non-native species was requested from the Sussex Biodiversity Records Centre (SxBRC) within a radius of 2 km of Crouchlands Farm.

A search of on-line mapping resources was undertaken to identify the location of any features of potential ecological interest including ponds within 500 m (relevant to great crested newts *Triturus cristatus*), watercourses (relevant to riparian mammals and crayfish, for example) and connectivity to woodland, scrub, and hedgerow networks (relevant to bats and dormice *Muscardinus avellanarius*, for example) in the wider landscape around the site. The connectivity of the site to these features, buildings and other semi-natural habitats are also relevant to species such as bats, great crested newts and reptiles.

The MAGIC website resource (www.magic.gov.uk) was used to identify the location of designated sites for nature conservation and European Protected Species (EPS) licences granted in relation to the survey site.

11.4.3 Habitat Survey

A site walkover survey was undertaken on 14 June 2022, during which the habitats contained within the site were described and evaluated in accordance with standard UK Habitat Classification (UKHab)[9]. The dominant species and indicators of important habitat types, such as ancient woodland or unimproved grassland, were recorded.

UKHab survey presents a standardised system for classifying and mapping wildlife habitats in all parts of Great Britain, including urban areas. The aim of the survey is to provide, relatively rapidly, a record of the vegetation and wildlife habitats present over large areas of countryside. The habitat classification is based principally on vegetation, augmented by reference to topographic and substrate features, particularly where vegetation is not the dominant component of the habitat.

[9] *The UK Habitat Classification Working Group (2018) The UK Habitat Classification User Manual at http://ecountability.co.uk/ukhabworkinggroup-ukhab*

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Data was gathered through a site walkover survey and use of on-line aerial photography to broadly categorise the habitats present using the UKHab classifications[10]. The results are presented as a map showing the distribution of habitat categories across the site. Target notes are used to describe specific features of biodiversity interest and record indicator species where appropriate. In addition to this, notable habitats, such as habitats listed under the NERC Act, 2006, are highlighted.

The UKHab methodology is a recognised tool for initial scoping of potential ecological constraints and opportunities, and for identifying potential effects of the proposed development as part of the planning application process.

As part of the Preliminary Ecological Appraisal, the site features were evaluated for their potential to support legally protected species and observations of any important plant communities, bird assemblages or other potentially valuable ecological features were recorded. Details of the preliminary survey methods for each legally protected species are given below. Any specific limitations to the survey(s), such as access constraints, are set out in **Section 11.5.11**.

11.4.4 Badgers

Badgers *Meles meles* tend to live in family groups with clearly defined territories with the main sett, used throughout the year, as a focal point. The territory often also contains a number of ‘annex’, ‘subsidiary’ and outlier setts that are used intermittently. Badgers can exist in a variety of habitats, but a mixed farmland landscape containing pasture and arable land, studded with woodland, scrub and hedgerows support the highest population density. Evidence of badger activity was recorded during the phase 2 survey, during which surveyors searched for badger setts, latrines, foraging marks, footprints and worn pathways, and trapped hairs on fences, with special attention paid to linear features.

11.4.5 Bats

There are 18 species of bat resident in the UK, each with their own specific habitat requirements. Bats can use a wide range of features for roosting purposes including loft spaces, cavity walls, loose tiles, mortice joints and cracks/gaps in a variety of built structures. They can also be found in trees with holes, splits, cracks, cavities, ivy and loose bark. Bats are generally active at night and utilise a wide range of habitats for foraging and commuting between roost sites, hibernation sites and foraging habitats. Linear features such as hedgerows, woodland edges, even fences can be important for navigation between roosting and foraging habitats.

11.4.5.1 Natural Roost Features – Trees

All trees likely to be affected directly or indirectly by Rickman’s Green Village were subject to a ground-based visual inspection to identify potential roost features, followed by climbing inspections where necessary and safe, to look for evidence of roosting bats and to further assess the suitability of the feature. Each tree/feature was categorised for its potential to support roosting bats as shown in **Table 11-2. Characterising potential roost features in trees**in accordance with best practice guidance[11].

[10] *UK Habitat Classification Working Group (2018). UK Habitat Classification – Habitat Definitions V1.0 at http://ecountability.co.uk/ukhabworkinggroup-ukhab*
[11] *Collins, J.(ed.) (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edn). The Bat Conservation Trust, London.*

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Table 11-2. Characterising potential roost features in trees

Category	Description
Negligible	A tree with negligible habitat features likely to be used by bats.
Moderate	A tree with one or more potential roost sites that could be used by bats due to their size, condition, and surrounding habitat, but unlikely to support a roost of high conservation status such as a maternity or hibernation roost.
High	Trees with one or more potential roost sites that appear suitable for large numbers of bats or use as maternity or hibernation roosts.

11.4.5.2 Trapping

Two trapping surveys for bats were carried out by Temple Group. The first between the 26 May and 28 May 2022 and the second between the 26 July and 28 July 2022 at the proposed development site and surrounding area, to ascertain which bat species the site supports and the breeding status of any individuals present.

A site walkover was first conducted during the day in order for surveyors to familiarise themselves with the site and establish which areas within the site were likely to have the greatest suitability for foraging and commuting bats based upon habitat value.

The trapping surveys were carried out across the site, using harp traps and mist nets. The locations were selected based on habitats of value to bats within and adjacent to the proposed development site, the details of which are outlined within Crouchlands Farm. Bat trapping, Radio-tagging and Roost Count Survey report (Ecology Co-op, 2022c).

Harp traps were set up at each location and were fitted with a sonic lure (Sussex Autobat or Binary Acoustic Technology AT100) that produced simulations of a variety of bat social calls, to increase the likelihood of trapping bats. The trapping commenced from dusk to just before dawn and lasted for between four and six hours on each survey night.

The bats caught in the harp traps were removed from the traps and transferred to a clean cloth bag. At the end of each trapping session the biometric information was obtained from all bats caught. Biometric data collection included sex of the bat, the reproductive status and any key measurements to help confirm species identity.

All bats were released immediately after processing, in close proximity to the site of capture, during the hours of darkness.

11.4.5.3 Radiotracking

In order to identify the location of maternity colonies of bats and rare or possible tree roosting bats, radiotracking was undertaken by Temple at the proposed development site.

Radio tags (LB-2X Holohill transmitters) were fixed to bats between the shoulder blades from which fur had been clipped. Radio telemetry was then used in the daytime to track the bat location and identify day roosts where possible. Full night tracking was not conducted as part of this project.

Once roost locations had been identified, if they were accessible and suitable, emergence surveys were conducted using professional night vision cameras and infrared (IR) illuminators, or thermal imaging cameras, to accurately identify and record bats emerging. This allows for a roost count, which can indicate colony size and roost characterisation.

11.4.5.4 Roost Monitoring – Bat Emergence Survey

As a result of the trapping/radiotracking effort, where a significant bat roost was identified within a tree located within the immediate surroundings of the proposed development site, an emergence survey was undertaken. One or more dusk emergence surveys were undertaken in accordance with guidance set out in the best practice guidelines prepared by the Bat Conservation Trust[5].

The survey utilised surveyors and night-vision or thermal imaging cameras as necessary to obtain accurate roost counts. The surveyor recorded any bat activity around the roost feature previously identified. The surveyors used full spectrum handheld bat detectors to identify species through call frequencies. The bat calls were logged and recorded as sonograms for later confirmation of species where necessary.

11.4.5.5 Bat Activity Surveys – Walked Transects

A series of bat activity surveys were undertaken within the proposed development site; activity surveys followed best practice guidelines[6]. Pre-determined transect routes were followed by surveyors, focusing on linear features within the site boundary (tree lines, woodland edge and hedgerows). The transect routes were walked at a slow pace during the period from sunset up to two hours after sunset by a team of surveyors, such that each part of the route was passed approximately 45 minutes. All surveys were undertaken during weather conditions suitable for bat activity and at ambient temperatures above 10 °C. The surveyors recorded bat activity using 'Echo Meter Touch' bat detectors featuring auto-identification of bat species and automatically triggered recording for later review. The locations of all bat 'registrations' were recorded onto a field map during the survey to correspond with all sound recordings. The transect routes with stops are detailed in Figure 4a of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

11.4.5.6 Bat Activity Surveys – Static Detector Deployment

Five Elekon Batlogger A static bat detectors were deployed across Crouchlands Farm on six occasions from August 2021–September 2022 (the majority of the site being surveyed August 2021–July 2022) and left in the field for a minimum of five days: the expected maximum lifetime of the battery. Static bat detectors comprise a passive recording device with real-time full-spectrum calls that can be viewed in detail once downloaded on analysis software, allowing accurate identification of most bat calls to species level (or genus level in the case of *Myotis* and *Plecotus* spp.).

The datasets collected by the static bat detectors were interpreted using ECOBAT[12]– an online resource, which is used to interpret static detector data by calculating percentiles through comparison of the data with a national database of bat activity data. Levels of bat activity were qualified according to Table 11-3 The positions of the static detectors deployed at Crouchlands Farm are shown in Figure 4b of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

Table 11-3. Qualification of bat activity levels detected by static bat detectors and using ECOBAT outputs.

Bat activity level	Bat passes/night (median percentile range)
Low	0 - 20th Percentile
Low–moderate	21st – 40th Percentiles
Moderate	41st – 60th Percentiles
Moderate–high	61st – 80th Percentiles
High	81st – 100th Percentiles

[1212] *http://www.ecobat.org.uk*

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11.4.6 Breeding Birds

The methodology used for the breeding bird survey was adapted from a methodology developed by the Bird Survey and Assessment Steering Group (RSK Biocensus)[13]. This methodology requires six visits spread evenly between late-March and early-July. The surveys should be carried out approximately 30 minutes before sunrise through to mid-morning (10 am to 11 am). At least one of these visits should be in the evening, extending past sunset. All bird surveys were only undertaken during favourable weather conditions for bird activity, with periods of persistent or heavy rain, high winds or fog avoided.

A pre-determined transect (see Figure 5 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a)) was walked on each visit, during which the observer recorded all birds encountered. As recommended in the guidelines, the transect route was walked at a constant slow pace by a competent bird surveyor, stopping to check any priority habitat/features and causing minimum disturbance, recording all birds detected either by sight or calls/song. Notes regarding the behaviour of birds identified were made to determine their breeding status. Birds were said to be 'confirmed as breeding' if they were observed carrying nesting material, food or faecal pellets; or nests, eggs, or recently fledged young were discovered. Birds were recorded as 'likely breeding' if observed singing or displaying, repeatedly visiting the same locations, and showing agitated or distraction behaviour. Each bird 'registration' was recorded on a field map of the survey site using standard BTO Common Birds Census (CBC) notation[14], which includes behaviours and flight movements – new standards. A note was also made of the start and end time, sunrise/sunset time, temperature, wind (Beaufort scale) and precipitation levels.

11.4.7 Common Dormouse

Common dormice are typically associated with broadleaved woodland habitat, hedgerows and scrub. They tend to occur at low density and good habitat connectivity is important. Common dormice need a constant supply of food throughout the active season over a large home range. A diversity of tree and shrub species will provide a range of fruit, nuts and insects. They hibernate during the winter – typically at ground level amongst leaf litter and mosses protected by coppice stools, tree stumps or piles of brash wood.

Dormouse surveys are undertaken by attaching purpose built 'nest tubes' on trees and shrubs in suitable habitat such as woodland, scrub and hedgerows. Nest tubes are used by dormice as places of shelter and they will often construct their nests within them during their periods of activity (typically between April and November). In accordance with current best practice guidelines[15], 75 nest tubes were deployed approximately 20 m apart in hedgerows and on the edge of woodland copses, with 50 deloyed on the 20 July 2021 and a further 25 deployed on the 13 April 2022 and left *in situ* for the survey season (see Figure 6 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a)).

These were checked on a monthly basis for presence of animals and evidence of dormouse presence (distinctively woven nests) from August 2021 and are scheduled to finish October 2022. Since the likelihood of use by dormice varies through the year, an index of probability score is used to determine confidence in a particular survey (see **Table 11-4**) comprising checks over several months. A minimum score of 21 is accepted to establish 'likely absence' in the event that no signs of dormice are found during the survey.

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[13] https://birdsurveyguidelines.org/methods/survey-method/
[14] https://www.bto.org/sites/default/files/u16/downloads/forms_instructions/bto_bird_species_codes.pdf
[15] Bright, B., Morris, P., Mitchell-Jones, A.J. and Mitchell-Jones, T (1997) The Dormouse Conservation Handbook. English Nature.

Table 11-4. Search effort score for each month that dormouse tubes are output the site and subject to checks for occupation.

Month of check	Index of probability
April	1
May	4
June	2
July	2
August	5
September	7
October	2
November	2

Dormouse checks were undertaken in the mornings and commenced one month after the nest-tubes were positioned. Surveys were undertaken under the supervision of licensed surveyor (licence no.: 2016-21456-CLS-CLS), Paul Whitby, BSc, MCIEEM, CEcol.

11.4.8 Great Crested Newts

Great crested newts *Triturus cristatus* require ponds for breeding that meet a series of habitat criteria including good quality water, aquatic plants and an absence of predatory fish. The ponds must have good connectivity to semi-natural terrestrial habitats that provide their invertebrate food sources and suitable safe places to rest and hibernate outside the breeding season. Great crested newts tend to occur more frequently in areas of high pond density across the landscape in 'metapopulations' where habitat occupancy ebbs and flows according to changes in conditions.

11.4.8.1 Habitat Suitability Assessment

The proposed development site contains one pond within the boundary. The desk study further revealed thirteen waterbodies within 250 m and six within 500 m of the site boundary. Where ponds were visible from public rights of way or access permission was granted, they were assessed for their potential to support great crested newts using the Habitat Suitability Index (HSI) (Oldham *et al* 2000)[16].

Ponds within 250 m of the site's boundaries, were carried forward for Environmental DNA (eDNA) sampling and/or presence/likely absence surveys where access was possible. Further information about ponds located between 250 m and 500 m was sought to help establish a wider understanding of populations but were largely discounted for having high-quality terrestrial habitat adjacent or within close vicinity to the pond.

11.4.8.2 Environmental DNA Sampling Analysis

This relatively new technique allows a quick and reliable qualitative measure of the presence/likely absence of great crested newts. It involves collection of water samples from a pond, using a standard protocol set out by Natural England[17]. The samples are sent to an approved laboratory to isolate and determine presence of eDNA shed into the water by amphibians during the breeding season. eDNA samples were taken in April 2021 and April 2022.

Ponds that were confirmed as positive for great crested newt eDNA were then carried forward to full field survey (population size-class assessment).

[16] Oldham, R.S., Keeble, J., Swan, M.J.S. and Jeffcote, M. (2000). Evaluating the suitability of habitat for the great crested newt (Triturus cristatus). Herpetological Journal 10, 143-155.
[17] Biggs J, Ewald N, Valentini A, Gaboriaud C, Griffiths RA, Foster J, Wilkinson J, Arnett A, Williams P and Dunn F 2014. Analytical and methodological development for improved surveillance of the Great Crested Newt. Defra Project WC1067. Freshwater Habitats Trust: Oxford.

11.4.8.3 Population Size-class Assessment

The survey methodology followed standard guidance for great crested newts[18]. Four survey visits were undertaken initially, using a combination of bottle-trapping, torchlight searching and egg searching during each survey visit. All surveys were undertaken during weather conditions suitable for great crested newts – above the minimum temperature of 5 °C – and at least two of the survey visits were undertaken during the 'peak activity period' for breeding great crested newts (i.e. between 15 April and 15 May). Weather conditions, temperature and pond turbidity was recorded during each survey visit. If great crested newts were confirmed present by either of the above methods at a given pond, the field survey was extended to six separate visits to allow the population size to be assigned to one of the following population classes[18]:

- 'Small' – peak count of 1–10
- 'Medium' – peak count of 11–100
- 'Large' – peak count of >100

11.4.9 Reptiles

Standard reptile presence/likely absence surveys involve setting out artificial refugia (reptile 'mats' or 'tins') in potentially suitable habitat. Reptile mats are pieces of roofing bitumen felt and reptile tins are pieces of corrugated metal sheet approximately 1 m x 0.5 m in size, which absorb heat from the sun more rapidly than the surrounding vegetation and provide cover and basking places attractive to reptiles. These are then checked for presence of animals under suitable weather conditions. They are placed in areas of potentially suitable habitat approximately 20 m apart along linear features. There are no up-to-date best practice guidelines for reptile surveys, but a minimum of seven survey visits under suitable weather conditions is generally considered to be adequate when determining their presence/likely absence, and 15–20 visits are used to calculate a 'peak count' for population size class assessment.

A total of 80 roofing felt mats were used in this survey and the approximate location of mats is shown in Figure 7 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a). The mats were left *in situ* for a minimum of one week to 'bed in' and allow reptiles to locate them before the first check. The mats were checked at least seven times over the period April– July 2022. All observations of reptiles were recorded, together with the weather conditions, temperature, and time of day.

11.4.10 Other Notable Species

The site's habitats were broadly assessed for their potential to support species of principal importance for nature conservation (Section 41 NERC Act 2006) and other notable species. This includes mammals such as harvest mouse *Micromys minutus*, hedgehog *Erinaceus europaeus*, brown hare *Lepus europaeus* and many bird species. The site was broadly assessed for its potential to support important invertebrate assemblages with specific attention paid to features such as standing deadwood, wet flushes, bare earth banks and botanically rich areas.

11.4.11 Invasive Non-native Species

No specific surveys for invasive non-native species (INNS) were undertaken; however, the presence of any invasive non-native species encountered during other fieldwork was recorded.

11.4.12 Previous survey work

Previous survey efforts for this site have been undertaken during the period between 2018 – 2019 for badgers, bats, breeding birds, common dormouse, great crested newts and reptiles. The surveys followed

[18] *English Nature (2001) Great Crested Newt Mitigation Guidelines. English Nature, Peterborough.*

recommended methodology, as above and have been summarised within the relevant sections. The area surveyed was considerably smaller than the current proposed plans and is demonstrated in Figure 2 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

11.5 Baseline Conditions

11.5.1 Desk Studies

11.5.1.1 Designated Sites

There are no statutory or non-statutory designated sites within or immediately adjacent to the proposed Rickman's Green Village site. There are five Local Wildlife Sites (LWS) within 2 km and within 5 km there are two Sites of Special Scientific Interest (SSSI) and two Special Areas of Conservation (SAC). A summary of designated sites is present in **Table 11-5** and Figure 8 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

Table 11-5. Statutory and non-statutory designated sites within 2 km of the propsoed dvelopment site. Note: SACs beyond 2 km, but which are potentially relevant, are also included.

Site name	Designation	Features listed on citation	Proximity (at closest point)	Ecological importance
Sparrwood Hanger & Roundwyke Copse Complex Woodland & Meadows	LWS	Habitats: • neutral grassland; • woodland; and • streams.	640 m SW	County
Whithurst Park	LWS	Habitats: • Ancient Woodland; • species-rich grassland; and • lake. Species: • small heath *Coenonympha pamphilus*.	580 m S	County
Steers Common	LWS	Habitats: • Ancient Woodland Species: • nightingale *Luscinia megarhynchos;* • brown hairstreak *Thecla betulae;* • purple emperor *Apatura iris;* and • wood white *Leptidea sinapsis*.	780 m SW	County
Chiddingfold Forest	SSSI	Chiddingfold Forest consists of several areas of woodland, which together form the largest continuous area of woodland on the Weald Clay. It consists of a mixture of woodland types ranging from ancient oak woodland to coniferous plantation and includes many semi-natural types of woodland supporting a wide range of floristic communities. Many of the streams on the site cut deep into the clay and support a relict gill flora and fauna. The variety of woodland types, the gills, and the well-maintained rides provide habitats for a rich variety of insects and the site supports many nationally rare invertebrates and several regionally scarce bryophytes and lichens. The site is also noted for its diverse community of breeding birds.	1.8 km N	National
Kymmings Hill Farm Meadows & Woodland	LWS	Habitats: • neutral grassland; • woodland; and • ponds. Species: • wild service tree *Sorbus torminalis;* • small-leaved lime *Tilia cordata;* • bluebell *Hyacinthoides non-scripta;* and • narrow-leaved bitter-cress *Cardamine impatiens*.	1.75 km SW	County

Site name	Designation	Features listed on citation	Proximity (at closest point)	Ecological importance
Headfoldswood Meadow	LWS	Habitats: • neutral grassland; and • acid grassland.	1.78 km SW	County
Ebernoe Common	SAC, SSSI, National Nature Reserve (NNR)	Ebernoe Common consists of an extensive area of beech woodland. The site is of international importance for rare species of bat including Bechstein's bat *Myotis bechsteinii* and barbastelle bat *Barbastella barbastellus*.	3.68 km SE	International
The Mens	SAC, SSSI	Supports the following Annex I habitats: Atlantic acidophilous beech forests with holly *Ilex* sp. and some Taxus sp. in the shrub layer. This site is an extensive area of mature beech woodland rich in lichens, bryophytes, fungi and saproxylic invertebrates, and is one of the largest tracts of Atlantic acidophilous beech forests in the south-eastern part of the habitat's UK range. This woodland supports barbastelle, but this is not the primary reason for the site selection.	3.9 km W	International
Shillinglee	SSSI	This large lake on acidic Weald clays has an important flora. Four plants which occur are nationally uncommon: • cut grass *Leersia oryzoides*; • mudwort *Limosella aquatica*; • needle spike rush *Eleocharis acicularis*; and • six-stamened waterwort *Elatine hexandra*.	3.9km	National

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Table 11-6. The UKHab habitats contained within the proposed development site.

Habitat type	UK Hab	Area (ha)/ length (m)	Target note including species composition	Ecological importance
Broadleaved semi-natural woodland	w1f7	1.4 ha	There are two areas of woodland within the site boundary: TQ 01342 29582 is listed as ancient woodland by SxBRC and provides connectivity to further ancient woodland outside the site's boundary. The main canopy is dominated by oak *Quercus robur* and ash *Fraxinus excelsior*. Species recorded within the woodland's understorey include holly *Ilex aquifolium*, elder *Sambuccus nigra*, hawthorn *Crataegus monogyna*, field maple *Acer campestre*, blackthorn *Prunus spinosa*, willows *Salix* spp., rose *Rosa* spp. and hazel *Corylus avellana*. Ground flora visible from within the site includes spurge laurel *Daphne laureola*, stinging nettle *Urtica dioica*, cleavers *Galium aparine* and bramble *Rubus fruticosus* agg. There are two further small woodland parcels at the north-western corner of the proposed development site, which provide connectivity to a large area of ancient woodland outside the red line boundary. The woodlands have a similar species composition as above and canopies overlap but are broken up by access roads. Further ancient woodland and Priority deciduous woodland is found bordering the application site in the north-eastern, south-western, and north-western corners of the site. TQ 01188 29888 is a small area of deciduous woodland which is connected to an extensive area of woodland approximately 200m west. Species recorded are as above. <u>The site's woodland habitat is considered to qualify as priority habitat under Lowland Mixed Deciduous Woodlands within Section 41 of the NERC Act, 2006.</u>	County
Modified grassland	g4 (60,75) Secondary codes that only apply to some of the fields: 10, 11,12,16, 73, 77	29.52 ha	All fields within the red line boundary of the proposed development site were classed as modified grassland, either being sheep grazed or agriculturally improved. There was a lack of floristic diversity with perennial rye *Lolium perenne* dominating within most fields. The sward structure was poor across the site, with most fields very uniform, either being grazed (5 cm) or at height of 15–20 cm. Other species included white clover *Trifolium repens,* creeping buttercup *Ranunculus repens*, broad-leaved dock *Rumex obtusifolius*, creeping cinquefoil *Potentilla* reptans, bird's foot trefoil *Lotus corniculatus,* and smooth meadow grass *Poa pratensis*, The field within the north-east of the site contained some small areas of scattered scrub and tall ruderal habitat.	Negligible/site

Habitat type	UK Hab	Area (ha)/ length (m)	Target note including species composition	Ecological importance
Other neutral grassland	g3c	0.76 ha	A small area of rough neutral grassland, which is not managed is found between two fields within the northern section of proposed development site. There is a varied sward structure, though the grassland has partially been used as a farm track and been damaged by vehicle use. Grasses that dominate the area are perennial rye, smooth meadow grass, rough meadow grass *Poa trivialis*, cocksfoot *Dactylis glomerata* and Yorkshire fog *Holcus lanatus*. Forb species recorded include lesser stitchwort *Stellaria graminea*, white clover, bird's foot trefoil, creeping buttercup, creeping cinquefoil, broad leaved dock and ribwort plantain *Plantago lanceolata*.	Site
Scrub/tall ruderal vegetation	h3h	0.2 ha	Within the north of the proposed development site, scrub dominated by tall ruderal herbs run along a ditch between two fields and extend into an area of bramble scrub, likely developed through ground disturbance. Species that dominate are broad-leaved dock *Rumex obtusifolius* with the following species also recorded: sow thistle *Sonchus oleraceus*, greater willowherb *Epilobium hirsutum*, spear thistle *Cirsium vulgaris*, greater plantain, bristly ox-tongue *Helminthotheca echioides*, dandelion *Taraxacum officinale*, cranesbill *Geranium* spp., cleavers, ragwort *Senecio jacobaea*, scarlet pimpernel *Anagallis arvensis*, creeping buttercup *Ranunculus repens*, and teasel *Dipsacus fullonum*. Common grasses present amongst the ruderal vegetation include rough meadow grass, perennial rye *Lolium perenne* and soft brome *Bromus hordeaceus*.	Negligible/site
Pond (priority habitat)	r1 (19)	0.01 ha	A small, ephemeral pond on the edge of woodland surrounded by a small area of scrub and rough grassland. Often drying in spring and summer months. Previous great crested newt presence detected by eDNA surveys within the pond in 2019.	Site
Bare ground	u1c	0.1 ha	The main working yard within the south-west of the site comprises an area of gravel and bare ground. An access track used by farm machinery extends past the yard and towards the field to the south.	Negligible/site
Native hedgerow (priority habitat)	H2a	1.9 km (total length of all native hedgerow habitat on site)	There are a number of native hedgerows both within and on the red line boundary of Rickman's Green Village site. All hedgerows contained native species: blackthorn, hawthorn. elder, rose *Rosa* sp., field maple, bramble *Rubus fruticosus* agg., dogwood *Cornus sanguinea* and hazel *Corylus avellana*. The hedges are considered to qualify as priority habitat under 'Hedgerows' within Section 41 of the NERC Act, 2006.	Local

Habitat type	UK Hab	Area (ha)/ length (m)	Target note including species composition	Ecological importance
Native hedgerow with trees	h2a (190)	675 m (total length of all native hedgerow with trees habitat on site)	There are a number of native hedgerows with trees within and on the red line boundary of Rickman's Green Village site. They had a similar species composition to the native hedgerows as above, with largely oak *Quercus spp.* trees found along the hedgerow. The hedges are considered to qualify as priority habitat under 'Hedgerows' within Section 41 of the NERC Act, 2006.	Local
Line of trees	w1g6	90 m (total length of all tree line habitat on site)	A row of mature oak trees exists within the middle of the site which partially separates two fields of modified grassland. Ground flora beneath the trees is contiguous with adjacent areas of improved grassland.	Local
Ditch	r1	200 m and 225 m	Two dry ditches are present, one between two fields within the red line boundary in the north of the proposed development site (D1) and the second between two fields in the north-east of the site (D2). During the survey walkover in June 2022 only the southerly sections contained minimal levels of water (D1), the rest remaining dry; the ditches are likely to be ephemeral in nature and only likely to contain water during peak periods of extended rainfall. No aquatic vegetation was observed within the ditches during the survey, the flora within the ditches consists mostly of tall ruderal vegetation including stinging nettle *Urtica dioica*, broad-leaved dock, bramble, cleavers, thistle *Cirsium* sp. and cow parsley *Anthriscus sylvestris*. The habitats do not meet the criteria of 'Rivers and Streams': a priority habitat listed under Section 41 of the NERC Act, 2006.	Site/negligible

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11.5.1.2 EPS Licences

There are four EPS licences for mitigation projects within 1km of the site boundary, all found between 850 m and 950 m north-east. The nearest licence concerns the destruction of a resting place for brown long-eared bats *Plecotus auritus* between 19/04/2012 and 30/09/2013 (EPSM2012-4357). All other licences concern the destruction of resting places for common pipistrelle *Pipistrellus pipistrellus* and brown long-eared, or both (2015-15850-EPS-MIT; EPSM2010-2682; 2017-28899-EPS-MIT). The location of the EPS licences are shown in Figure 9 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

11.5.2 Habitats

The site consists of several agricultural fields of modified grassland (which are grazed by livestock or regularly ploughed). The fields are generally species poor and dominated by perennial rye grass *Lolium perenne* with scattered trees, scrub and tall ruderal vegetation within small areas.

Other habitat on site includes a small area of broadleaved woodland and two small woodland parcels, areas of scrub and tall ruderal habitat and a small area of rough, neutral grassland. The fields are generally bounded by native species hedgerows or woodland edges, with significant areas of the latter designated as ancient woodland.

Table 11-6 below lists the habitats within the site of the proposed Rickman's Green Village site, with target notes on specific features of interest and the general species composition. The habitat survey map of the site is shown in Figure 10 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

The records search from SxBRC centre returned four Section 41 habitats within 2km of the site's boundary (see Figure 11 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a)): lowland fen, traditional orchard, lowland meadow, deciduous woodland and ancient woodland. Of these, ancient and deciduous woodland is found within or immediately adjacent to the site.

11.5.3 Badgers

No evidence of badgers was found during any of the surveys in 2021/2022 within the red line boundary, although there are habitats of value for this species with the proposed development site; however, a badger sett and evidence of badgers was found immediately outside the site boundary on the far south-western corner (TQ 01360 29241) (see Photograph 1 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a)). Additionally, in July 2019, a single badger was recorded foraging within the south-eastern half of the proposed development site within Phase 1 of the masterplan.

There are no records of badgers within the search area.

The survey results indicate that badgers are not sheltering within the proposed red line boundary but are found within the immediate surroundings and occasionally move on to proposed development site for foraging. Further evidence of badgers within the red line boundary will be recorded until October 2022 when all protected species surveys are scheduled to finish. Habitats within the site are considered to be of value to badgers at the site level only, pending the results of the completion of all the ecological surveys.

11.5.4 Bats

11.5.4.1 Natural Roost Features – Trees

A ground-based inspection is yet to be undertaken across the proposed development site, and the data are therefore not included within this ES, but will be part of an addendum. There are several standing deadwood trees across the site and roosting features found across all boundaries of the proposed development site that form part of an ongoing investigation into the use of the site by roosting bats.

A survey undertaken in 2019 within an area of the proposed development site identified nine trees with bat roosting potential. The results of which are shown in Figure 12 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

11.5.4.2 Trapping

The full results are detailed within Crouchlands Farm. Bat trapping, Radio-tagging and Roost Count Survey report (Ecology Co-op, 2022c). In summary, a total of six trapping nights were conducted on the 26, 27 and 28 May and 26, 27 and 28 July 2022 across eight trapping locations within Crouchlands Farm. The surveys captured a total of 192 bats and a minimum of 12 species.

The following species were identified to be breeding within the survey area: Barbastelle *Barbastella barbastellus*, Bechstein's *Myotis bechsteinii* bat, Brandt's *Myotis brandtii*, Daubenton's *Myotis daubentonii*, Whiskered *Myotis mystacinus*, Brown long-eared *Plecotus auritus*, common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, and noctule *Nyctalus noctula*.

Further species trapped on site: Serotine *Eptesicus serotinus*, Alcathoe *myotis alcathoe*, and Natterer's *Myotis nattereri*.

11.5.4.3 Radiotracking

The full results are detailed within Crouchlands Farm. Bat trapping, Radio-tagging and Roost Count Survey report (Ecology Co-op, 2022c). In summary, a total of six confirmed roosting locations and two unconfirmed roosting locations were identified from seven radio-tagged bats (six Bechstein's bat and one barabastelle).

The barbastelle was tracked to a small, woodland copse on Heron's Farm Lane, Kirdford, 2 km south of Rickman's Green Village.

The remaining bats tagged were Bechstein's bats, four of these roosts were identified within the landholding of Crouchlands Farm, with one roost found 50 m from the edge of the proposed development site. The remaining roosts were identified within the close surrounding area outside Crouchlands Farm.

11.5.4.4 Roost Monitoring – Bat Emergence Survey

The full results are detailed within Crouchlands Farm. Bat trapping, Radio-tagging and Roost Count Survey report (Ecology Co-op, 2022c). In summary, the seven roosts identified by the radiotracking were assessed in order to characterise the roost. Access to the barbastelle roost was not possible and the roost type is unknown.

The surveys revealed six maternity roosts, one day roost and one unknown roost type for Bechstein's bat. The nearest roost from the proposed development site was characterised as a maternity roost and 40 bats were seen to emerge from the feature.

11.5.4.5 Bat Activity Surveys – Walked Transects

The full results of the activity surveys so far completed including timings, weather conditions and personnel are provided in Figure 13 and Table 8 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a). The data from the survey completed in September 2022 will be provided within an addendum to the EIA.

At least seven bat species were recorded during the seven bat activity surveys so far undertaken. By far the most common species recorded was common pipistrelle and soprano pipistrelle *Pipistrellus pygmaeus,* with periods of sustained foraging recorded across the majority of the site. Barbastelle were recorded numerous times across the surveys in low numbers, generally with a single pass recorded but most frequently recorded within the blue, red and green transects which are found in the south-west and north-west of the site. The levels of highest activity were recorded between April and June, adjacent to woodland boundaries.

11.5.4.6 Bat Activity Surveys – Static Detector Deployment

The full dataset for all loggers was not finished until September 2022 and a full analysis of the data will not be completed until all data has been collected, this will be provided within an addendum to the EIA. The results so far, dating from August 2021–June 2022, have been summarised in P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

The data so far reveals very high levels of activity across the site by common and soprano pipistrelle, peaking between April and June. Low levels of activity have been recorded from Leisler's *Nyctalus leisleri*, serotine *Eptesicus serotinus* and brown long-eared *Plecotus auritus*. Moderate levels of activity have been recorded from noctule *Nyctalus noctule,* with high levels of activity recorded in June in the north-west of the proposed development site.

Barbastelle have been consistently recorded throughout the survey period to date and across all deployment locations, with moderate to high levels of activity recorded peaking between May and June.

Moderate levels of activity were recorded for all *Myotis spp.,* with high levels of activity during different times of the year predominately in the south-west of the proposed development site.

11.5.4.7 Pre-existing Records

SxBRC provided a large number of bat records in the search area, comprising ten identified species. The number of records for each species is presented in **Table 11-7**.

Table 11-7. Number of pre-existing records of each bat species within 2 km of Crouchlands Farm.

Species	No. of records
Common pipistrelle *Pipistrellus pipistrellus*	42
Soprano pipistrelle *P. pygmaeus*	22
Brown long-eared *Plecotus auritus*	27
Whiskered bat *M. mystacinus*	5
Alcathoe's bat *M. alcathoe*	3
Daubenton's Myotis *M. daubentonii*	1
Natterer's bat *M. nattereri*	5
Bechstein's bat *M. bechsteinii*	9
Barbastelle *Barbastella barbastellus*	10
Serotine *Eptesicus serotinus*	6
Noctule *Nyctalus noctula*	12
Unidentified bat species etc…	23

11.5.4.8 Interpretation

The full dataset is yet to be fully analysed. A full assessment of the proposed development site's importance to foraging and commuting bats cannot be completed until all scheduled work has completed, though this assessment has sought to identify clear constraints to Rickman's Green Village based on the data that has been processed and develop an appropriate mitigation and compensation strategy.

The conservation status and distribution of bat species recorded within Crouchlands Farm to date are presented in **Table 11-8** below. Guidance on the valuation of the site for bats made in this assessment is taken from Wray et al., 2010[19].

In summary, the site and its immediate surroundings provide high value habitat for a minimum of twelve different species (least concern/widespread–near threatened/restricted range), including two Annex II listed species (Habitats Regulations 2017 (as amended)): Barbastelle and Bechstein's bat.

The foraging/commuting habitat on site for barbastelle and Bechstein's bat for both the Phase 1 and Phase 2 development is considered to be significant at a **national** level, as bats foraging and commuting across the site likely form a metapopulation with known maternity roosts of both species at Ebernoe Common SAC and The Mens SAC within the wider landscape. Figure 14 illustrates how Barbastelle and *Myotis spp.,* (likely to include Bechstein's and Alcathoe bat *Myotis alcathoe*) have been using the site based upon the results from the bat activity survey and static logger deployment. While the static loggers provide bias towards where these species have been recorded the activity surveys have generally corroborated these findings and commuting corridors are fairly evident from Figure 14. The foraging/commuting habitat on site for Alcathoe bats is considered to be significant at a **regional** level, largely considering the low numbers caught within the trapping survey and applying the 'precautionary principle' in this consideration. It should however be noted that Alcathoe are underrecorded and estimates on the abundance and distribution are poorly understood compared to other species, with likely under recording.

Common and soprano pipistrelle were recorded foraging/commuting at high levels across all aspects of the site but are common and are found widespread across the UK, and edge woodland and hedgerow habitat found on site is abundant within the local area. For both the Phase 1 and Phase 2 development the site is considered to be of significant importance at the **county** level within the guidance provided within Wray et al, however considering the common and widespread nature of both species, a more appropriate weighting is considered to be **local** level.

All other species recorded in low numbers include: Nathusius' pipistrelle *Pipistrellus nathusii, Myotis spp.,* noctule, serotine and brown long-eared. Brown long-eared are common and are found widespread across the UK, the site is considered to be important at the **local** level for both development areas. The remaining species are either listed as near threatened or determined to be rarer[15], as such in the Phase 1 area the importance for these species is considered to be at **county** level for Nathusius' pipistrelle and other *Myotis spp.,* and at a **local** level for serotine and noctule. In the Phase 2 area the importance for these species is considered to be at **county** level for Nathusius' pipistrelle, serotine, noctule and *Myotis spp.* Again, it should be noted that the assessment method within Wray et al does not consider the abundance and distribution of these species beyond a national level, so the weighting can lean towards a higher valuation at geographical scale than would ordinarily be afforded within CIEEM EcIA guidance.

Bechstein's bat and likely Alcathoe have been found roosting in trees in close proximity to Rickman's Green Village, with some of them roosting within Crouchlands Farm, whilst a barbastelle bat from a maternity roost

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[19] *Wray, S., Wells, D., Long, E., Mitchell-Jones, T., and Wells, D. (2010) Valuing Bats in Ecological Impact Assessment.*

located in nearby Kirdford was trapped at the site. The application site is approximately 3.9km from The Mens SAC and 3.68km from Ebernoe Common SAC, the latter for which Bechstein's bat and barbastelle are a primary reason for its designation. The sites woodland habitats for roosting Bechsteins bats is considered to be of **national** importance based upon the data gathered to date and the relationship this population is almost certain to have with the population at Ebernoe Common SAC. A barbastelle roost was located between the Crouchland's Farm site (1.9km to the south) and The Mens SAC (1.2km to the north). The trapping survey was unable to tag any Alcathoe bats to assess potential roosts within the site and surrounding area. The sites woodland habitats for roosting Alcathoe is considered to be of likely **regional** importance, largely due to the small sample size for this species, whilst it is presently assumed that barbastelle bats are unlikely to be roosting at Crouchlands Farm, but do utilise the habitat at the farm for foraging.

No other species recorded on site were radio tagged to determine roosts within and around the boundary of the proposed development area. It is however reasonable to assume from trapping pregnant and lactating bats during the trapping effort, that maternity roosts for other *Myotis spp.,* are present at the site or in the close surrounding landscape. The sites woodland habitat is therefore considered to be of likely **regional** importance to other *Myotis spp.* The value of the site for all other species is largely unknown, but based upon the high value woodland habitat on the boundaries of the site, the levels of activity on site, potential roost types and the rarity of the species the importance of the site to roosting bats for the following species is expected; Brown long eared (**local** importance), common and soprano pipistrelle (**local – county** importance) and serotine, noctule and Nathusius' pipistrelle (**county – regional** importance).

Table 11-8. Conservation status and distribution of bats recorded on the proposed development site[20].

Species	Conservation status in England	Distribution in England
Common pipistrelle	Least concern	Widespread
Soprano pipistrelle	Least concern	Widespread
Nathusius' pipistrelle	Near threatened	Widespread
Brown long-eared	Least concern	Widespread
Noctule	Least concern	Widespread
Serotine	Vulnerable	Southern England only
Barbastelle	Vulnerable	Southern Britain only
Bechstein's	Least concern	Southern England only
Whiskered	Data deficient	Widespread
Natterer's	Least concern	Widespread
Daubenton's	Least concern	Widespread
Alcathoe	Data deficient	Unknown

11.5.5 Breeding Birds

Full results of the breeding bird surveys including timings, weather conditions and personnel are provided in Table 12 and Table 13 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

During the six surveys undertaken in 2022 (March to June), a total of 43 species of bird were recorded; of these, six species are 'red' listed under the Birds of Conservation Concern (BoCC) and ten are 'amber' listed. The following species recorded during the survey are also listed under Section 41 of the NERC Act

[20] *The Mammal Society (2020). https://www.mammal.org.uk/science-research/red-list/*

(2006): common bullfinch *Pyrrhula pyrrhula*, common starling *Sturnus vulgaris*, song thrush *Turdus philomelos*, linnet *Carduelis cannabina*, yellowhammer *Emberiza citronella*, house sparrow *Passer domesticus* and turtle dove *Epithet turtur*.

Barn owl *Tyto alba* were also recorded on site several times foraging within the northern fields whilst undertaking bat activity surveys in April and June 2022.

During the three surveys undertaken in 2018 (May to June), in total, 33 species of bird were recorded; of these, nine species are 'red' listed under the BoCC and three are 'amber' listed. The following species recorded during the survey are also listed under Section 41 of the NERC Act (2006): marsh tit *Poecile palustris*, bullfinch *Pyrrhula pyrrhula,* starling *Sturnus vulgaris*, linnet *Linaria cannabina*, cuckoo *Cuculus canorus* and skylark *Alauda arvensis*.

The SxBRC provided bird records for a total of 108 species. Most of these species are relatively common and widespread, but the list includes 22 species of principal importance for conservation (S41 NERC Act 2006), and 16 species listed on Schedule 1 of the Wildlife and Countryside Act. In addition, 19 species are red listed on the BoCC lists.

The breeding bird assemblage at Rickman's Green Village consists largely of garden, woodland and farmland species. With regard to the application area, the most notable species are turtle dove, nightingales, song thrush, starling and house sparrow.

A single faint call for a turtle dove was heard on the final survey, it was not seen but thought to have come from an area of scrub and tall ruderal herbs on the margins of one of the fields within the application site. House sparrows and starlings were generally recorded around hedgerows and trees adjacent to existing farm and residential development on the boundaries of the proposed site. Several nightingales were heard across the site with a peak count of four individuals, largely found in woodland within and adjacent to the site. Linnet and yellowhammer, also red listed, were recorded onsite, however, were not seen to be frequently using the proposed development area.

Species recorded most frequently within and across all survey visits includes; dunnock, wren, blackcap, song thrush, chaffinch, great ti, blue tit, robin, blackbird and starling.

Based on these findings, the breeding bird assemblage supported by the application site and the immediate zone of influence within Rickman's Green Village is considered to be important for the conservation of birds at the **local** level. The population of nightingale could potentially be around **district** level importance, with an estimate of 760 territories present in Sussex, but more localised population estimates unavailable.

The presence of turtle dove potentially using the site is also an important record, however only a faint, brief call was heard. The results would suggest that the site is only likely to be used infrequently as a resource within the wider landscape and such only hold an importance at the **local** level.

11.5.6 Common Dormouse

No dormice or evidence of dormice has been found during surveys but small numbers of other small mammals were recorded on the proposed development site. Detailed results are found in Figure 15 and Appendix 6 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a). This concurs with previous survey efforts in 2018 where no dormice or evidence of dormice were recorded.

The SxBRC provided two records of dormice in the search area. The closest of these was approximately 1 km west from the boundary of the proposed development site, the record was dated in 2005. The second record was located approximately 1.6 km north-east and dated 2007.

Dormice are considered to be likely absent from the proposed development site and the immediate zone of influence within Rickman's Green Village.

The proposed development site is considered to be of **negligible** importance for common dormice at this point.

11.5.7 Great Crested Newts

A total of 14 ponds, one within the proposed development site were identified within 250 m of the proposed development site's boundary. No access was given to six of the ponds and three ponds did not hold water during the 2022 survey period. The remaining ponds were carried forward for a Habitat Suitability Index assessment and eDNA test. The results, including historic data from previous surveys, are summarised in **Table 11-9** below. For full results, refer to P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a) Figures 16 and17, Table 14 and Appendix 7).

Table 11-9. Summary of ponds and Great Crested Newt survey results for ponds at Rickman's Green Village.

Pond ref.	NGR	Proximity to application site	Surveys completed	Results	Survey date
1	TQ 02027 30143	104 m NE	Letter sent: No access granted to assess pond	N/A	N/A
2	TQ 02135 29916	230 m E	Letter sent: No access granted to assess pond	N/A	N/A
3	TQ 02038 29772	225 m E	Letter sent: No access granted to assess pond	N/A	N/A
4	TQ 01679 29498	190 m E	Letter sent: No access granted to assess pond	N/A	N/A
5	TQ 01480 29707	On-site	Non-existent: no pond evident.	N/A	N/A
6	TQ 01475 29469	30 m S	Pond dry, heavy leaf litter.	N/A	N/A
7	TQ 01090 29190	0 m	HSI, eDNA survey	eDNA negative	2022
8	TQ 33445 25903	100 m SW	HSI, eDNA survey	eDNA negative	2022
12	TQ 0118 2975	20 m from site boundary	HSI, eDNA survey	eDNA negative	2021
13	TQ 01154 29837	20 m from site boundary	HSI, eDNA survey	eDNA negative	2022
14	TQ 01063 29717	100 m from site boundary	HSI, eDNA survey	eDNA negative	2022
Ponds surveyed in 2019 within 250 m					

Pond ref.	NGR	Proximity to application site	Surveys completed	Results	Survey date
9	TQ 0114 2934	50 m W	Population size class assessment	Peak count of 4 great crested newts	2019
10	TQ 0106 2939	50 m W	Population size class assessment	Peak count of 2 great crested newts	2019
11	TQ 01294 29644	On-site	eDNA survey	eDNA positive	2019
Historic presence of great crested newts in ponds further than 250m					
	TQ 0085 3036	Over 250 m NW	eDNA survey	eDNA positive	2019
	TQ 0030 2971	Over 25 0m N	Population size class assessment	Peak count of 12 great crested newts	2019

The SxBRC provided 103 amphibian records in the search area. This included 36 records for great crested newt *Triturus cristatus*, 20 records for smooth newt *Lissotriton vulgaris*, 18 records for palmate newt *Lissotriton helvetica*, 14 records for common frog *Rana temporaria* and 15 records for common toad *Bufo bufo*. The nearest great crested newt record is found 360 m north of the site, dated 2010.

Based on the results of this and previous years surveys, a small population of great crested newts is confirmed in ponds 9 and 10 found within 50 m of the site, with historic presence of an unknown population in pond 11 which is within the proposed development site's boundaries, though could not be surveyed this year due to a lack of water during the 2022 survey period.

An adjacent field outside the boundary of the proposed development site in the south-western corner, nearest to ponds 9 and 10, provides high quality terrestrial habitat being an area of rough grassland, whilst the adjacent field within the boundary is grazed and species poor making it less suitable for great crested newts and amphibians.

The woodland and tall ruderal vegetation within Rickman's Green Village is considered to provide suitable habitat for great crested newts and is considered to be of importance at **site** level.

11.5.8 Reptiles

No reptiles were recorded during the surveys in 2018 and 2022. For full results, including survey metadata, refer to Table 16 of P2645 EcIA Rickman's Green Village (Ecology Co-op, 2022a).

The SxBRC provided 99 reptile records in the search area. This included 55 records for slow-worm, 26 records for grass snake and seven records for adder. The most recent record was a grass snake in 2015 found 260 m north of the site in a private garden.

The results of the reptile surveys indicate the likely absence of reptiles from within the proposed development site, though given there is suitable habitat on proposed development site, it is likely there is a reptile population but at a very low level.

The proposed development site is not considered to be of value to reptiles beyond the **site level**; however, it should also be noted that concurrent studies have identified a low population of grass snake, slow worm and common lizard elsewhere within the wider landholding of Crouchlands Farm.

11.5.9 Other Notable Species

The woodland habitat within the proposed development site contained ancient woodland indicators: bluebells, goldilocks buttercup, three nerved sandwort and spurge laurel. This habitat is considered to be of value to ancient woodland indicator species at a **local** level.

The woodland and tall ruderal/scrub creates suitable habitat for a number of invertebrate species. The proposed development site is considered to be of likely importance to invertebrates at the **local** level.

The habitats within the proposed development site are considered to provide suitable foraging and refuge habitat for hedgehogs and are considered to be of likely importance for this species at the **local** level.

11.5.10 Invasive Non-native Species

No invasive species were recorded within the proposed development site.

The SxBRC provided 152 records of 25 species, comprising plants, invertebrates and birds from the search area.

Given the likely absence of non-native species within the proposed development site the ecological risk of such species is considered to be negligible; however, Himalayan balsam *Impatiens glandulifera* is found on Crouchlands Farm land, approximately 450 m west of the proposed proposed development site. This plant grows quickly, outcompeting other species of vegetation and with further foot traffic within the area may increase the likelihood of the plant reaching the proposed development site.

11.5.11 Constraints/Limitations to Surveys

Surveys record any flora or fauna that is present at the time of the survey visits. It is therefore possible that some species may not have been present during the surveys but may be evident at other times of the year and may appear or disappear from the proposed development site if habitat conditions change. For this reason, the surveys are considered valid for up to eighteen months for badgers and bats, two years for reptiles and three years for great crested newts and dormice. If the habitat conditions change significantly in the intervening period, then it is recommended that the surveys be updated.

Pond 11, which is contained within the proposed red line boundary of the proposed development site did not hold water during the 2019 or 2022 survey period and therefore could not be subjected to a great crested newt population size class assessment. A low population of great crested newts has been assumed to be present in order to provide a more robust impact assessment on this species.

No access was given to six ponds within 250 m of the red line boundary for the proposed development site, including ponds 9 and 10 which had a known population from previous surveys in 2019. It is assumed that a low population of great crested newts is still present within ponds 9 and 10. The remaining ponds not accessed within 250 m of the site boundary are assumed to have presence of great crested newts in order to provide a more robust impact assessment of this species.

11.6 Potential Environmental Effects During Construction – Development Scenario 1

11.6.1 Impact 1: Designated Sites

Without the adoption of appropriate mitigation, the construction phase of Phase 1 of the masterplan has the potential to negatively impact upon Whithurst Park LWS, Sparrwood Hanger & Roundwyke Copse Complex Woodland & Meadows LWS and Steers Common LWS, all found within 1 km of the site boundary. The construction phase impacts could result in a **negligible–moderate adverse** effect at the **local** level on the LWSs, through creation of dust and air pollution which then may be blown into the LWSs damaging the habitats found within the sites.

Potential impacts on designated sites through construction can be mitigated for by following best practice guidelines to prevent excessive dust pollution. This can be achieved through applying water to the area (ground or building materials) to prevent dust being airborne, and dust barriers attached to Heras fencing, the work should also cease in high winds.

Ebernoe Common and The Mens SACs lie within 5 km of the site boundary and which provide high value habitat for bats, including Annex II species: barbastelle and Bechstein's bat. Any development within 12 km of the SAC, which results in habitat loss/fragmentation, has the potential to have a significant effect on bat populations associated with the SAC where these species are present.

Whilst the direct footprint of the Phase 1 development site comprises almost entirely of modified grassland and does not include likely direct significant impacts upon habitats of value for these bat species, secondary effects, including artificial lighting impacts, pollution risks and the effects these may also have on invertebrate prey populations, are a key consideration.

The level of effect provided below has been based upon the findings from all data analysed to date to understand how Bechstein's and barbastelle bats use the site, but construction has the potential to disrupt commuting corridors and foraging opportunities for these species through artificial lighting, habitat degradation and noise pollution, resulting in a **possible adverse** effect significant at the **county level**.

There is some potential for a revision to this evaluation once the remaining bat logger data has been analysed, though this is unlikely.

The development will include a sensitive lighting scheme during construction and retain the majority of high value habitat that acts as an important commuting corridor for bats. These areas will be protected, the detail of which is outlined is **Section 11.6.2.**

The proposed development will see extensive native planting in the long-term around the boundaries of the site which will be designed to be an ecotone from the retained habitats (further detailed in **Section 11.6.2**). To mitigate for the loss of foraging opportunities, disruption to commuting corridors and potential for habitat degradation, in the short-term as much of the ecotone habitat within the buffer zones should be planted at least a year prior to construction commencing.

11.6.2 Impact 2: Habitats

The creation of a new access road within the north-east corner of the site and in the northern boundary will result in the removal of approximately 50 m of native, species-poor hedgerow in good condition and further has the potential to result in the loss of mature trees. The Phase 1 development will result in the loss of a further 90 m of native hedgerow within the centre of the site considered to be in good condition. In the absence of appropriate avoidance, mitigation and compensation (where significant residual effects remain), the described impacts would result in a likely **moderate adverse** effect at the **site level.**

The Phase 1 development will result in the loss of 6 ha of poor value modified grassland used primarily for cattle and sheep grazing. This habitat is considered to be of low intrinsic value due to a relative absence of structural and species diversity and is found commonly within the local area. The described potential impacts would result in a certain **site level** impact that has a low significance.

In the absence of mitigation, the Phase 1 development has the potential to impact on retained ancient woodland, scattered trees and hedgerows through accidental damage and root compaction from construction activity, dust pollution and vibration. In the absence of appropriate avoidance and mitigation, the described potential impacts would result in a likely **moderate adverse** effect at the **local level.**

Mitigation comprises the establishment of a permanent 30 m buffer around all woodland and a 10 m construction buffer around hedgerows and lines of trees; Heras fencing will demarcate the buffer zone to prevent equipment storage and vehicle damage within the footprint of Phase 1 of the masterplan. Potential impacts on retained habitats through construction can be avoided by following best practice guidelines to prevent excessive dust pollution, see **Section 9.7.1.3**.

With the adoption of the above mitigation measures, this would see a **negligible** effect on the retained woodland, hedgerow, and scattered tree habitat during the construction phase.

The loss of up to 140 m of native hedgerow will be mitigated for through the native planting of the buffer zones around retained habitat. The loss of poor value grassland will not require direct mitigation but the inclusion of high value grassland within the buffer zone will provide a wider botanical diversity enhancement to the proposed development site. In total, a permanent 30 m buffer zone around all woodland habitats (approx. 550 m) and a 10 m buffer (approx. 155 m) around other hedgerows will provide 1.3 ha of new habitat that will replace existing modified grassland habitat.

The woodland buffer zones will be designed to be a graded ecotone leading from the retained habitats towards the developed areas, with 10 m of mixed native trees and shrubs, largely comprising of thorny species (i.e. blackthorn and hawthorn), to be established as a varied tree and shrub layer adjacent to the woodlands. A further 10 m of dense scrub habitat, also incorporating thorny species such as dog rose *Rosa canina* and gorse *Ulex europaeus,* and 10 m of high value species rich grassland, incorporating wetland habitat in the form of SuDS will be planted, featuring an additional hard barrier in order to deter public access. The buffer zone will be designed to ensure habitat variance and a natural appearance to the ecotone habitat margins will be varied and avoid straight line edges. Species composition and management will need to be set out in a Biodiversity Enhancement Strategy. This will ultimately see a **moderate beneficial** effect on the proposed development site's woodland and hedgerow habitat resource by increasing and protecting these habitat areas.

11.6.3 Impact 3: Badgers

Given the likely absence of active badger setts, Phase 1 of the masterplan would not result in any foreseeable impacts on badgers or their setts. Badgers however were seen foraging within the proposed development site in 2019 during a bat activity survey and without the adoption of precautionary measures there is the potential for badgers to become trapped/injured by uncovered excavations during construction which pose a risk of **moderate adverse** effect on individual badgers.

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Precautionary measures to mitigate potential adverse effects on badgers during construction include:

- an updated walkover survey prior to construction commencing and every six months during construction to confirm continued absence of active setts or to inform a badger mitigation strategy; and
- all excavations to be covered at night to prevent badgers falling into pits; alternatively, an escape mechanism will be provided to allow badgers (and other wildlife) to climb out of an excavation.

Should badgers take up residence within a sett in the construction zone or its immediate zone of influence (within 30 m), a badger mitigation strategy will be required, which will include consideration of the need for a development licence from Natural England to close the sett.

With the adoption of the above avoidance/mitigation measures, the potential residual effects on badgers resulting from construction phase of Phase 1 of the masterplan is considered to be **negligible**.

11.6.4 Impact 4: Bats

Some logger survey data analysis remains ongoing for bats and the significance of effects has been based on all data interpreted to date, with changes to this assessment remaining unlikely, however an addendum to the EIA will also be provided including the additional data.

The construction phase has the potential to result in the loss of foraging habitat and disruption of commuting corridors caused by habitat removal, artificial lighting, and noise disturbance. Without appropriate mitigation, the loss of foraging habitat and disruption to commuting corridors for barbastelle and Bechstein's presents a likely **minor adverse** effect at a **national level.** Alcathoe bats were captured less frequently during the trapping survey and as such the disruption and loss of commuting corridors presents a likely **minor adverse** significant effect at a **regional** level.

The impact on foraging and commuting during construction on *Myotis spp.*, Nathusius' pipistrelle, soprano pipistrelle and common pipistrelle presents a likely **moderate** adverse significant effect at a **county** level. The impact on serotine, noctule and *Plecotus spp.*, presents a likely **minor adverse** significant effect at a **district/local** level.

New habitat creation, to include the 30 m and 10 m buffer zones, as outlined in **Section 11.6.2**, will provide sufficient mitigation in the long term given the majority of habitat lost within the proposed development's footprint is considered sub-optimal for foraging bats (poor value modified grassland).

In the short term, there would be a temporary loss of habitat where hedgerows are removed to facilitate new access. To minimise this impact, the 10 m of shrub layer within the proposed 30 m buffer zone would be planted prior to the commencement of construction with at least one full growing season of establishment achieved, and a mitigation strategy should be followed to minimise adverse effects associated with construction. This strategy should include:

- Heras fencing to be placed around the buffer zones to include a noise control barrier where more sensitive habitats are located;
- disruption of commuting corridors should be completed outside the breeding season (May – August);
- an ecologically sensitive lighting scheme must be in place to prevent light pollution to the retained commuting/foraging corridors; and
- best practice should be followed during construction to minimise air pollution and a decline in air quality caused by vehicle and machinery use.

The removal of trees without further assessment or mitigation has the potential to result in a possible **minor – major adverse** significant effect at a **local – national** level given the species recorded using the site and the surrounding high value habitat. Where trees are affected, they should be checked by a suitably qualified ecologist for any bat roosting features to ensure no roosts are destroyed or damaged during construction. Where potential roost features are identified, further surveys will be required in line with guidance set out by the Bat Conservation Trust.

With the adoption of these measures, the potential residual effects on bats resulting from the construction phase of Phase 1 of the masterplan is considered to be **negligible**.

11.6.5 Impact 5: Breeding Birds

Without the adoption of avoidance and mitigation measures, any clearance of vegetation during the breeding bird season could result in the destruction of active nests and the killing/injury of eggs/young. Light and noise pollution, and a reduction in air quality caused by construction works have the potential to impact on breeding birds indirectly. The effects of which are considered to result in a **moderate adverse** effect on breeding birds at a **local level.**

Phase 1 of the masterplan will likely result in the loss of small areas of high value habitat for breeding birds, including hedgerow, providing suitable habitat for priority species recorded on or near to the site, such as yellowhammer, linnets and song thrush. As the habitat lost would result in a **minor adverse** effect at a **local level**.

Any vegetation removal should only be undertaken outside of the breeding bird season (avoiding March–August inclusive). The construction phase will need to follow a mitigation strategy to minimise construction impacts as outlined in **Section 11.6.4** outlining how light, noise and air pollution will be minimised particularly within sensitive areas of the site. Heras fencing will be placed around hedgerows and woodland to prevent any accidental damage caused through construction.

Extensive habitat creation on the site through the native planting of the buffer zones will provide high value habitat for nesting birds in replacement of sub-optimal habitat (modified grazed grassland) as outlined in **Section 11.6.2**. This will mitigate for the loss of nesting habitat (hedgerow) that will be removed as part of the development. In the short term, there will be a temporary loss of habitat, to minimise this impact the 10 m of shrub layer within the 30 m buffer zone should be planted prior to construction commencing and development will need to include a mixture of bird boxes suitable for the species recorded on-site and should be set out in a Biodiversity Enhancement Strategy.

With the adoption of these measures, the potential for residual effects on breeding birds resulting from the construction phase of Phase 1 of the masterplan is considered to be **negligible**.

11.6.6 Impact 6: Common Dormouse

Given the likely absence of the species from the site and its immediate surroundings. The construction phase of Phase 1 of the masterplan will have no impact on dormice.

The extensive habitat creation as a result of native planting will increase suitable habitat within the site, providing a possible **minor beneficial** effect for common dormouse, should this species colonise the site in the future.

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11.6.7 Impact 7: Great Crested Newts

Pond 11 was dry throughout the 2022 survey period; however great crested newts have previously been detected within the pond (eDNA positive). The size of the population and whether the pond is a breeding pond are unknown. It has been assumed that the pond could support a small population given the size and desiccation rate, with a likely moderate metapopulation within the surrounding area that includes ponds 4, 6, 9, 10 and 11, which are all found within 250 m of the site boundary.

The habitat found on site is considered sub-optimal given it is a grazed field dominated by perennial rye grass; however, Pond 11 is found directly adjacent to the proposed development area and impacts on great crested newts through killing/injury could occur unless appropriate mitigation during the construction phase is implemented. In the absence of mitigation, the construction phase would result in a **moderate adverse** effect on great crested newts at the **local level**.

A great crested newt EPS Mitigation Licence will be secured to permit the loss of great crested newt terrestrial habitat within the proposed development site. A method statement will be required as part of the licence application and will include the following measures:

- exclusion works to be timed outside of the great crested newt hibernation period (avoiding November–February inclusive);
- installation of newt drift fencing and pitfall traps to allow newts to be translocated from the construction zone to a suitable receptor area which is yet to be determined;
- pitfall traps will be set at a density of 50/ha;
- pitfall traps will be checked daily by a suitably qualified ecologist for a minimum of 60 ‘trapping nights’ (night air temperature >5^{o}C with rain in the last few days);
- trapping will take place from February–October (inclusive);
- following the completion of the trapping process, tall grassland will be strimmed to a low height to reduce cover for sheltering newts and allow a finger-tip search by a suitably qualified ecologist; and
- prior to the commencement of construction works within areas of suitable great crested newt terrestrial habitat, a fingertip search will be undertaken by a suitably qualified ecologist, licensed to handle great crested newts. Any amphibians encountered during the works will be translocated to a receptor site outside of the construction zone.

Mitigation will be achieved in the form of habitat creation. The creation of an ecotone/buffer zone around the woodland to contain woodland, scrub and high value grassland will provide a minimum of 1.3 ha of high value great crested newt terrestrial habitat and maintain connectivity across the landscape which includes parcels of high value ancient woodland.

The existing pond should be retained and enhanced, and SuDS ponds will be created within the buffer zone. These water bodies will be designed to offer new breeding habitat for amphibians including the great crested newt.

With the adoption of the above mitigation and enhancement measures, the construction phase of Phase 1 of the masterplan is considered to result in a **minor beneficial** effect for great crested newt.

11.6.8 Impact 8: Reptiles

Given the likely absence of reptiles from the site, or at least a very low population, the construction phase of Phase 1 of the masterplan will have no impact on these species.

It is recognised however that reptiles can quickly colonise sites in the event that habitat suitability changes through altered management. Best practice guidelines should be followed and outlined within a mitigation strategy to include:

- any clearance work of vegetation should be undertaken when reptiles are likely to be fully active (April–September) with temperatures above 10 °C;
- clearance of the log piles around the garage to be undertaken carefully by hand, and under the supervision of an ecologist. Should a reptile be found, the ecologist will relocate it to suitable habitat that is found adjacent to the construction site and within the same land ownership;
- clearance of any vegetation between now and prior to construction should be undertaken in a phased approach. The first cut at 150 mm; The second cut at 75 mm; The third cut at 30 mm, leaving at least 24 hours between the first and second cut; and
- during construction any grass on site will need to be continually managed and maintained at a height of 30 mm to discourage reptiles potentially moving on to the site.

11.6.9 Impact 9: Other Notable Species

With the majority of high value habitat for invertebrates and hedgehogs being retained, other than approximately 140 m of native hedgerow, the potential impacts of habitat loss through construction are considered to result in a **negligible–minor adverse** effect at **site level**.

In the absence of appropriate mitigation measures, there remains a risk of direct harm to hedgehogs through killing/injury during construction activities, if present. This is considered to result in a **moderate adverse** effect at **site level**.

All excavations should be covered at night to prevent hedgehogs falling into any pits; alternatively, an escape mechanism should be provided to allow hedgehogs (and other wildlife) to climb out of an excavation. All construction staff should also be briefed on risks to site wildlife through an initial induction, including potential hazards to hedgehogs and steps that should be taken if a hedgehog is found.

With the adoption of the above mitigation measures the overall effect of the construction phase on hedgehogs is considered to be **negligible**.

The construction phase of Phase 1 of the masterplan will see the creation of an ecotone, containing woodland, scrub and species-rich grassland which will provide new high-value habitat for a wide variety of invertebrate species and hedgehogs. In addition, connectivity across the site for hedgehogs would be increased by creating a 11 cm x 11 cm gap within fences and the inclusion of insect houses.

The enhancement measures detailed above are considered to result in a **moderate beneficial** effect at **site level** for invertebrates and hedgehogs in the long-term. There will however be a short term loss in habitat. To mitigate this, the first 10 m of shrub layer within the 30 m buffer zones should be planted and established prior to construction commencing.

11.6.10 Impact 10: Invasive/Non-native Species

There are currently no invasive species contained within the Phase 1 masterplan's development site. The spread of any invasive species as a result of construction works is therefore considered to be **negligible**.

During construction, vehicles will be regularly driving in and out of the development site. Best practice guidelines are recommended to prevent transportation of invasive/non-native plants being brought onto the site.

11.7 Potential Environmental Effects During Construction – Development Scenario 2

11.7.1 Impact 1: Designated Sites

Without the adoption of appropriate mitigation, the construction phase of the Phase 2 of the masterplan has the potential to negatively impact upon Whithurst Park LWS, Sparrwood Hanger & Roundwyke Copse Complex Woodland & Meadows LWS and Steers Common LWS all found within less than 1 km of the proposed development site boundary. The construction phase impacts could result in a **negligible – moderate adverse** effect on the LWSs at the **local** level, through the creation of dust and air pollution. Potential impacts on designated sites through construction can be avoided by following best practice guidelines to prevent excessive dust pollution, see **Section 9.7.1.3**.

Ebernoe Common and The Mens SACs lie within 5 km of the proposed development site and provide high value habitat for bats including Annex II species: Barbastelle and Bechstein's bat. Any development within 12 km of the SACs which results in habitat loss/fragmentation has the potential to have significant effect on the SACs.

The level of effect provided below has been based upon the findings from all data analysed to date to understand how Bechstein's and barbastelle bats use the site, but construction has the potential to disrupt commuting corridors and foraging opportunities for these species through artificial lighting, habitat degradation and noise pollution, resulting in a **likely adverse** effect significant at the **county - national level**.

There is some potential for a revision to this evaluation once the remaining bat logger data has been analysed, though this is unlikely.

The development will include a sensitive lighting scheme during construction and retain the majority of high value habitat that acts as an important commuting corridor for bats. These areas will be protected, the detail of which is outlined is **Section 11.6.2.**

The proposed development will see extensive native planting in the long-term around the boundaries of the site which will be designed to be an ecotone from the retained habitats (further detailed in **Section 11.6.2**). To mitigate for the loss of foraging opportunities, disruption to commuting corridors and potential for habitat degradation, in the short-term a minimum of at least 10m of the ecotone should be planted within the 30m buffer zones at least a year prior to construction commencing.

11.7.2 Impact 2: Habitats

The landscape plan for the Phase 2 development would result in the loss of some high value habitat. It is likely that hedgerows and mature trees will need to be removed for the creation of new road access, though the location and length of habitat to be removed is unknown at this time. It is likely Phase 2 of the masterplan will result in the loss of scrub, tall ruderal and a small area of rough grassland in moderate condition located between field R1 and field R8. In the absence of appropriate mitigation measures, the described potential impacts would result in a **moderate adverse** effect at **local level.**

Phase 2 of the masterplan will also result in the loss of approximately 23.07 ha of poor value modified grassland. This habitat is considered to be of low intrinsic value due to a relative absence of structural and species diversity and is found commonly within the local area. The described potential impacts would result in a **negligible** impact; however, mitigation is still recommended to ensure there are areas of grassland contained within the proposed development site with higher distinctiveness value.

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Phase 2 of the masterplan has the potential to impact on retained ancient woodland, scattered trees and hedgerows through causing root damage through construction, dust pollution and vibration. In the absence of appropriate mitigation measures, the described impacts would result in a **moderate adverse** effect at **local level**.

The loss of habitat will be mitigated for through the native planting of the buffer zones around retained habitat as detailed in **Section 11.6.2**. In total, it is expected that 1,630 m of 30 m buffer and 1,980 m of 10 m buffer, creating a total area of 8.72 ha of new habitat, will be created within the red line boundary of the proposed development site.

Details of the species composition and management will need to be set out in a Biodiversity Enhancement Strategy. The provision of the ecotone buffer is to provide a likely **moderate beneficial** effect on the proposed development site's hedgerow habitat resource, protection of retained habitat and replacement of lost habitats. The newly created habitat will need to be designed to maintain connectivity across the site and prevent fragmentation of habitats caused by new roads and artificial lighting. It is likely that further habitat will be required off-site as compensation for biodiversity losses, given the large area of grassland being affected by Phase 2 of the masterplan. To achieve this, existing species-poor modified grassland within the wider Crouchlands Farm and outside of the proposed development area will be enhanced to create more species-rich swards of a higher distinctiveness.

Heras fencing will be placed around the buffer zone to prevent equipment storage and vehicle damage within the development area. Potential impacts on retained habitats through construction can be avoided by following best practice guidelines to prevent excessive dust pollution, see **Section 9.7.1.3**.

With the adoption of the above avoidance measures, a likely **negligible** effect on the proposed development site's retained woodland, hedgerow, and scattered tree habitat during the construction phase.

11.7.3 Impact 3: Badgers

A badger sett was found on the immediate southern boundary of field R9 and suitable foraging habitat is found across the site. The sett will not be directly affected by Phase 2 of the masterplan but could be affected indirectly through disruption during the construction phase and there is the potential for badgers to become trapped/injured by uncovered excavations during construction, which pose a risk of **moderate adverse** effect at a **site level**.

A 30 m buffer zone from the woodland edge where the sett was located will be created with a barrier to prevent access into this area avoiding disturbance if the sett still remains active.

Further precautionary measures during construction should include:

- all excavations should be covered at night to prevent badgers falling into pits; failing that an escape mechanism should be provided to allow badgers (and other wildlife) to climb out of an excavation; and
- an updated walkover survey prior to construction commencing and every six months during construction to confirm continued absence of active setts or to inform a badger mitigation strategy.

Should badgers take up residence within a sett in the construction zone or its immediate zone of influence (within 30 m), a badger mitigation strategy will be required which will include consideration of the need for a development licence from Natural England to close the sett.

With the adoption of the above avoidance/mitigation measures, the potential for residual effects on badgers resulting from the construction phase of Phase 2 of the masterplan is considered to be likely **negligible**.

11.7.4 Impact 4: Bats

Some logger survey data analysis remains ongoing for bats and the significance of effects has been based on all data interpreted to date, with changes to this assessment remaining unlikely.

The construction phase has the potential to result in the temporary loss of foraging habitat and disruption of commuting corridors caused by habitat removal, temporary low-level artificial lighting, and noise disturbance. Without appropriate mitigation, the loss of foraging habitat and disruption to commuting corridors for Barbastelle and Bechstein's presents a likely **minor-moderate adverse** effect at a **national level.** Alcathoe bats were captured less frequently during the trapping survey and as such the disruption and loss of commuting corridors presents a likely **minor**-**moderate adverse** significant effect at a **regional** level.

The impact on foraging and commuting during construction on *Myotis spp.*, serotine, noctule, Nathusius' pipistrelle, soprano pipistrelle and common pipistrelle presents a likely **moderate** adverse significant effect at a **county** level. The impact on *Plecotus spp.*, presents a likely **minor adverse** significant effect at a **district/local** level.

New habitat creation, to include the 30 m and 10 m buffer zones, as outlined in **Section 11.6.2**, will provide sufficient mitigation in the long term given the majority of habitat lost within the proposed development's footprint is considered sub-optimal for foraging bats (poor value modified grassland). The design of which will need to ensure habitat connectivity is maintained across the site, preventing fragmentation of habitat. In the short term, there will be a temporary loss of habitat, through the removal of hedgerow sections to create site access and from the loss of modified grassland. To help reduce this impact, the 10 m of shrub layer within the 30 m buffer zone should be planted at least one full growing season prior to construction commencing.

The construction phase will also need to consider a mitigation strategy for the potential impacts associated with construction, including:

- Heras fencing should be placed around the buffer zones to include a noise control barrier where the more sensitive habitats are located;
- disruption of commuting corridors should be completed outside the breeding season;
- an ecological sensitive lighting scheme to prevent light pollution to the retained commuting/foraging corridors; and
- best practice should be followed during construction to minimise air pollution and a decline in air quality caused by vehicle and machinery use.

The removal of trees without further assessment has the potential to result in a possible **minor – major adverse** significant effect at a **local – national** level given the species recorded using the site and the surrounding high value habitat. Where trees are affected, they should be checked by a suitably qualified ecologist for any bat roosting features to ensure no roosts are destroyed or damaged during construction. Where potential roost features are identified, further surveys will be required in line with guidance set out by the Bat Conservation Trust.

With the adoption of these measures, the potential for residual effects on bats resulting from the construction phase can be reduced to **likely negligible**, and with new habitat creation is considered to result in a **likely minor beneficial** effect on commuting/foraging bats.

11.7.5 Impact 5: Breeding Birds

Without the adoption of mitigation measures, any clearance of vegetation during the breeding bird season could result in the destruction of active nests and the killing/injury of eggs/young. Light and noise pollution, and a reduction in air quality caused by construction works have the potential to impact on breeding birds indirectly. The effects of which are considered to result in a **moderate-major adverse** effect on breeding birds at a **local level.**

Phase 2 of the masterplan will likely result in the loss of high value habitat for breeding birds, such as hedgerow, scrub and tall ruderal field margins, which provides suitable habitat for priority species recorded on site such as turtle dove, yellowhammer, linnets and song thrush. The habitat lost would result in a **moderate-major adverse** effect at a **local level**.

Any vegetation removal should only be undertaken outside of the breeding bird season (avoiding March–August inclusive). The construction phase will need to follow a mitigation strategy to minimise construction impacts as outlined in **Section 11.6.4** outlining how light, noise and air pollution will be minimised particularly within sensitive areas of the site. Heras fencing will be placed around hedgerow and woodland to prevent any accidental damage caused through construction.

Extensive habitat creation on the site through the native planting of the buffer zones will provide high value habitat for nesting birds in replacement of sub-optimal habitat (modified grazed grassland) as outlined in **Section 11.6.2**. This will mitigate for the loss of nesting habitat (hedgerow) that will be removed as part of the development. In the short term, there will be a temporary loss of habitat, to minimise this impact the 10m of shrub layer within the 30 m buffer zone should be planted prior to construction commencing and development will need to include a mixture of bird boxes suitable for the species recorded on-site and should be set out in a Biodiversity Enhancement Strategy.

With the adoption of these measures, the potential for residual effects on breeding birds resulting from the construction phase of Phase 2 of the masterplan is considered to be likely **negligible**.

11.7.6 Impact 6: Common Dormouse

Surveys remain ongoing for common dormouse and the significance of effects cannot be fully determined until all surveys have been completed; however, given the likely absence of the species from the proposed development site and its immediate surroundings, given current and historical surveys, the construction phase of Phase 2 of the masterplan will result in a **negligible** effect on dormice.

The extensive habitat creation as a result of native planting will increase suitable habitat within the site, providing a possible **minor beneficial** effect for common dormouse, where seen to colonise the site in the future.

Should the presence of common dormice be confirmed, or evidence of dormice are found during the further survey work, recommendations and impacts on this species will alter. Should direct impacts on habitat used by dormice not be avoided, an EPS licence would be necessary. Mitigation and compensation measures would be required under such a licence, for example careful timing of activities and planting of native-species hedgerows and scrub, where appropriate.

11.7.7 Impact 7: Great Crested Newts

The metapopulation of great crested newts within 250 m of the proposed development site is largely unknown given the lack of access to many of the ponds but are likely to support at least a moderate

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population given the population assessment of ponds 9 and 10, the records search and large areas of suitable habitat within and around the site.

Without appropriate mitigation, the construction phase of Phase 2 of the masterplan would result in a **moderate adverse** effect on great crested newts at a **local level**.

A great crested newt EPS Mitigation Licence will be secured to permit the loss of great crested newt terrestrial habitat within the proposed development site. A method statement will be required as part of the licence application and will include the following measures:

- exclusion works to be timed outside of the great crested newt hibernation period (avoiding October–February inclusive);
- installation of newt drift fencing and pitfall traps to allow newts to be translocated from the construction zone to a suitable receptor area;
- pitfall traps will be set at a density of 50/ha;
- pitfall traps will be checked daily by a suitably qualified ecologist for a minimum of 60 ‘trapping nights’ (night air temperature >5 ^{o}C with rain in the last few days);
- trapping will take place from February–October (inclusive);
- following the completion of the trapping process, tall grassland will be strimmed to a low height to reduce cover for sheltering newts and allow a finger-tip search by a suitably qualified ecologist; and
- prior to the commencement of construction works within areas of suitable great crested newt terrestrial habitat, a fingertip search will be undertaken by a suitably qualified ecologist whom is licensed to handle great crested newts. Any amphibians encountered during the works will be translocated to a receptor site outside of the construction zone.

Without appropriate compensation, the loss of approximately 23.07 ha of poor value terrestrial habitat during the construction phase represents a **moderate adverse** effect on great crested newts.

Compensation will be required in the form of habitat creation. The creation of an ecotone/buffer zone around the woodland, to contain woodland, scrub and high value grassland, will provide high value great crested newt terrestrial habitat and maintain connectivity across the landscape which includes parcels of high value ancient woodland. The total area of habitat created will be approximately 8.72 ha.

The existing pond should be retained and enhanced, and a further three ponds alongside the SuDS will be created within the buffer zone. These water bodies will be designed to offer new breeding habitat for amphibians including the great crested newt.

With the adoption of the above mitigation and enhancement measures, the construction phase of Phase 2 of the masterplan is considered to result in a **minor beneficial** effect on the great crested newt.

11.7.8 Impact 8: Reptiles

Given the likely absence of reptiles from the site, the construction phase of Phase 2 of the masterplan would have no impact on these species.

As reptiles can quickly colonise sites were habitat suitability changes through altered management, best practice guidelines should be followed and outlined within a mitigation strategy to include:

- any clearance work of vegetation should be undertaken when reptiles are likely to be fully active (April – September) with temperatures above 10 °C;

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- clearance of the log piles around the garage to be undertaken carefully by hand, and under the supervision of an ecologist. Should a reptile be found, the ecologist will relocate it to suitable habitat that is found adjacent to the construction site and within the same land ownership;
- clearance of any vegetation between now and prior to construction should be undertaken in a phased approach. The first cut at 150 mm; The second cut at 75 mm; The third cut at 30 mm, leaving at least 24 hours between the first and second cut; and
- during construction any grass on site will need to be continually managed and maintained at a height of 30 mm to discourage reptiles potentially moving on to the site.

11.7.9 Impact 9: Other Notable Species

With the majority of high value habitat for invertebrates and hedgehogs being retained, other than hedgerow and small areas of scrub, tall ruderal and rough grassland habitat, the potential impacts of habitat lost through construction are considered to result in a **minor adverse** effect at **site level**.

In the absence of appropriate mitigation measures, there remains a risk of direct harm to hedgehogs through killing/injury during construction activities, if present. This is considered to result in a **moderate adverse** effect on the species at **site level**.

All excavations should be covered at night to prevent hedgehogs falling into any pits; failing that an escape mechanism should be provided to allow hedgehogs (and other wildlife) to climb out of an excavation.

With the adoption of the above mitigation measures the overall effect of the construction phase on hedgehogs is considered to be **negligible**.

The construction phase of Phase 2 of the masterplan will see the creation of an ecotone, containing woodland, scrub and species-rich grassland which will provide new high-value habitat for a wide variety of invertebrate species and hedgehogs. In addition, connectivity across the site for hedgehogs would be increased by creating a 11 cm x 11 cm gap within fences and the inclusion of insect houses.

The enhancement measures detailed above are considered to result in a **moderate beneficial** effect at **site level**.

11.7.10 Impact 10: Invasive/Non-native Species

There are currently no invasive species contained within the proposed development site. The spread of any invasive species from construction are therefore considered to be **negligible**.

During construction vehicles will be regularly driving in and out of site. Best practice guidelines are recommended to prevent transportation of invasive/non-native plants being brough onto the site.

11.8 Potential Environmental Effects During Construction – Development Scenario 3

11.8.1 Impact 1: Designated Sites

Without the adoption of appropriate mitigation, the construction phase of the combined developments has the potential to negatively impact upon Whithurst Park LWS, Sparrwood Hanger & Roundwyke Copse Complex Woodland & Meadows LWS and Steers Common LWS all found within less than 1 km of the proposed development site boundary. The construction phase impacts could result in a **minor – major adverse** effect on the LWSs at a **local level**, through the creation of dust and air pollution.

Potential impacts on designated sites through construction can be avoided by following best practice guideline to prevent excessive dust pollution see **Section 9.7.1.3**.

Ebernoe Common and The Mens SACs lie within 5 km of the proposed development site and provide high value habitat for bats including Annex II species: Barbastelle and Bechstein's bat. Any development within 12 km of the SACs which results in habitat loss/fragmentation has the potential to have significant effect on the SACs.

The level of effect provided below has been based upon the findings from all data analysed to date to understand how Bechstein's and barbastelle bats use the site, but construction has the potential to disrupt commuting corridors and foraging opportunities for these species through artificial lighting, habitat degradation and noise pollution, resulting in a **possible adverse** effect significant at the **county - national level**.

There is some potential for a revision to this evaluation once the remaining bat logger data has been analysed, though this is unlikely.

The development will include a sensitive lighting scheme during construction and retain the majority of high value habitat that acts as an important commuting corridor for bats. These areas will be protected, the detail of which is outlined is **Section 11.6.2.**

The proposed development will see extensive native planting in the long-term around the boundaries of the site which will be designed to be an ecotone from the retained habitats (further detailed in **Section 11.6.2**). To mitigate for the loss of foraging opportunities, disruption to commuting corridors and potential for habitat degradation, in the short-term a minimum of at least 10m of the ecotone should be planted within the 30m buffer zones at least a year prior to construction commencing.

11.8.2 Impact 2: Habitats

The combined development will result in the loss of hedgerow, scrub, tall ruderal and a small area of rough grassland which provide moderate–high value habitat on site and considered to be in moderate condition. The extent of which is not known. In the absence of appropriate mitigation measures, the described potential impacts would result in a **moderate adverse** effect at **local level.**

The combined development will also result in the loss of approximately 29.52 ha of poor value modified grassland. This habitat is considered to be of low intrinsic value due to a relative absence of structural and species diversity and is found commonly within the local area. The described potential impacts would result in a **negligible** effect; however, mitigation is still recommended to ensure there are areas of grassland contained within the proposed development site with higher distinctiveness value.

The combined development has the potential to impact on retained ancient woodland and scattered trees through causing root damage through construction, dust pollution and vibration, along with the potential fragmentation between the north and south of Rickman's Green Village site. In the absence of appropriate mitigation measures, the described impacts would result in a **moderate adverse** effect at **local level.**

The loss of habitat will be mitigated for through the native planting of the buffer zones around retained habitat as detailed in **Section 11.6.2**. In total, it is expected that 2,180 m of 30 m buffer and 2,135 m of 10 m buffer, creating a total area of 10.02 ha of new habitat, will be created within the red line boundary of the proposed development site.

Details of the species composition and management will need to be set out in a Biodiversity Enhancement Strategy. The provision of this ecotone buffer is to provide a **moderate beneficial** effect on the proposed development site's hedgerow habitat resource, protection of retained habitat and replacement of lost habitats. The newly created habitat will need to be designed to maintain connectivity across the proposed development site and prevent fragmentation of habitats caused by new roads and artificial lighting.

Heras fencing will be placed around the buffer zone to prevent equipment storage and vehicle damage within the area. Potential impacts on retained habitats through construction can be avoided by following best practice guidelines to prevent excessive dust pollution, see **Section 9.7.1.3**.

With the adoption of the above avoidance and mitigation measures, a **negligible** effect on the proposed development site's retained woodland, hedgerow, and scattered tree habitat during the construction phase.

11.8.3 Impact 3: Badgers

A badger sett was found on the immediate southern boundary of field R9 and suitable foraging habitat is found across the site. The sett will not directly be affected by the combined development but could be affected indirectly through disruption during the construction phase and there is the potential for badgers to become trapped/injured by uncovered excavations during construction which pose a risk of **moderate adverse** effect at a **site level**.

A 30 m buffer zone from the woodland edge where the sett was located will be created with a barrier to prevent access into this area avoiding disturbance if the sett still remains active.

Further precautionary measures during construction should include;

- all excavations should be covered at night to prevent badgers falling into pits; failing that an escape mechanism should be provided to allow badgers (and other wildlife) to climb out of an excavation; and
- an updated walkover survey prior to construction commencing and every six months during construction to confirm continued absence of active setts or to inform a badger mitigation strategy.

Should badgers take up residence within a sett in the construction zone or its immediate zone of influence (within 30 m), a badger mitigation strategy will be required which will include consideration of the need for a development licence from Natural England to close the sett.

With the adoption of the above avoidance/mitigation measures, the potential for residual effects on badgers resulting from the construction phase of the combined development is considered to be **negligible**.

11.8.4 Impact 4: Bats

Some logger survey data analysis remains ongoing for bats and the significance of effects has been based on all data interpreted to date, with changes to this assessment remaining unlikely.

The construction phase has the potential to result in the temporary loss of foraging habitat and disruption of commuting corridors caused by habitat removal, artificial lighting, and noise disturbance. Without appropriate mitigation, the loss of foraging habitat and disruption to commuting corridors for Barbastelle and Bechstein's presents a **likely moderate adverse** effect at a **national level.** Alcathoe bats were captured less frequently during the trapping survey and as such the disruption and loss of commuting corridors presents a **likely moderate adverse** significant effect at a **regional** level.

The impact on foraging and commuting during construction on *Myotis spp*., serotine, noctule, Nathusius' pipistrelle, soprano pipistrelle and common pipistrelle presents a likely **moderate** adverse significant effect at a **county** level. The impact on *Plecotus spp.*, presents a likely **minor adverse** significant effect at a **district/local** level.

New habitat creation, to include the 30m and 10m buffer zones, as outlined in **Section 11.6.2**, will provide sufficient mitigation in the long term given the majority of habitat lost within the proposed development's footprint is considered sub-optimal for foraging bats (poor value modified grassland). The design of which will need to ensure habitat connectivity is maintained across the site, preventing fragmentation of habitat. In the short term, there will be a temporary loss of habitat, through the removal of hedgerow sections to create site access and from the loss of modified grassland. To help reduce this impact, the 10m of shrub layer within the 30m buffer zone should be planted at least one full growing season prior to construction commencing.

The construction phase will also need to consider a mitigation strategy for the potential impacts associated with construction, including:

- Heras fencing should be placed around the buffer zones to include a noise control barrier where the more sensitive habitats are located;
- disruption of commuting corridors should be completed outside the breeding season;
- an ecological sensitive lighting scheme to prevent light pollution to the retained commuting/foraging corridors; and
- best practice should be followed during construction to minimise air pollution and a decline in air quality caused by vehicle and machinery use.

The removal of trees without further assessment has the potential to result in a **possible minor – major adverse** significant effect at a **local – national** level given the species recorded using the site and the surrounding high value habitat. Where trees are affected, they should be checked by a suitably qualified ecologist for any bat roosting features to ensure no roosts are destroyed or damaged during construction. Where potential roost features are identified, further surveys will be required in line with guidance set out by the Bat Conservation Trust.

With the adoption of these measures, the potential for residual effects on bats resulting from the construction phase can be reduced to **likely negligible**, and with new habitat creation is considered to result in a **likely minor beneficial** effect on commuting/foraging bats.

11.8.5 Impact 5: Breeding Birds

Without the adoption of mitigation measures, any clearance of vegetation during the breeding bird season could result in the destruction of active nests and the killing/injury of eggs/young. Light and noise pollution, and a reduction in air quality caused by construction works have the potential to impact on breeding birds indirectly. The effects of which are considered to result in a **moderate-major adverse** effect on breeding birds at a **local level.**

The combined development will likely result in the loss of high value habitat for breeding birds, such as hedgerow, scrub and tall ruderal field margins, which provide suitable habitat for priority species recorded on site such as turtle dove, yellowhammer, linnets and song thrush. The habitat lost would result in a **moderate-major adverse** effect at a **local level**.

Any vegetation removal should only be undertaken outside of the breeding bird season (avoiding March–August inclusive). The construction phase will need to follow a mitigation strategy to minimise construction impacts as outlined in **Section 11.6.2** outlining how light, noise and air pollution will be minimised particularly within sensitive areas of the site. Heras fencing will be placed around hedgerow and woodland to prevent any accidental damage caused through construction.

Extensive habitat creation on the site through the native planting of the buffer zones will provide high value habitat for nesting birds in replacement of sub-optimal habitat (modified grazed grassland) as outlined in **Section 11.6.2**. This will mitigate for the loss of nesting habitat (hedgerow) that will be removed as part of the development. In the short term, there will be a temporary loss of habitat, to minimise this impact the 10m of shrub layer within the 30 m buffer zone should be planted prior to construction commencing and development will need to include a mixture of bird boxes suitable for the species recorded on-site and should be set out in a Biodiversity Enhancement Strategy.

With the adoption of these measures, the potential for residual effects on breeding birds resulting from the construction phase of the combined development is considered to be **negligible**.

11.8.6 Impact 6: Common Dormouse

Surveys remain ongoing for common dormouse and the significance of effects cannot be fully determined until all surveys have been completed; however, given the likely absence of the species from the proposed development site and its immediate surroundings given current and historical surveys, the construction phase of the combined development will result in a **negligible** effect on dormice.

The extensive habitat creation as a result of native planting will increase suitable habitat within the site, providing a possible **minor beneficial** effect for common dormouse, where seen to colonise the site in the future.

Should the presence of common dormice be confirmed, or evidence of dormice are found during the further survey work, recommendations and impacts on this species will alter. Should direct impacts on habitat used by dormice not be avoided, an EPS licence would be necessary. Mitigation and compensation measures would be required under such a licence, for example careful timing of activities and planting of native-species hedgerows and scrub, where appropriate.

11.8.7 Impact 7: Great Crested Newts

The metapopulation of great crested newts within 250 m of the proposed development site is largely unknown given the lack of access to many of the ponds but are likely to support at least a moderate population given the population assessment of ponds 9 and 10, the records search and large areas of suitable habitat within and around the site.

Without appropriate mitigation, the construction phase of the combined development would result in a **moderate adverse** effect on great crested newts at a **local level**.

A great crested newt EPS Mitigation Licence will be secured to permit the loss of great crested newt terrestrial habitat within the proposed development site. A method statement will be required as part of the licence application and will include the following measures:

- exclusion works to be timed outside of the great crested newt hibernation period (avoiding November–February inclusive);
- installation of newt drift fencing and pitfall traps to allow newts to be translocated from the construction zone to a suitable receptor area;
- pitfall traps will be set at a density of 50/ha;

- pitfall traps will be checked daily by a suitably qualified ecologist for a minimum of 60 ‘trapping nights’ (night air temperature >5 ^{o}C with rain in the last few days);
- trapping will take place from February–October (inclusive;)
- following the completion of the trapping process, tall grassland will be strimmed to a low height to reduce cover for sheltering newts and allow a finger-tip search by a suitably qualified ecologist; and,
- prior to the commencement of construction works within areas of suitable great crested newt terrestrial habitat, a fingertip search will be undertaken by a suitably qualified ecologist whom is licensed to handle great crested newts. Any amphibians encountered during the works will be translocated to a receptor site outside of the construction zone.

Without appropriate compensation, the loss of approximately 31 ha of poor value terrestrial habitat during the construction phase represents a **moderate adverse** effect on great crested newts.

Compensation will be required in the form of habitat creation. The creation of an ecotone/buffer zone around the woodland to contain woodland, scrub and high value grassland will provide high value great crested newt terrestrial habitat and maintain connectivity across the landscape which includes parcels of high value ancient woodland.

The existing pond should be retained and enhanced, and a further three ponds alongside the SuDS will be created within the buffer zone. These water bodies will be designed to offer new breeding habitat for amphibians including the great crested newt.

With the adoption of the above mitigation and enhancement measures, the construction phase of the combined development is considered to result in a **minor beneficial** effect on the great crested newt

11.8.8 Impact 8: Reptiles

Given the likely absence of reptiles from the site, the construction phase of the combined development will have no impact on these species.

As reptiles can quickly colonise sites were habitat suitability changes through altered management, best practice guidelines should be followed and outlined within a mitigation strategy to include:

- any clearance work of vegetation should be undertaken when reptiles are likely to be fully active (April – September) with temperatures above 10 °C;
- clearance of the log piles around the garage to be undertaken carefully by hand, and under the supervision of an ecologist. Should a reptile be found, the ecologist will relocate it to suitable habitat that is found adjacent to the construction site and within the same land ownership;
- clearance of any vegetation between now and prior to construction should be undertaken in a phased approach. The first cut at 150 mm; The second cut at 75 mm; The third cut at 30 mm, leaving at least 24 hours between the first and second cut; and
- during construction any grass on site will need to be continually managed and maintained at a height of 30 mm to discourage reptiles potentially moving on to the site.

11.8.9 Impact 9: Other Notable Species

With the majority of high value habitat for invertebrates and hedgehogs being retained, other than hedgerow and small areas of scrub, tall ruderal and rough grassland habitat, the potential impacts of habitat lost through construction are considered to result in a **minor adverse** effect at **site level**.

In the absence of appropriate mitigation measures, there remains a risk of direct harm to hedgehogs through killing/injury during construction activities, if present. This is considered to result in a **moderate adverse** effect on the species at **site level**.

All excavations should be covered at night to prevent hedgehogs falling into any pits; failing that an escape mechanism should be provided to allow hedgehogs (and other wildlife) to climb out of an excavation.

With the adoption of the above mitigation measures, the overall effect of the construction phase on hedgehogs is considered to be **negligible**.

The construction phase of the combined development will see the creation of an ecotone, containing woodland, scrub and species-rich grassland which will provide new high-value habitat for a wide variety of invertebrate species and hedgehogs. In addition, connectivity across the site for hedgehogs would be increased by creating a 11 cm x 11 cm gap within fences and the inclusion of insect houses.

The enhancement measures detailed above are considered to result in a **moderate beneficial** effect at **site level**.

Impact 10: Invasive/Non-native Species

There are currently no invasive species contained within the proposed development site. The spread of any invasive species from construction are therefore considered to be **negligible**.

During construction vehicles will be regularly driving in and out of site. Best practice guidelines are recommended to prevent transportation of invasive/non-native plants being brough onto the site.

11.9 Potential Environmental Effects During Operation – Development Scenario 1

11.9.1 Impact 1: Designated Sites

Potential impacts on internationally important assemblages of roosting/foraging/commuting bats (Bechstein's bat and barbastelle) through light-spillage, habitat fragmentation, predation from domestic cats during the operational phase has the potential to cause negative impacts upon Ebernoe Common SAC and The Mens SAC (barbastelle only), should bats move between the proposed development site and the SACs. This impact risk is therefore weighted as a **possible minor impact at a national level.**

The development will include a sensitive lighting scheme (outlined in **Section 11.9.4** and detailed within a separate report) ensuring minimal light pollution (less than 0.5lux) on retained habitat. Within the phase 1 development there will be extensive native planting in the form of the buffer zones as outlined in **Section 11.6.2**. This will protect and enhance existing commuting corridors for bats along with providing increased foraging opportunities. As an addition, there should be a review of the current management regime of the site, and introduction of management to maximise the biodiversity value of the woodland. An appropriate monitoring regime can be put in place to ensure that the management measures for the site's woodland habitat resource are successful and if necessary, can be altered to achieve desired outcomes. The plan will include an objective around sustaining the current populations of Bechstein's and barbastelle bats.

The increased levels of human activity during the operational phase have the potential to impact upon Whithurst Park LWS, Sparrwood Hanger & Roundwyke Copse Complex Woodland & Meadows LWS and Steers Common LWS given their proximity to the site (less than 1 km). Increased human recreational pressure could lead to degradation of Section 41 Priority habitats for which the LWSs are designated, through damage to vegetation, compaction, erosion, nutrient enrichment and disturbance to wildlife. Unmitigated, the potential impacts on the three LWSs present a **minor adverse** effect at a **local level**.

A habitat and visitor management plan will need to be prepared in order to manage recreational pressure on the LWSs. The plan should include measures such as fencing, dead hedging as 'soft barriers', signage and appropriate access restrictions to reduce damage to the most important habitats. There should be a review of the current management regime of the LWSs, and the introduction of management to maximise their biodiversity value.

The Arun Valley SPA, SAC and Ramsar site lies approximately 12 km south of the proposed development site. The site is vulnerable to changes in water levels, water pollution and inappropriate ditch management. Increased water usage by Phase 1 of the masterplan will increase groundwater abstraction with the potential to affect the Arun Valley SPA, SAC and Ramsar site. Without mitigation Phase 1 of the masterplan presents a likely **minor adverse** effect upon the designated sites at an **international level**.

With the adoption of a suitable mitigation strategy/water neutrality statement, the potential residual effects on the Arun Valley SPA, SAC and Ramsar site resulting from the operational phase of Phase 1 of the masterplan is considered to be **negligible**.

11.9.2 Impact 2: Habitats

The most ecologically valuable habitat within the proposed development site is the semi-natural broadleaf woodland that is located along the south-western boundary, with a significant proportion recognised as ancient woodland. Increased recreational activity could lead to degradation of this habitat through damage to vegetation, compaction, erosion of soils, nutrient enrichment and disturbance to wildlife. Residential development will increase the levels of noise, light, and risks of ground and air pollution within the immediate vicinity of the site through the introduction of vehicles, pets and people. In the absence of mitigation, the operational phase of Phase 1 of the masterplan represents a **moderate adverse** effect at a **local level.**

Phase 1 of the masterplan will see extensive areas of new planting in the long-term including a buffer zone around retained sensitive habitats to act as an ecotone as outlined in **Section 11.6.2**. No access will be given to residents, being prevented through the planting of a dense layer (approx. 10 m) of thorny shrub species, careful design of the SuDS to act as an additional physical barrier. This will prevent/minimise recreational activity near or within the sensitive habitats, such as the ancient woodland found on site. To minimise the short-term impacts before habitat is established, a minimum of at least 10 m of the shrub layer should be planted within the 30 m buffer zone at least a year prior to construction commencing, in order for the benefits of the buffer zone to begin to become effective during the early stages of the operational phase.

The creation of buffer zones will help to mitigate for the potential impacts of nutrient enrichment, pesticides and herbicides, noise pollution and light pollution by acting as a barrier between the development and the retained habitats found within the immediate vicinity of the site. The inclusion of SuDS ponds across the site will mitigate for polluted groundwater run-off otherwise affecting retained habitats.

A review of the current management regime of the site should be undertaken to maximise the biodiversity value of the woodland. An appropriate monitoring regime can also be put in place to ensure that the management measures for the proposed development site's woodland habitat resource are successful and if necessary, can be altered to achieve the desired outcomes.

With the adoption of the above mitigation measures, effects on woodland and other sensitive habitats during the operational phase are considered to be **negligible**.

The loss of 6.45 ha of poor value grassland will be further compensated for through altering the management of other grazed fields on land within the farm ownership. The aim will be to encourage natural regeneration within species poor grassland that is presently intensively grazed as in line with much of the farm. Individual trees will be planted to create a future canopy and parkland structure, with these trees protected from grazing pressures. Pigs will be initially introduced for a short period to effectively turn over the high nitrate topsoil and create areas of bare ground for new plant colonisation and some scrub development. The field is then rested before the introduction of low density seasonal grazing by cattle. The aim being to create an area of higher value grassland habitat, with scrub and good canopy cover for commuting species. The introduction and the levels of grazing will need be monitored and adjusted as necessary until the target habitat condition is met. It is anticipated that a landscape and ecology management plan (LEMP) will be conditioned, detailing measures for restoration of the site, including habitat creation and maintenance.

This will ultimately see a **minor beneficial** effect on the site's woodland and hedgerow habitat resource by increasing these habitat areas and a **minor beneficial** effect on the site's grassland habitat, though it is acknowledged that habitat establishment times and risk of habitat establishment failure create some uncertainty.

11.9.3 Impact 3: Badgers

Badgers are generally quite adaptable to some degree of human disturbance, with foraging, commuting routes and occupation or establishment of new setts, constantly adjusting in response to new food sources and disturbance.

The inclusion of a native planting scheme and buffer zones, which prevent human access to these areas of habitat, will help to provide higher quality foraging habitat within the site and minimise disturbance, so any effect is considered to be **negligible**.

11.9.4 Impact 4: Bats

Some logger survey data analysis remains ongoing for bats and the significance of effects has been based on all data interpreted to date, with changes to this assessment remaining unlikely.

In the absence of mitigation, increased artificial lighting during the operation phase will likely result in the disruption of flight lines and negatively impact the foraging and commuting behaviour of a variety of species, including Bechstein's bat, barbastelle and Alcathoe bat.

Increased human activity within the proposed development site has the potential to result in increased disturbance and/or displacement of roosting bats, through noise pollution, human disturbance, harmful chemicals (pesticides and herbicides), reduced water quality and increased predation by cats.

Unmitigated, Phase 1 of the masterplan would result in a **likely minor adverse** effect at a **national level** for barbastelle and Bechstein's. Alcathoe bats were captured less frequently during the trapping survey and as such the disruption and loss of commuting corridors presents a **likely minor adverse** significant effect at a **regional** level.

The impact on foraging and commuting during construction and operation on *Myotis spp*., Nathusius' pipistrelle, soprano pipistrelle and common pipistrelle presents a likely **moderate** adverse significant effect at a **county** level. The impact on serotine, noctule and *Plecotus spp.*, presents a likely **minor adverse** significant effect at a **district/local** level.
Phase 1 of the masterplan will include a buffer/ecotone from the high value habitat including the ancient woodland that borders the proposed development site, the design of which is outlined in **Section 11.6.2**.

This newly created habitat will be designed to stop access from humans and cats to prevent disturbance and predation, and to provide a barrier to operational impacts such as light, air and noise pollution.

In addition to the proposed ecotone along the edges of woodland to minimise light pollution, a 'sensitive lighting plan' has been developed as part of the detailed design, in accordance with guidelines set out by the Bat Conservation Trust. Any future lighting design must include the following measures:

- external lighting must be avoided where possible, with reflective white line marking used to highlight the new access road and paths where required;
- all external lighting and internal lighting spill must be directed away from buffers;
- an ecotone 'dark corridor' will be created along the boundary of the site where existing woodland is found on the site. No light amounting to over 0.5 lux must be detectable within this corridor, and any lighting will be positioned outside of these areas;
- all external lighting should be directed downwards, with low-level bollards with hoods or baffles used where feasible;
- light sources must be of a spectrum and type which bats and their invertebrate prey are not sensitive to, with no external lighting above 1800 Kelvin currently proposed; and
- light spill should be directed away from any woodland, hedgerows, and other semi-natural habitats.

The potential impacts of poor water quality through groundwater run-off, the potential introduction of pesticides and herbicides providing a bioaccumulation risk and accidental killing (i.e. road collisions) have the potential to affect long term populations. While the buffer zone will minimise this risk it cannot be completely avoided along with effects of noise pollution on foraging bats, as levels are hard to control or monitor. Compensation will therefore be required, including further habitat creation, in particular for barbastelle and Bechstein's bat.

The further habitat creation as outlined in **Section 11.9.2**, will provide further commuting and foraging opportunities within Crouchlands Farm. The areas of habitat to be restored are yet to be determined but will be designed to have optimum connectivity to existing high-value woodland habitat.

With the adoption of the above mitigation measures, effects on foraging/commuting bats will be reduced to at least likely **negligible,** with the opportunity to create a **likely minor positive effect,** significant at a **national level.**

11.9.5 Impact 5: Breeding Birds

Increased human activity within the site has the potential to result in the disturbance and/or displacement of breeding birds through increased levels of noise pollution, light pollution, and recreational activity including dog walking along with habitat degradation. It is considered likely that use of harmful chemicals (herbicides and pesticides) and groundwater run-off, reducing water quality will increase bioaccumulation risks within breeding birds.

The results of the surveys indicate that this would likely impact upon mostly common and widespread species; however, could also affect some priority species such as nightingales, which were found within the ancient woodland on the boundary of the site. The overall effects on breeding birds are considered to be **minor– moderate adverse** at the **local level**.

The newly created buffer zone habitat on site, outlined in **Section 11.6.2**, would provide additional habitat and also mitigate for the effects of noise, light pollution, predation, and disturbance through recreational activity by providing a barrier between the development and high value habitats.

Phase 1 of the masterplan will further incorporate a sensitive lighting plan and habitat management plan as described in **Section 11.9.2** to further mitigate for habitat degradation and light pollution.

The effects of noise, the bioaccumulation risks of pesticides and herbicides and accidental killings (e.g. road collisions) cannot be fully mitigated for by the introduction of the buffer zones and other methods would be impractical given the lack of control during the operational phase. Further compensation will be required for breeding birds to mitigate for the associated residual effects.

To ensure populations of breeding birds are maintained, in particular red listed species, areas of previously over-grazed grassland within the wider landholding of the farm will be restored (see **Section 11.9.2**). The aim being to provide an ecologically diverse area of grassland with scrub and mature trees for species such as turtle dove, nightingale, yellowhammer, linnet, bullfinch, cuckoo, and skylark, all of which are not usually associated with residential development. The areas of habitat to be restored are yet to be determined for each scenario.

Bird boxes should be included within the design of the development and should be integrated into the buildings to ensure long term populations of red and amber listed species that have been recorded around the site. Below is the recommended number of boxes for specific species, the location of the and detail of the boxes should be further outlined within the LEMP:

- house sparrow nest box x 25
- swift nest box x 20
- barn swallow nest x 20
- starling nest box x 15
- mixture of boxes for common garden nesting birds x 40

With the adoption of the above mitigation measures, potential effects on breeding birds will be reduced to **negligible**.

11.9.6 Impact 6: Common Dormouse

Surveys for common dormouse within the immediate surroundings of the site have failed to identify the presence of this species.

Given the likely absence of the species from the site, the operational phase would have no impact on dormice.

Phase 1 of the masterplan would likely prevent future colonisation by dormouse in the area if the potential effects of artificial light, habitat degradation, predation and human disturbance were not appropriately mitigated for. The extensive habitat creation in the form of buffer zones around habitat with good suitability for dormice will appropriately mitigate for these effects with dormice potentially being able to colonise suitable habitat in the future.

The extensive habitat creation, as a result of native planting, will increase suitable habitat within the proposed development site, providing a **negligible-minor beneficial** effect for common dormouse.

11.9.7 Impact 7: Great Crested Newts

The operational phase of Phase 1 of the masterplan has the potential to negatively impact upon great crested newt habitat through degradation as a result of littering and trampling of grassland, predation by cats, as well as damage/disturbance of newly created ponds as a result of people and/or dogs entering the margins or water. The effects are considered to be **minor adverse** at the **site level**.

The newly created buffer zone habitat on site, outlined in **Section 11.6.2**, while providing additional habitat, will mitigate for the effects of disturbance by preventing access to cats, dogs and humans.

Phase 1 of the development will further incorporate a habitat management plan, as described in **Section 11.9.2**, to further mitigate for habitat degradation and poor management. It will also outline signage, pathways and fencing to be installed to deter visitors away from sensitive areas.

The mitigation measures, including the habitat management plan, is considered to result in an overall **negligible–minor beneficial** effect on great crested newts.

11.9.8 Impact 8: Reptiles

Given the likely absence of these species from the site. The operational phase of Phase 1 of the masterplan will have no impact on reptiles.

The habitat creation of native planting of woodland, scrub and high value grassland will provide higher quality habitat for these species providing a **negligible–minor beneficial** effect for reptiles.

11.9.9 Impact 9: Other Notable Species

The operational phase of Phase 1 of the masterplan has the potential to impact on the site's invertebrate assemblage through an increase in artificial light which can alter invertebrate behaviour. Furthermore, in the absence of appropriate mitigation measures, including increased human activity within the site, could result in the degradation of invertebrate habitat and the introduction of harmful pesticides and herbicides. The overall effect on invertebrates is considered to result in a **minor adverse** effect at the **site level**.

Effects from artificial lighting will be avoided through the adoption of a sensitive lighting scheme outlined in **Section 11.9.1**. The degradation of existing and newly created habitat will be prevented through a habitat management plan and ongoing management of the habitat on site.

The effects of noise, the bioaccumulation risks of pesticides and herbicides and accidental killings (e.g. road collisions) cannot be fully mitigated for by the introduction of the buffer zones and other methods would be impractical given the lack of control during the operational phase. Without creation of compensatory habitat this would have a negative adverse effect at the **site/local** level. Areas of previously over-grazed grassland within the farm will be restored (see **Section 11.9.2**) to provide high value habitat within the surrounding landscape. The areas of habitat to be restored are yet to be determined for each scenario.

With the adoption of these measures it is considered that there would be a **negligible** effect on invertebrates. The newly created woodland, scrub, high quality grassland and SuDs ponds will provide a **minor beneficial** effect.

The design of the Phase 1 of the masterplan is likely to include garden fencing which can fragment habitat for hedgehogs leading to a **minor adverse** effect at **site level**. Any fencing will have a 11 cm x 11 cm gap on the ground to allow hedgehogs to move across the site. The habitat creation will further provide refuge and foraging opportunities. With the adoption of these measures, the operational phase of Phase 1 of the masterplan will see a **negligible** effect on hedgehogs.

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11.9.10 Impact 10: Invasive/Non-native Species

Without the adoption of suitable avoidance measures, the operational phase could see the introduction of invasive/non-native species through ornamental planting within the site or introduction through transportation (i.e., vehicles and humans moving on and off the site). This is considered to present a **moderate adverse** effect at a **site level**.

Avoidance of impacts resulting from introduction of invasive/non-native species will be achieved through adoption of planting regimes as specified in the Biodiversity Enhancement Strategy. Additionally, the site will be monitored annually through a walkover by a suitably qualified ecologist who will identify the presence of any invasive/non-native species. Should any species be identified by the ecologist, appropriate measures will be put into place for their eradication.

With the adoption of the above measures, there is considered to be a **negligible** effect from invasive/non-native species during the operational phase.

11.10 Potential Environmental Effects During Operation – Development Scenario 2

11.10.1 Impact 1: Designated Sites

Potential impacts on internationally important assemblages of roosting/foraging/commuting bats (Bechstein's bat and barbastelle) through light-spillage, habitat fragmentation, predation from domestic cats during the operational phase has the potential to cause negative impacts upon Ebernoe Common SAC and The Mens SAC (barbastelle only), should bats move between the proposed development site and the SACs. This impact risk is therefore weighted as a possible **moderate impact** at a **national level.**

The development will include a sensitive lighting scheme (outlined in **Section 11.9.4** and detailed within a separate report) ensuring minimal light pollution on retained habitat. Within the phase 2 development there will be extensive native planting in the form of the buffer zones as outlined in **Section 11.6.2**. This will protect and enhance existing commuting corridors for bats along with providing increased foraging opportunities. As an addition, there should be a review of the current management regime of the site, and introduction of management to maximise the biodiversity value of the woodland. An appropriate monitoring regime can be put in place to ensure that the management measures for the site's woodland habitat resource are successful and if necessary, can be altered to achieve desired outcomes. The plan will include an objective around sustaining the current populations of Bechstein's and barbastelle bats.

The increased levels of human activity during its operational phase have the potential to impact upon Whithurst Park LWS, Sparrwood Hanger & Roundwyke Copse Complex Woodland & Meadows LWS and Steers Common LWS given their proximity to the site (less than 1 km). Increased human recreational pressure could lead to degradation of Section 41 Priority habitats for which the LWS's are designated, through damage to vegetation, compaction, erosion, nutrient enrichment and disturbance to wildlife. Unmitigated the potential impacts on the three LWSs present a **moderate** adverse effect at a **local level**.

A habitat and visitor management plan will need to be prepared in order to manage recreational pressure on the LWSs. The plan will include measures such as fencing, dead hedging as 'soft barriers', signage and appropriate access restrictions to reduce damage to the most important habitats. There should be a review of current management regime of the LWSs, and the introduction of management to maximise their biodiversity value.

The Arun Valley SPA, SAC and Ramsar site lies approximately 12 km south of the proposed development site. The site is vulnerable to changes in water levels, water pollution and inappropriate ditch management. Increased water usage by Phase 2 of the masterplan will increase groundwater abstraction with the potential to affect the Arun Valley SPA, SAC and Ramsar site. Without mitigation Phase 2 of the masterplan presents a **minor adverse** effect upon the designated sites at an **international level**.

With the adoption of a suitable mitigation strategy/water neutrality statement, the potential residual effects on the Arun Valley SPA, SAC and Ramsar site resulting from the operational phase of Phase 2 of the masterplan is considered to be **negligible**.

11.10.2 Impact 2: Habitats

The most ecologically valuable habitat on or within close vicinity of the proposed development site is the semi-natural broadleaf woodland, with a significant proportion recognised as ancient woodland. Increased recreational activity could lead to degradation of this habitat through damage to vegetation, compaction, erosion of soils, nutrient enrichment and disturbance to wildlife. Residential development will increase the levels of noise, light, ground and air pollution within the immediate vicinity of the site through the introduction of vehicles, pets, and people.

In the absence of mitigation, the operational phase of Phase 2 of the masterplan represents a **moderate adverse** effect at **local level** (though it is currently unknown how much of this habitat will be removed).

Phase 2 of the masterplan will see extensive areas of new planting in the long-term including a buffer zone around retained sensitive habitats, to act as an ecotone as outlined in **Section 11.6.2**. No access will be given to residential living, being prevented by planting a dense layer (approx. 10 m) of thorny shrub species, careful design of the SuDS to act as an additional physical barrier. This will prevent/minimise recreational activity near or within the sensitive habitats such as the ancient woodland found on site. To minimise the short-term impacts before habitat is established, a minimum of at least 10 m of the shrub layer should be planted within the 30 m buffer zone at least a year prior to construction commencing, in order for the benefits of the buffer zone to be effective during the early stages of the operational phase.

The creation of buffer zones will help to mitigate for the potential impacts of nutrient enrichment, pesticides and herbicides, noise pollution and light pollution by acting as a barrier from the development to the retained habitats found within the immediate vicinity of the site. The inclusion of SuDS ponds across the site will mitigate for polluted groundwater run-off otherwise affecting retained habitats.

A review of the current management regime of the site should be undertaken to maximise the biodiversity value of the woodland. An appropriate monitoring regime can also be put in place to ensure that the management measures for the proposed development site's woodland habitat resource are successful and if necessary, can be altered to achieve the desired outcomes.

With the adoption of the above mitigation measures, effects on woodland and other sensitive habitats during the operational phase are considered to be **negligible**.

The loss of 23.07ha of poor and moderate value grassland will be further compensated for through altering the management of other grazed fields on land within the farm ownership (as outlined in **Section 11.9.2**).

This will ultimately see a **minor beneficial** effect on the site's woodland and hedgerow habitat resource by increasing these habitat areas and a **minor beneficial** effect on the site's grassland habitat, though it is acknowledged that habitat establishment times and risk of habitat establishment failure create some uncertainty.

11.10.3 Impact 3: Badgers

Badgers are generally quite adaptable to some degree of human disturbance, with foraging, commuting routes and occupation or establishment of new setts, constantly adjusting in response to new food sources and disturbance,

The inclusion of a native planting scheme and buffer zones which prevent human access to these areas of habitat will help to provide higher quality foraging habitat within the site and minimise disturbance, so any effect is considered to be **negligible**.

11.10.4 Impact 4: Bats

Some logger survey data analysis remains ongoing for bats and the significance of effects has been based on all data interpreted to date, with changes to this assessment remaining unlikely.

In the absence of mitigation, increased artificial lighting during the operation phase will likely result in the disruption of flight lines, negatively impact upon foraging and commuting behaviour for a variety of species, including Bechstein's bat, barbastelle and Alcathoe bat and has the potential to fragment habitat that is found across the site.

Increased human activity within the proposed development site has the potential to result in increased disturbance and/or displacement of roosting bats, through noise pollution, human disturbance, harmful chemicals (pesticides and herbicides), reduced water quality and increased predation by cats.

Unmitigated, Phase 2 of the masterplan would result in a **moderate adverse** effect at a **national level** for barbastelle and Bechstein's. Alcathoe bats were captured less frequently during the trapping survey and as such the disruption and loss of commuting corridors presents a likely **moderate adverse** significant effect at a **regional** level.

The impact on foraging and commuting during construction and operation on *Myotis spp*., serotine, noctule, Nathusius' pipistrelle, soprano pipistrelle and common pipistrelle presents a likely **moderate** adverse significant effect at a **county** level. The impact on *Plecotus spp.*, presents a likely **minor adverse** significant effect at a **district/local** level

Phase 2 of the masterplan will include a buffer/ecotone from the high value habitat including the ancient woodland that borders the proposed development site, the design of which is outlined in **Section 11.6.2**. This newly created habitat will be designed to stop access from humans and cats to prevent disturbance and predation and to provide a barrier to operational impacts such as light, air and noise pollution. It will largely ensure that existing commuting corridors are maintained and habitat is not fragmented across the proposed development site.

Phase 2 of the masterplan will further incorporate a sensitive lighting plan and habitat management plan as described in **Section 11.9.4** to further mitigate for habitat degradation/disturbance and light pollution.

The impacts of poor water quality through groundwater run-off, the potential introduction of pesticides and herbicides providing a bioaccumulation risk and accidental killing (i.e. road collisions) have the potential to affect long term populations. While the buffer zone will minimise these risks, along with noise pollution and habitat fragmentation, the effects as the levels of impact are hard to control or monitor.

The further habitat creation as outlined in **Section 11.9.2**, will provide further commuting and foraging opportunities within Crouchlands Farm. The areas of habitat to be restored are yet to be determined but will be designed to have optimum connectivity to existing high-value woodland habitat.

Phase 2 of the masterplan will have to prevent severance of habitat between the north and south of the site caused by increased usage of the existing private road and artificial light. While an ecological lighting plan will be included within the design there should also remain a good level of canopy cover of trees across the road, particularly within the western side of the site adjacent to the farm buildings. Specific measures to ensure this must be detailed within a subsequent LEMP.

With the adoption of the above mitigation measures, effects on foraging/commuting bats will be reduced to at least likely **negligible,** with the opportunity to create a **likely minor positive effect,** significant at a **national level.**

11.10.5 Impact 5: Breeding Birds

Increased human activity within the site has the potential to result in the disturbance and/or displacement of breeding birds through increased levels of noise pollution, light pollution, and recreational activity along with habitat degradation. It is considered likely that use of harmful chemicals (herbicides and pesticides) and groundwater run-off, reducing water quality will increase bioaccumulation risks within breeding birds.

The results of the surveys indicate that this would likely impact upon mostly common and widespread species; however, could also affect some priority species such as nightingales, turtle doves, linnet and yellowhammer which were found within the surrounding woodland and scrub within and around the immediate boundary of the site. The overall effect on breeding birds is considered to be **moderate adverse** effect at **local level**.

The newly created buffer zone habitat on site, outlined in **Section 11.6.2**, would provide additional habitat and also mitigate for the effects of noise, light pollution, predation, and disturbance through recreational activity by providing a barrier between the development and high value habitats that are being retained.

Phase 1 of the masterplan will further incorporate a sensitive lighting plan and habitat management plan as described in **Section 11.9.2** to further mitigate for habitat degradation and light pollution.

The effects of noise, the bioaccumulation risks of pesticides and herbicides and accidental killings (e.g., road collisions) cannot be fully mitigated for by the introduction of the buffer zones and other methods would be unpractical given the lack of control during the operational phase. Further compensation will be required for breeding birds to mitigate for the associated residual effects.

To ensure populations of breeding birds are maintained within the area, in particular red listed species, areas of previously over-grazed grassland within the wider landholding of the farm will be restored (see **Section 11.9.2**). The aim being to provide an ecologically diverse area of grassland with scrub and mature trees for species such as turtle dove, nightingale, yellowhammer, linnet, bullfinch, cuckoo, and skylark, all of which are not usually associated with residential development. The areas of habitat to be restored are yet to be determined for each scenario.

Bird boxes should be included within the design of the development and should be integrated into the buildings to ensure long term populations of red and amber listed species that have been recorded around the site. Below is the recommended number of boxes for specific species, the location of the and detail of the boxes should be further outlined within the LEMP:

- house sparrow nest box x 40
- swift nest box x 40
- barn swallow nest x 40
- starling nest box x 30
- mixture of boxes for common garden nesting birds x150

With the adoption of the above mitigation measures, effects on breeding birds will be reduced to **negligible**.

11.10.6 Impact 6: Common Dormouse

Surveys for common dormouse within the immediate surroundings of the site have failed to identify the presence of this species.

Phase 2 of the masterplan would likely prevent future colonisation by dormouse in the area if the potential effects of artificial light, habitat degradation, predation and human disturbance were not appropriately mitigated for. The extensive habitat creation in the form of buffer zones around habitat with good suitability for dormice will appropriately mitigate for these effects with dormice potentially being able to colonise suitable habitat in the future.

The extensive habitat creation as a result of native planting will increase suitable habitat within the proposed development site, providing a **negligible-minor beneficial** effect for common dormouse.

11.10.7 Impact 7: Great Crested Newts

The operational phase of Phase 2 of the masterplan has the potential to negatively impact upon great crested newt habitat through degradation as a result of littering and trampling of grassland, predation by cats, as well as damage/disturbance of newly created ponds as a result of people and/or dogs entering the margins or water. The effects are considered to be **moderate adverse** effect at the **site level**.

The newly created buffer zone habitat on site, outlined in **Section 11.6.2**, while providing additional habitat will mitigate for the effects of disturbance by preventing access to cats or humans.

Phase 2 of the masterplan will further incorporate a habitat management plan as described in **Section 11.9.2**, to further mitigate for habitat degradation and poor management. It will also outline signage, pathways and fencing to be installed to deter visitors away from sensitive areas.

The mitigation measures, including the habitat management plan, is considered to result in an overall **negligible- minor beneficial** effect on great crested newts.

11.10.8 Impact 8: Reptiles

Given the likely absence of these species from the site. The operational phase of Phase 2 of the masterplan will have no impact on reptiles. The habitat creation of native planting of woodland, scrub and high value grassland will provide higher quality habitat for these species providing a **negligible-minor beneficial** effect for reptiles.

11.10.9 Impact 9: Other Notable Species

The operational phase of Phase 2 of the masterplan has the potential to impact on the site's invertebrate assemblage through an increase in artificial light which can alter invertebrate behaviour. Furthermore, in the absence of appropriate mitigation measures, including increased human activity within the site could result in the degradation of invertebrate habitat and the introduction of harmful pesticides and herbicides. The overall effect on invertebrates is considered to be a **minor–moderate adverse** effect at the **site level**.

Effects from artificial lighting will be avoided through the adoption of a sensitive lighting scheme outlined in **Section 11.9.1**. The degradation of existing and newly created habitat will be prevented through a habitat management plan and ongoing management of the habitat on site.

The effects of noise, the bioaccumulation risks of pesticides and herbicides and accidental killings (e.g. road collisions) cannot be fully mitigated for by the introduction of the buffer zones and other methods would be impractical given the lack of control during the operational phase. Without creation of compensatory habitat this would have a negative adverse effect at the **site**/**local** level. Areas of previously over-grazed grassland within the farm will be restored (see **Section 11.9.2**) to provide high value habitat within the surrounding landscape. The areas of habitat to be restored are yet to be determined for each scenario.

With the adoption of these measures it is considered that there would be a **negligible** effect on invertebrates. The newly created woodland, scrub, high quality grassland and SuDs ponds will provide a **minor beneficial** effect.

The design of Phase 2 of the masterplan is likely to include garden fencing which can fragment habitat for hedgehogs leading to a **moderate adverse** effect at **site level**. Any fencing will have a 11 cm x 11 cm gap on the ground to allow hedgehogs to move across the site. The habitat creation will further provide refuge and foraging opportunities. With the adoption of these measures, the operational phase of Phase 2 of the masterplan will see a **negligible** effect on hedgehogs.

11.10.10 Impact 10: Invasive/Non-native Species

Without the adoption of suitable avoidance measures, the operational phase could see the introduction of invasive/non-native species through ornamental planting within the site or introduction through transportation (i.e., vehicles and humans moving on and off the site). This is considered to present a **moderate adverse** effect at **site level**.

Avoidance of impacts resulting from introduction of invasive/non-native species will be achieved through adoption of planting regimes as specified in the Biodiversity Enhancement Strategy. Additionally, the site will be monitored annually through a walkover by a suitably qualified ecologist who will identify the presence of any invasive/non-native species. Should any species be identified by the ecologist, appropriate measures will be put into place for their eradication.

With the adoption of the above measures, there is considered to be a **negligible** effect from invasive/non-native species during the operational phase.

11.11 Potential Environmental Effects During Operation – Development Scenario 3

11.11.1 Impact 1: Designated Sites

Potential impacts on internationally important assemblages of roosting/foraging/commuting bats (Bechstein's bat and barbastelle) through light-spillage, habitat fragmentation, predation from domestic cats during the operational phase has the potential to cause negative impacts upon Ebernoe Common SAC and The Mens SAC (barbastelle only), should bats move between the proposed development site and the SACs. This impact risk is therefore weighted as a possible **moderate impact** at a **national level.**

The development will include a sensitive lighting scheme (outlined in **Section 11.9.2** and detailed within a separate report) ensuring minimal light pollution (less than 0.5lux) on retained habitat. Within all phases of the proposed development there will be extensive native planting in the form of the buffer zones as outlined in **Section 11.6.2**. This will protect and enhance existing commuting corridors for bats along with providing increased foraging opportunities. As an addition, there should be a review of the current management regime of the site, and introduction of management to maximise the biodiversity value of the woodland. An appropriate monitoring regime can be put in place to ensure that the management measures for the site's woodland habitat resource are successful and if necessary, can be altered to achieve desired outcomes. The plan will include an objective around sustaining the current populations of Bechstein's and barbastelle bats.

The increased levels of human activity during its operational phase have the potential to impact upon Whithurst Park LWS, Sparrwood Hanger & Roundwyke Copse Complex Woodland & Meadows LWS and Steers Common LWS given their proximity to the site (less than 1 km). Increased human recreational pressure could lead to degradation of Section 41 Priority habitats for which the LWS's are designated, through damage to vegetation, compaction, erosion, nutrient enrichment and disturbance to wildlife. Unmitigated the potential impacts on the three LWSs present a possible **moderate** adverse effect at the **local** level.

A habitat and visitor management plan will need to be prepared in order to manage recreational pressure on the LWSs. The plan will include measures such as fencing, dead hedging as 'soft barriers', signage and appropriate access restrictions to reduce damage to the most important habitats. There should be a review of current management regime of the LWSs, and the introduction of management to their maximise biodiversity value.

The Arun Valley SPA, SAC and Ramsar site lies approximately 12 km south of the proposed development site and. The site is vulnerable to changes in water levels, water pollution and inappropriate ditch management. Increased water usage by the combined developments will increase groundwater abstraction with the potential to affect the Arun Valley SPA, SAC and Ramsar site. Without mitigation the combined developments will presents a likely **minor adverse** effect upon the designated sites at an **international level**.

With the adoption of a suitable mitigation strategy/water neutrality statement, the potential for residual effects on the Arun Valley SPA, SAC and Ramsar site resulting from the operational phase of the combined developments is considered to be **negligible**.

11.11.2 Impact 2: Habitats

The most ecologically valuable habitat on or within close vicinity of the proposed development site is the semi-natural broadleaf woodland, with a significant proportion recognised as ancient woodland. Increased recreational activity could lead to degradation of this habitat through damage to vegetation, compaction, erosion of soils, nutrient enrichment and disturbance to wildlife. Residential development will increase the levels of noise, light, ground and air pollution within the immediate vicinity of the site through the introduction of vehicles, pets, and people.

In the absence of mitigation, the operational phase of the combined developments represents a **moderate adverse** effect at **local level** (though it is currently unknown how much of this habitat will be removed).

The combined developments will see extensive areas of new planting in the long-term including a buffer zone around retained sensitive habitats, to act as an ecotone as outlined in **Section 11.6.2**. No access will be given to residential living, being prevented by planting a dense layer (approx. 10 m) of thorny shrub species, careful design of the SuDS to act as an additional physical barrier. This will prevent/minimise recreational activity near or within the sensitive habitats such as the ancient woodland found on site. To minimise the short-term impacts before habitat is established, a minimum of at least 10 m of the shrub layer should be planted within the 30 m buffer zone prior to construction commencing, in order for the benefits of the buffer zone to be effective during the early stages of the operational phase.

The creation of buffer zones will help to mitigate for the potential impacts of nutrient enrichment, pesticides and herbicides, noise pollution and light pollution by acting as a barrier from the development to the retained habitats found within the immediate vicinity of the site. The inclusion of SuDS ponds across the site will mitigate for polluted groundwater run-off otherwise affecting retained habitats.

A review of the current management regime of the site should be undertaken to maximise the biodiversity value of the woodland. An appropriate monitoring regime can also be put in place to ensure that the management measures for the proposed development site's woodland habitat resource are successful and if necessary, can be altered to achieve the desired outcomes.

With the adoption of the above mitigation measures, effects on woodland and other sensitive habitats during the operational phase of the combined developments are considered to be **negligible**.

The loss of 29.52ha of poor value grassland will be further compensated for through altering the management of other grazed fields on land within the farm ownership (as outlined in **Section 11.9.2**).

This will ultimately see a **minor beneficial** effect on the site's woodland and hedgerow habitat resource by increasing these habitat areas and a **minor beneficial** effect on the site's grassland habitat, though it is acknowledged that habitat establishment times and risk of habitat establishment failure create some uncertainty

11.11.3 Impact 3: Badgers

Badgers are generally quite adaptable to some degree of human disturbance, with foraging, commuting routes and occupation or establishment of new setts, constantly adjusting in response to new food sources and disturbance,

The inclusion of a native planting scheme and buffer zones which prevent human access to these areas of habitat will help to provide higher quality foraging habitat within the site and minimise disturbance, so any effect is considered to be **negligible**.

11.11.4 Impact 4: Bats

Some logger survey data analysis remains ongoing for bats and the significance of effects has been based on all data interpreted to date, with changes to this assessment remaining unlikely.

Increased artificial lighting during the operation phase will likely result in the disruption of flight lines, negatively impact upon foraging and commuting behaviour for a variety of species, including Bechstein's bat, barbastelle and Alcathoe bat and the potential to fragment habitat that is found across the site.

Increased human activity within the proposed development site has the potential to result in increased disturbance and/or displacement of roosting bats, through noise pollution, human disturbance, harmful chemicals (pesticides and herbicides), reduced water quality and increased predation by cats.

Unmitigated, Phase 2 of the masterplan would result in a **major adverse** effect at a **international level** for barbastelle and Bechstein's. Alcathoe bats were captured less frequently during the trapping survey and as such the disruption and loss of commuting corridors presents a likely **moderate adverse** significant effect at a **regional** level.

The impact on foraging and commuting during construction and operation on *Myotis spp*., serotine, noctule, Nathusius' pipistrelle, soprano pipistrelle and common pipistrelle presents a likely **moderate** adverse significant effect at a **county** level. The impact on *Plecotus spp.*, presents a likely **minor adverse** significant effect at a **district/local** level

The combined developments will include a buffer/ecotone from the high value habitat including the ancient woodland that borders the proposed development site, the design of which is outlined in **Section 11.6.2**. This newly created habitat will be designed to stop access from humans and cats to prevent disturbance and predation and to provide a barrier to operational impacts such as light, air and noise pollution. It will largely ensure that existing commuting corridors are maintained and habitat is not fragmented across the proposed development site.

The combined developments will further incorporate a sensitive lighting plan and habitat management plan as described in **Section 11.9.4** to further mitigate for habitat degradation/disturbance and light pollution.

The impacts of poor water quality through groundwater run-off, the potential introduction of pesticides and herbicides providing a bioaccumulation risk and accidental killing (i.e. road collisions) have the potential to affect long term populations. While the buffer zone will minimise these risks, along with noise pollution and habitat fragmentation, the effects as the levels of impact are hard to control or monitor.

The further habitat creation as outlined in **Section 11.9.2**, will provide further commuting and foraging opportunities within Crouchlands Farm. The areas of habitat to be restored are yet to be determined but will be designed to have optimum connectivity to existing high-value woodland habitat.

The combined developments will have to prevent severance of habitat between the north and south of the site caused by increased usage of the existing private road and artificial light. While an ecological lighting plan will be included within the design there should also remain a good level of canopy cover of trees across the road, particularly within the western side of the site adjacent to the farm buildings. Specific measures to ensure this must be detailed within a subsequent LEMP.

With the adoption of the above mitigation measures, effects on foraging/commuting bats will be reduced to at least likely **negligible,** with the opportunity to create a **likely minor positive effect,** significant at a **national level.**

11.11.5 Impact 5: Breeding Birds

Increased human activity within the site has the potential to result in the disturbance and/or displacement of breeding birds through increased levels of noise pollution, light pollution, and recreational activity along with habitat degradation. It is considered likely that use of harmful chemicals (herbicides and pesticides) and groundwater run-off, reducing water quality will increase bioaccumulation risks within breeding birds.

The results of the surveys indicate that this would likely impact upon mostly common and widespread species; however, could also affect some priority species such as nightingales, turtle doves, linnet and yellowhammer which were found within the surrounding woodland and scrub within and around the immediate boundary of the site. The overall effect on breeding birds is considered to be **moderate adverse** effect at **local level**.

The newly created buffer zone habitat on site, outlined in **Section 11.6.2**, would provide additional habitat and also mitigate for the effects of noise, light pollution, predation, and disturbance through recreational activity by providing a barrier between the development and high value habitats that are being retained.

The combined developments will further incorporate a ‘sensitive lighting plan’ and habitat management plan as described in **Section 11.9.2** to further mitigate for habitat degradation and light pollution.

The effects of noise, the bioaccumulation risks of pesticides and herbicides and accidental killings (e.g., road collisions) cannot be fully mitigated for by the introduction of the buffer zones and other methods would be unpractical given the lack of control during the operational phase. Further compensation will be required for breeding birds to mitigate for the associated residual effects.

To ensure populations of breeding birds are maintained within the area, in particular red listed species, areas of previously over-grazed grassland within the wider landholding of the farm will be restored (see **Section 11.9.2**). The aim being to provide an ecologically diverse area of grassland with scrub and mature trees for species such as turtle dove, nightingale, yellowhammer, linnet, bullfinch, cuckoo, and skylark, all of which are not usually associated with residential development. The areas of habitat to be restored are yet to be determined for each scenario.

Bird boxes should be included within the design of the development and should be integrated into the buildings to ensure long term populations of red and amber listed species that have been recorded around the site. Below is the recommended number of boxes for specific species, the location of the and detail of the boxes should be further outlined within the LEMP:

- house sparrow nest box x 55
- swift nest box x 50
- barn swallow nest x 45
- starling nest box x 40
- mixture of boxes for common garden nesting bird boxes x 180

With the adoption of the above mitigation measures, effects on breeding birds will be reduced to **negligible**.

11.11.6 Impact 7: Common Dormouse

Surveys for common dormouse within the immediate surroundings of the site have failed to identify the presence of this species.

The combined developments would likely prevent future colonisation by dormouse in the area if the potential effects of artificial light, habitat degradation, predation and human disturbance were not appropriately mitigated for. The extensive habitat creation in the form of buffer zones around habitat with good suitability for dormice will appropriately mitigate for these effects with dormice potentially being able to colonise suitable habitat in the future.

The extensive habitat creation as a result of native planting will increase suitable habitat within the proposed development site, providing a **negligible-minor beneficial** effect for common dormouse.

11.11.7 Impact 7: Great Crested Newts

The operational phase of the combined developments has the potential to negatively impact upon great crested newt habitat through degradation as a result of littering and trampling of grassland, predation by cats, as well as damage/disturbance of newly created ponds as a result of people and/or dogs entering the margins or water. The effects are considered to be **moderate adverse** effect at the **site level**.

The newly created buffer zone habitat on site, outlined in **Section 11.6.2**, while providing additional habitat will mitigate for the effects of disturbance by preventing access to cats or humans.

The combined developments will further incorporate a habitat management plan as described in **Section 11.9.2**, to further mitigate for habitat degradation and poor management. It will also outline signage, pathways and fencing to be installed to deter visitors away from sensitive areas.

The mitigation measures, including the habitat management plan, is considered to result in an overall **negligible- minor beneficial** effect on great crested newts.

11.11.8 Impact 8: Reptiles

Given the likely absence of these species from the site, the operational phase of the combined developments will have no impact on reptiles.

The habitat creation of native planting of woodland, scrub and high value grassland will provide higher quality habitat for these species providing a **negligible-minor beneficial** effect for reptiles.

11.11.9 Impact 9: Other Notable Species

The operational phase of the combined developments has the potential to impact on the site's invertebrate assemblage through an increase in artificial light which can alter invertebrate behaviour. Furthermore, in the absence of appropriate mitigation measures, including increased human activity within the site could result in the degradation of invertebrate habitat and the introduction of harmful pesticides and herbicides. The overall effect on invertebrates is considered to be likely **moderate adverse** at the **local level**.

Effects from artificial lighting will be avoided through the adoption of a sensitive lighting scheme outlined in **Section 11.9.4**. The degradation of existing and newly created habitat will be prevented through a habitat management plan and ongoing management of the habitat on site.

The effects of noise, the bioaccumulation risks of pesticides and herbicides and accidental killings (e.g. road collisions) cannot be fully mitigated for by the introduction of the buffer zones and other methods would be impractical given the lack of control during the operational phase. Without creation of compensatory habitat this would have a negative adverse effect at the **site/local** level. Areas of previously over-grazed grassland within the farm will be restored (see **Section 11.9.2**) to provide high value habitat within the surrounding landscape. The areas of habitat to be restored are yet to be determined for each scenario.

With the adoption of these measures it is considered that there would be a **negligible** effect on invertebrates. The newly created woodland, scrub, high quality grassland and SuDS ponds will provide a **minor beneficial** effect.

The design of the combined developments is likely to include garden fencing which can fragment habitat for hedgehogs leading to a **moderate adverse** effect at **site level**. Any fencing will have a 11 cm x 11 cm gap on the ground to allow hedgehogs to move across the site. The habitat creation will further provide refuge and foraging opportunities. With the adoption of these measures, the operational phase of the combined developments will see a **negligible** effect on hedgehogs.

11.11.10 Impact 10: Invasive/Non-native Species

Without the adoption of suitable avoidance measures, the operational could see the introduction of invasive/non-native species through ornamental planting within the site or introduction through transportation (i.e., vehicles and humans moving on and off the site). This is considered to present a **moderate adverse** effect at **site level**.

Avoidance of impacts resulting from introduction of invasive/non-native species will be achieved through adoption of planting regimes as specified in the Biodiversity Enhancement Strategy. Additionally, the site will be monitored annually through a walkover by a suitably qualified ecologist who will identify the presence of any invasive/non-native species. Should any species be identified by the ecologist, appropriate measures will be put into place for their eradication.

With the adoption of the above measures, there is considered to be a **negligible** effect from invasive/non-native species during the operational phase.

11.12 Biodiversity Net Gain and Enhancements

Whilst not detailed within this chapter, all scenarios for the Rickman's Green Village proposals will utilise the wider landholding of Crouchlands Farm to ensure that at least a 10% net gain in biodiversity is achieved, in line with the ambitions of the Environment Act 2021. A Biodiversity Strategy document produced separately will detail how 10% biodiversity net gain will be achieved within the Defra Metric 3.1, whilst specific habitat creation and management measures will also target significant habitat enhancements for bats within these areas to ensure that the development proposals seek to create habitat value that is an enhancement for, most notably, barbastelle and Bechstein's bats.

Essential to any future proposal to achieve benefits for wildlife and biodiversity is a period of monitoring and a means of assurance that these objectives are met. Surveys in 1, 2, 5, 7 and 10 years from the commencement of construction will be crucial to ensure that the health of establishing habitats is appropriate and any indications of habitat failure are remedied. Further, on-going surveys of the Bechstein's bat population can ascertain population trends from surveys in these years and a monitoring strategy is included within the Biodiversity Strategy document (Ecology Co-op 2022d).

11.13 Climate Change

Natural England have requested that the development should consider how Rickman's Green Village will affect the ability of the natural environment to adapt to climate change and how the development will impact the natural environment's ability to store and sequester greenhouse gases, in relation to climate change mitigation and the natural environment's contribution to achieving net zero by 2050.

11.13.1 Natural Environment's Ability to Adapt to Climate Change

The development will take place largely upon grazed farmland for sheep and cattle used year-round. Historically, the site has been used to spread digestate associated with the previous use of the farm to support a dairy herd and produce biogas. This spreading of nitrogen-rich material has led to an increase in soil fertility and the dominance of high nutrient plants. The site is subsequently largely dominated by perennial rye grass and other coarse grasses.

Agriculture is one of the main drivers of climate change through the production of greenhouse gases through livestock and fertiliser use. The farming at the proposed development site already has an impact on the ability of the natural environment to adapt to climate change and is a contributor itself to climate change. Many of the consequences of climate change on the natural environment's ability to adapt are likely to be similar irrelevant of whether the land continues to be farmed or is built upon. Land use change from farming to residential development will however increase the rate or level at which certain impacts and adaption responses associated with climate change occur upon the ecological features found within Crouchlands Farm, summarised below in **Table 11-10** with adaptive/mitigation measures that will be implemented as part of the design.

The design of Rickman's Green Village may also provide an increase in the natural environment's ability to deal with climate change impacts compared to its existing use. The buffer zone/ecotone outlined in **Section 5.1.2** will be designed to mitigate for impacts associated with development on retained woodland and hedgerow habitat. Buffer zones are considered to play a pivotal role by shielding the existing habitat from extreme weather events (i.e. high wind, drought, flooding, soil erosion), reduce stress from other pressures not associated with climatic factors (livestock grazing), maintenance of diverse range of species and age structure within and around the woodland, space for natural regeneration and greater connectivity for species' movement across the landscape.

Table 11-10. Increased level and rate of climatic impacts caused by land use change from agriculture to residential development.

Features of development that will increase certain consequences of climate change within the site	Increased consequences of climate change from land use change (farming to infrastructure)	Impacts on ecological features	Adaptive responses/mitigation
Higher area of sealed surface/building	Flooding with more frequent extreme weather events	**Woodland and Hedgerow** • Reduced rooting depth for less water tolerant species increasing the effects of drought and likelihood of wind-blown • Woody species exposed to prolonged flooding in the growing season will be at risk of dying • Flooded soil could cause damage to soil structure, leading to increased die-back **Protected and Notable species** • Loss of terrestrial habitat vital for foraging, refuge and breeding of a number of protected species.	The design of Rickman's Green will include Sustainable Urban Drainage systems. This will mitigate for the increased risk of flooding due to an increased area of sealed surface, protecting the retained habitat on site from associated impacts. An effective buffer around woodland and hedgerows will be designed around the developed area to protect retained habitat and species using these features. Management scheme for retained and newly created habitats on site to ensure species diversity and age structure remains varied and promotes natural regeneration. Where necessary more resilient species to climate change can be stocked.
	Fragmentation of habitat caused by residential development	**Protected and Notable species** • Loss of connectivity through development will reduce survival and the resilience of species to adjust to the impacts of climate change.	The design of the buffer zones/ecotones around the proposed development have been designed to maintain connectivity across the landscape to prevent any major fragmentation or isolation of high value habitat on and around the boundaries of the site. It has the potential to create wider habitat corridors with low value grassland being replaced with moderate/high value habitat.
	Higher local/ground level temperatures in summer	**Woodland and Hedgerow**	The design of the Rickman's Green Village will be designed to include

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Features of development that will increase certain consequences of climate change within the site	Increased consequences of climate change from land use change (farming to infrastructure)	Impacts on ecological features	Adaptive responses/mitigation
	and winter caused by developed areas absorbing heat and emitting heat from heating properties.	• Winter chill requirements of berry species may not be met, reducing food availability for wildlife • Winter chill requirements for seed germination may not be met leading reducing natural regeneration of species **Protected and Notable species** • Hibernation behaviour of species such as bats may be disrupted by warmer temperatures associated with residential areas.	native planting of trees and hedges within the development area to reduce land surface temperatures. The ecotones will have layers of vegetation creating a 3D structure better able to create stable environments. These ecotones will also protect the retained woodland parcels.
	Water scarcity/drought – less water storage within the local area as grassland replaced by sealed surface	**Woodland and Hedgerow** • Increased mortality and die-back of hedgerow and tree species and increase stress of other impacts when under drought conditions • Increased competition from invasive species more tolerant to drought conditions • Quicker alteration in species composition of native woodland **Protected and Notable species** • Increased water shortage within a shorter space of time for native flora and species within the area.	The design of Rickman's Green will include Sustainable Urban Drainage systems. This will help to mitigate for lack of water storage leading to local water scarcity for native flora and fauna. An effective buffer around woodland and hedgerows will be designed around the developed area to protect retained habitat and species using these features. Management scheme for retained and newly created habitats on site to ensure species diversity and age structure remains varied and promotes natural regeneration. Where necessary more resilient species to climate change can be stocked. Maintain connectivity across the landscape through native planting within the buffer zones for species to source water.
Residential use	Fire risk	**Priority habitats and species** • Under drought conditions caused by climate change, increased residential use in the area has the potential to increase the likelihood of fires by providing more opportunities for ignition	There are considered to be no practical mitigation measures to reduce the number of potential ignition events as this would be hard to control. The buffer zones will however provide a barrier to the ancient woodland on site from any fire damage.
	Introduction of pathogens, invasive species, pests	**Priority habitats and species**	Management scheme for retained and newly created habitats on site to

Features of development that will increase certain consequences of climate change within the site	Increased consequences of climate change from land use change (farming to infrastructure)	Impacts on ecological features	Adaptive responses/mitigation
	and diseases caused by climate shifts	• Increased residential use within the area may increase the rate at which invasive species, disease and pathogens through transport and non-native planting	ensure species diversity and age structure remains varied and promotes natural regeneration. Where necessary more resilient species to pathogens and specific diseases can be stocked. Monitoring between sites to minimise disease risk and to detect changes in population status and distribution.

11.13.2 The Developments Impact on the Natural Environment to Store and Sequester Greenhouse Gases

Grassland used for agriculture and livestock grazing has the potential to sequester greenhouse gases and mitigate for the effect of livestock production systems when managed in a sensitive way[21][22]. The site when maintained as a livestock farm therefore has the potential to sequester greenhouse gases mitigating for farm production systems and not be a contributor to climate change; however, the farm has historically not followed management techniques that would likely mitigate for farming on the site, such as spraying fields with high nitrogen fertiliser, overgrazing and arable rotation. The site is therefore likely to be an emitter of greenhouse gases contributing to climate change.

The proposed development plans for Rickman's Green Village will be to convert farmland into residential housing. Buildings and residential properties are a main contributor to greenhouse gases directly or indirectly through construction, building materials or once operative through use of energy resources[23] [24]. It is likely that the proposed development will result in the area being a greater contributor to greenhouse gases and climate change than the existing use. As such, mitigation would be required to address how the development impacts the ability of the natural environment to store and sequester greenhouse gases, in relation to climate change mitigation and the natural environments contribution to achieving net zero by 2050.

The buffer zones and ecotones around the site will create approximately 10.02ha of high value habitat to include woodland, scrub and semi-natural grassland, all of which are a greater sequester and storer of carbon than existing habitat[19]. Urban trees and SuDs ponds will be included within the landscape design. There will be a management plan created for the woodland on site to prevent habitat degradation caused by development but also to mitigate for the effects of climate change. This will provide mitigation for the loss of grassland and its potential role in storing greenhouse gases.

Additionally high value habitat will also look to be created by restoring over-grazed fields to provide new habitat for a range of species. The details of which have been outlined in **Section 11.9.2**, though it is currently not understood the size of the area where farm management will be altered. This will sequester

[21] Soussana, J.F., Tallec, T., Blanfort. V. (2010) Mitigating the greenhouse gas balance of ruminant production systems through carbon sequestration in grasslands. Animal 4:3, pp 334-350.
[22] http://publications.naturalengland.org.uk/publication/5419124441481216
[23] Lamb. W..L et al. (2021) A review of trend and drivers of greenhouse gas emissions by sector from 1990 to 2018. Environmental Research Lett.16
[24] Zhong, X. (2021) Global greenhouse gas emissions from residential and commercial building materials and mitigation stratergies to 2060. Nature 12. 6126

more greenhouse gases from the atmosphere, further mitigating for the increase caused by the development.

11.14 Summary

A summary of the potential impacts, mitigation measures and residual effects associated with the Rickman's Green Village development proposals are detailed in **Table 11-11.**

Table 11-11 Summary of the potential impacts, mitigation measures and residual impacts associated with the Rickman's Green Village development proposals.

Ecological Feature	Importance	Impact characterisation	Level of significance	Avoidance/mitigation	Residual effect	Compensation required? (Y/N)
Designated Sites						
Local Wildlife Site (within 5km)	Local	Construction phase impacts such as dust Increased recreational pressure	Local	Dust control A habitat and visitor management plan	Negligible	N
Ebernoe Common and The Mens SAC	International	Impacts on qualifying features (Barbastelle and Bechstein's bat)	National	Habitat creation in the form of buffer zones Habitat management plan Retainment of all woodland on site Sensitive lighting scheme		N
Arun Valley SPA/SAC/Ramsar	International	Increased water abstraction	International	Water neutrality statement		N
Habitats	Negligible/site – Local	Habitat loss Habitat degradation Recreational activity	Local	Retain as much high value habitat as possible Buffer zone planting Habitat management plan	Loss of habitat	Y - Habitat creation

Ecological Feature	Importance	Impact characterisation	Level of significance	Avoidance/mitigation	Residual effect	Compensation required? (Y/N)
Badgers	Negligible/site	Killing/injury Potential loss of foraging habitat	Site	Covering of excavations at night Site walkover prior to construction	Loss of foraging habitat	Y – Habitat creation
Bats	Local –national	Loss of foraging and commuting habitat Fragmentation of habitat Artificial lighting Habitat degradation Human disturbance Predation Water quality, noise and ground pollution	Local - national	Sensitive lighting scheme Habitat management plan Buffer zone planting Implementation of a bat mitigation strategy Retainment of nearly all high value habitat on site	Loss of commuting and foraging opportunities Habitat degradation associated with residential use	Y – Habitat creation
Breeding birds	Local	Destruction of active nests Killing/Injury Human disturbance Water quality, noise, light and ground pollution	Local	Retainment of nearly all high value habitat on site Sensitive lighting scheme Habitat management plan Buffer zone planting	Loss of nesting habitat Habitat degradation associated with residential use	Y – Habitat creation, nest boxes

Ecological Feature	Importance	Impact characterisation	Level of significance	Avoidance/mitigation	Residual effect	Compensation required? (Y/N)
		Habitat degradation Loss of nesting habitat		Completion of vegetation clearance outside the bird nesting season		
Common dormice	Negligible	N/A	Negligible	N/A	N/A	N
Great crested newts	Local	Killing/injury Loss of terrestrial habitat Predation Habitat degradation	Local	Mitigation strategy and EPS Licence Implementation of GCN mitigation strategy Habitat management plan Buffer zone planting	Loss of terrestrial habitat	Y – Habitat creation
Reptiles	Negligible/Site	N/A	Negligible/Site	Pre-cautionary methods during vegetation cutting/removal	N/A	N
Other notable species	Site	Killing/injury Habitat loss Artificial light Habitat degradation Habitat fragmentation	Site	Retainment of nearly all high value habitat on site Sensitive lighting scheme Habitat management plan Buffer zone planting Covering of excavations	Site	Y – Habitat creation

Ecological Feature	Importance	Impact characterisation	Level of significance	Avoidance/mitigation	Residual effect	Compensation required? (Y/N)
Invasive/non-native species	Negligible/Site	Construction traffic bringing plants onto site Ornamental planting Increased vehicle traffic during operation	Site	Best practice during construction Habitat management plan Monitoring of the site	N/A	N/A

12 Cultural Heritage and Archaeology

12.1 Introduction

This Chapter of the ES considers the likely effects of Rickman's Green Village with respect to cultural Heritage and Archaeology, and how this could affect heritage assets. It describes the methods used to assess potential effects, the baseline conditions currently existing within the Rickman's Green Village footprint and surrounding area. The mitigation measures required to avoid/prevent, reduce or off-set any significant adverse effects are presented together with the likely residual effects after these measures have been adopted.

This chapter is supported by:

- Historic England's National Heritage List for England

12.2 Legislation, Planning Policy and Guidance

12.2.1 Legislation

Section 1(5) of the Planning (Listed Buildings and Conservations Areas) Act 1990 ("*the Act*") defines a listed building as:

'In this Act "listed building" means a building which is for the time being included in a list compiled or approved by the Secretary of State under this section; and for the purposes of this Act —

a) any object or structure fixed to the building;

b) any object or structure within the curtilage of the building which, although not fixed to the building, forms part of the land and has done so since before 1st July 1948.'

Section 7(1) of the Act sets out the restrictions on works affecting listed buildings, stating:

'Subject to the following provisions of this Act, no person shall execute or cause to be executed any works for the demolition of a listed building or for its alteration or extension in any manner which would affect its character as a building of special architectural or historic interest, unless the works are authorised.'

With regards to the preservation of Conservation Areas, Section 72(1) of the Act states:

'In the exercise, with respect to any buildings or other land in a conservation area, of any functions under or by virtue of any of the provisions mentioned in subsection (2), special attention shall be paid to the desirability of preserving or enhancing the character or appearance of that area.'

12.2.2 Planning Policy and Guidance

Section 15 of the National Planning Policy Framework (2021) ("the Framework") relates to the conservation and enhancement of the historic environment. Paragraphs 194 and 195 of the Framework set out that:

'In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where

necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where necessary, a field evaluation.

Local planning authorities should identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this into account when considering the impact of a proposal on a heritage asset, to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal.'

Paragraph 199 of the Framework states:

'When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). This is irrespective of whether any potential harm amounts to substantial harm, total loss or less than substantial harm to its significance.'

Policy 47 of the Chichester Local Plan (2015) relates to heritage and design, and states:

'The Local Planning Authority will continue to conserve and enhance the historic environment through the preparation of conservation area character appraisals and management plans and other strategies, and new development which recognises, respects and enhances the local distinctiveness and character of the area, landscape and heritage assets will be supported. Planning permission will be granted where it can be demonstrated that all the following criteria have been met and supporting guidance followed:

1. *The proposal conserves and enhances the special interest and settings of designated and non-designated heritage assets including:*
    - *Monuments, sites and areas of archaeological potential or importance;*
    - *Listed buildings including buildings or structures forming part of the curtilage of the listed building;*
    - *Buildings of local importance, including locally listed and positive buildings;*
    - *Historic buildings or structures / features of local distinctiveness and character;*
    - *Conservation Areas; and*
    - *Historic Parks or Gardens, both registered or of local importance and historic landscapes.*
2. *Development respects distinctive local character and sensitively contributes to creating places of a high architectural and built quality;*
3. *Development respects existing designed or natural landscapes; and*
4. *The individual identity of settlements is maintained, and the integrity of predominantly open and undeveloped character of the area, including the openness of the views in and around Chichester and Pagham Harbours, towards the city, the Cathedral, local landmarks and the South Downs National Park, is not undermined.'*

12.3 Consultation

In May 2022, a pre-application enquiry was submitted to Chichester District Council (LPA ref PS/22/01224/PRELM). A site visit was made on 7 June 2022. A formal pre-application meeting was held on 15 July 2022. As part of the pre-application enquiry, the Council's archaeology officer was consulted. The following advice was given:

"There is nothing specific known about the archaeology of this site that would lead to the conclusion that it should not be developed. However, a site of this size and type is likely to contain well-preserved deposits relating to past settlement and land management. In the circumstances it would be reasonable to expect

to see a desk-based assessment of the archaeological potential prior to determination followed by an investigation of the site in order to establish what deposits of interest might be threatened by development and how to mitigate this. The latter could be secured via a suitable standard condition."

In June 2022, an EIA Scoping Request was made to Chichester District Council. The following advice was given by the Council's archaeology officer:

"I agree with the summary of the likely effects of development on deposits of archaeological interest as outlined in the environmental scoping report. I also agree with the proposed approach to EIA and that this should inform measures to ensure appropriate preservation and enhancement of significance. The latter should ultimately be secured via the imposition of suitable planning conditions."

Historic England did not wish to make comment on either the pre-application or EIA Scoping request.

12.4 Assessment Methodology

Chapter 5 Approach to EIA provides a summary of the general impact assessment methodology applied to Rickman's Green Village.

The assessment methodology outlined below has been used to identify and evaluate the potential effects of Rickman's Green Village on existing heritage assets and archaeological remains associated with the development and the surrounding area. This, in turn, informs the mitigation measures that will be implemented to ensure the preservation and enhancement of these features. The assessment has been informed by the documentation submitted with the planning application, and site visits in 2020-2022.

The assessment methodology is broken down in to the following stages detailed below.

12.4.1 Stage 1. Identify Baseline Environment

The first stage of the assessment is to identify all heritage assets and archaeological remains ("the receptors") located within or adjacent to the application site that could be affected by development. A search of Historic England's National Heritage List for England revealed the nationally statutory listings, and a search of Chichester District Council's Local Buildings List revealed no non-designated heritage assets. A review of the Plaistow Conservation Area Character Appraisal and Management Proposal (May 2013) has also been conducted.

12.4.2 Stage 2. Potential effect Identification

Stage 2 considers the potential effects of Rickman's Green Village on heritage assets. This assesses the degree to which the settings of the heritage assets and views make a contribution to the significance of the heritage asset(s) or allow significance to be appreciated.

When considering the setting of heritage assets (which do not form part of the heritage designation), it is important to consider:

- the asset's physical surrounds;
- the asset's intangible associations and patterns of use;
- the contribution made by noises and smells; and
- the ways views allow the significance of an asset to be appreciated.

12.4.3 Stage 3. Establish Sensitivity

In order to establish the magnitude of the potential impact, one must consider the sensitivity of each receptor based on its significance and proximity to the site.

12.4.4 Stage 4. Assess Level of Harm

During stage 4 the impact of Rickman's Green Village, whether beneficial or harmful, on the significance of the heritage assists is considered. There are three levels of harm that can be identified:

- substantial harm or total loss - this would be harm that would '*have such a serious impact on the significance of the asset that its significance was either vitiated altogether or very much reduced*' (R DCLG and Nuon UK Ltd v Bedford Borough Council, EWHC 2847);
- less than substantial harm - harm of a lesser level than that defined above. The Planning Practice Guidance stipulates that the extent of the harm within this category should be clearly articulated (reference ID: 18a-018-20190723); and
- no harm (preservation) - the principle that preserving means doing no harm was clearly articulated in South Lakeland District Council Appellants v Secretary of State for the Environment and Another Respondents 1992, and EWHC 1895, R (Forge Field Society, Barraud and Rees) v Sevenoaks DC, West Kent Housing Association and Viscount De L'Isle which concluded that with regard to preserving the setting of a Listed building or preserving the character and appearance of a Conservation Area, 'preserving' means doing 'no harm'.

12.4.5 Stage 5. Mitigation Hierarchy

The assessment of the significance of effect is made initially in the absence of mitigation. Where harm is identified, a sequential process of determining the most appropriate way to remove or minimise significant impacts is applied. The preferred option is to, where practicable, avoid potential impacts in the first place, for example by redesigning the scheme to retain or avoid altering a heritage asset.

Where significant impacts are unavoidable, mitigation measures are integrated into the design to ensure the preservation and enhancement of heritage assets and archaeological remains, with a particular focus on the most highly sensitive assets.

When residual significant adverse effects remain after all practicable measures to avoid and/or minimise these have been applied, compensation measures are required.

12.4.6 Definitions of Sensitivity and Magnitude

12.4.6.1 Sensitivity

The significance of each heritage asset has been determined. The National Planning Policy Framework (2021) defines heritage significance as (pages 71 and 72):

'The value of a heritage asset to this and future generations because of its heritage interest. That interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.'

The Planning Practice Guidance (reference 18a-006-20190723) interprets archaeological, architectural, artistic or historic interest as:

- *'archaeological interest: As defined in the Glossary to the National Planning Policy Framework, there will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point;*
- *architectural and artistic interest: These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skill, like sculpture; and*
- *historic interest: An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation's history, but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity*.'

12.4.6.2 Impact Significance

Significance results from a combination of any, some, or all of the values described above. For the purpose of this assessment, the scale for each significance is negligible, low, moderate, high or very high. Each heritage asset (including any archaeological remains) has then been given a sensitivity score, depending on the proximity of the heritage asset to the site, and other factors such as its historic association with the site and visual screening and buffers.

12.5 Baseline Conditions

The below sets out the heritage assets in geographical proximity to Rickman's Green Village. A full list of all heritage assets referred to below is provided within the Historic England's National Heritage List for England.

12.5.1 Conservation Areas

The site is not located within a Conservation Area. The Plaistow Conservation Area is located approximately 0.7 miles to the north of the site. The Plaistow Conservation Area contains 27 Grade II listed buildings and is characterised as a small tranquil rural village with an attractive setting of undulating woodland and fields.

The Plaistow Conservation Area is centred around the historic core of the village, with special features identified in the appraisal being the triangular street pattern and large green, the areas of woodland and tree lined fields around the village, and three important buildings - Holy Trinity Church, The Sun Public House, and the village Primary School. The appraisal also refers to the high concentration of listed buildings grouped mainly in The Street which are recognised for their varied form but similar use of traditional materials and details.

Furthermore, the appraisal describes the rural setting of Plaistow as contributing to its character, "*which provides the village with a high degree of tranquillity and a slight sense of isolation, reinforced by the countryside setting and the predominantly residential uses*". Possible impacts could therefore be associated with changes to this rural setting through the introduction of more urban forms of development.

The Plaistow Conservation Area Character Appraisal and Management Proposal (May, 2013) makes a brief reference to Crouchlands Farm as a site owned by an early industrialist, but does not refer to the site as contributing directly to the character or setting of the Conservation Area.

12.5.2 Statutorily Listed Buildings

There are no statutorily listed buildings located within the site.

There are a total of 52 statutorily listed buildings within 1km of the site boundary. Seven Grade II listed buildings are located within close geographical proximity to the site and are considered to have the potential to be of higher sensitivity to the development. They are:

- Crouchland, Rickman's Lane (more commonly known as Crouchlands House);
- Outbuilding to Crouchland, Rickman's Lane;
- Lanelands, Kirdford Road;
- Little Flitchings, Rickman's Lane;
- Nuthurst, Rickman's Lane;
- Old House, Rickman's Lane; and
- Foxbridge Farmhouse.

12.5.3 Scheduled Monuments

There are no scheduled monuments within the site. One scheduled monument, a 15th century glassworks, is located within 1km of the site boundary but is over 650 m to the east.

12.5.4 Archaeology

As set out in the supporting Archaeological Desk-Based Assessment, the potential for:

- encountering remains of prehistoric date has been assessed as **low**, reflecting the general paucity of evidence for features, deposits and finds of this date in the immediate vicinity of the site. Although, it should be noted that evidence for a focus of Bronze Age/Iron Age activity (represented by scatters of lithic and pottery finds) has been identified on the southern periphery of the study area;
- encountering Romano-British remains has been assessed as **low**, reflecting the lack of evidence of activity from this period both in the immediate vicinity of the site and its wider environs. It appears that the site lay at some distance from any major focus of Romano-British settlement during this period, although some evidence of Romano-British occupation has been identified further to the south near Kirdford;
- encountering remains associated with medieval activity has been assessed as **moderate** to **high**. This reflects the fact that the site lies within a landscape exhibiting extensive evidence of medieval rural settlement (represented by several farmstead sites including Crouchland and Hardnip's Barn) and a pattern of field boundaries which broadly reflects the gradual assarting (enclosure and clearance) of the woodland of the Low Weald during the later medieval period. Significant evidence for the exploitation of woodland resources for industrial activities (in particular glassworking) has also been identified within the western half of the site, including the remains of a late medieval glassworks to the south of Hardnip's Copse (found in 1931). There is potential for further evidence of glassworking to be identified in this specific area; and
- revealing archaeological remains of post-medieval date has been assessed as **moderate** to **high**. There is potential to encounter sub-surface remains of early post-medieval industrial activities within the site (particularly focused within the more heavily wooded central and western portions of the site), including evidence of glassworking and iron-smelting, as well as features associated with extractive activities (i.e. quarrying) and the manufacture of lime as evidenced by the presence of several former kiln sites in close proximity to the site.

12.5.5 Non-designated Heritage Assets

There are no non-designated heritage assets within the site. There are eight non-designated heritage assets located within 150 m of the site boundary. They are:

- site of a limekiln at Crouchland Farm;
- site of limekiln at Laneland;
- site of limekiln within Limekiln Wood;
- site of a former courtyard outfarm, Kirdford;
- 19th century regular courtyard farmstead at Streeters Farm, Plaistow;
- 19th century regular courtyard farmstead at Redland, Plaistow;
- 19th century loose courtyard farmstead at Crouchland, Plaistow; and
- 19th century regular courtyard farmstead at Laneland, Plaistow.

12.5.6 World Heritage Sites

There are no World Heritage Sites in close proximity to the site.

12.6 Potential Environmental Effects During Construction – Development Scenario 1, 2 and 3

The temporary potential effects during construction include increased numbers of construction vehicles as well as dust, noise, and lighting associated with the construction works.

12.6.1 Impact 1: Conservation Area

The application site is not located within a Conservation Area. [**No works are proposed within the Conservation Area, so there will be no direct effect on this heritage asset during construction of the proposed development**.]

There is potential for indirect impacts to the Conservation Area caused by the movement of construction vehicles through the village of Plaistow.

12.6.2 Impact 2: Listed Buildings

There are no listed buildings within the application site, and no works are proposed to nearby listed buildings or their curtilages for scenarios 1, 2 or 3. Therefore, there are no direct risks to listed buildings (i.e. direct impacts to the fabric of the listed buildings) during the construction phase(s) for the three development scenarios.

There is potential for the setting of the six nearby heritage assets to be adversely impacted during construction phase(s) for the three development scenarios.

To the south of the site, the setting of Lanelands could potentially be adversely impacted by dust, noise, and lighting during construction, but is unlikely to be impacted by the movement of construction vehicles due to its proximity to Rickman’s Lane and Plaistow Road.

To the north of the site, the setting of Little Flitchings, Nuthurst, and Old House could potentially be adversely impacted by dust, noise, lighting during construction. There is also potential for the setting of these buildings to be impacted by the movement of construction vehicles due to their proximity to Rickman’s Lane and Plaistow Road.

For scenarios 2 and 3, immediately adjacent to the site, the setting of Crouchland and associated outbuildings could potentially be adversely impacted by dust, noise, lighting, and the movement of construction vehicles associated with the construction of the primary school.

12.6.3 Impact 3: Archaeology

The Archaeological Desk-Based Assessment prepared for Rickman's Green Village found that the archaeological potential of the application site would not present an impediment to the proposed development, but further investigatory works will be required prior to the commencement of development, including demolition (and this will be appropriately secured by planning conditions).

12.6.4 Mitigation

An extensive amount of mitigation features have been integrated into Rickman's Green Village to reduce the effect of development on nearby heritage assets during construction, as set out below:

- in order to reduce the potential for harm to the setting of nearby listed buildings during construction, a Construction Management Plan will be produced and enforced to avoid, minimise and mitigate potential impacts from noise, vibrations, and other pollutants such as dust, waste, and odours. This will also include details of restricted working hours;
- a Construction Transport Plan will also be produced and enforced to control the number of vehicular movements going to / from the application site. This will seek to route construction vehicles, so far as is practicable, away from the Conservation Area. Heavy Goods Vehicles and plant servicing the construction phase, including delivery and / or removal of construction materials, would access the site from Rickman's Lane only;
- as set out in the supporting Noise Assessment, a Construction Noise Management Plan will be produced prior to the commencement of development. To reduce noise impacts, measures such as locating temporary plant at appropriate distances away from the sensitive heritage assets, and ensuring that modern, quiet equipment will be used by trained staff, will be enforced throughout the construction stage;
- to ensure that no harm is caused to any archaeological remains, an appropriate programme of site investigation and recording will be undertaken prior to construction work commencing (to be dealt with via planning conditions) to confirm the findings of the Archaeological Desk-Based Assessment; and
- ***[INSERT FURTHER MITIGATION MEASURES FROM TECHNICAL REPORTS].***

12.6.5 Residual Impact

[**CHECK CONSERVATION AREA EFFECT UPON RECEIPT OF OTHER INFO**]
The significance of nearby listed buildings is **high**, however the sensitivity is **low**. Rickman's Green Village will not have any direct impact on these buildings during construction and, where there is potential for the setting of these buildings to be adversely effected, sufficient mitigation measures will be put in place to ensure that no harm is caused during the construction stage.

The significance of Crouchland is **high**, and the significance of the associated outbuildings is **moderate** to **high**. The sensitivity of these heritage assets is **moderate** to **high** for scenarios 2 and 3, but **low** for scenario 1. Rickman's Green Village will not have any direct impacts on these buildings during construction and, where there is potential for the setting of these buildings to be adversely effected, sufficient mitigation measures will be put in place to ensure that no harm is caused during the construction stage.

As the archaeological potential of the application site will not present an impediment to Rickman's Green Village, there will be no harm to archaeological remains on site during construction.

As such there are **no significant** adverse environmental effects to heritage assets during construction.

12.7 Potential Environmental Effects During Operation – Development Scenarios 1, 2 and 3

The potential effects during operation include increased use of the site for living and recreation and associated noise and lighting. The operation of Rickman's Green Village will also result in the loss of agricultural land and a permanent change to the surrounding landscape with the potential to impact the setting of nearby heritage assets.

12.7.1 Impact 1: Conservation Area

The site is not located within a Conservation Area, the nearest Conservation Area is located 0.7 miles away. The site cannot be seen from the Plaistow Conservation Area. Therefore, there will be no direct harm caused to these heritage assets during operation.

There is potential for direct impacts to the Conservation Area as a result of the movement of visitor traffic through the village of Plaistow.

There is potential for Rickman's Green Village to effect the setting of the Conservation Area, however, the Plaistow Conservation Area Character Appraisal and Management Proposal (May 2013) does not refer to the site as contributing directly to the character or setting of the Conservation Area.

12.7.2 Impact 2: Listed Buildings

There are no listed buildings on site, and no works are proposed to any listed buildings as part of scenarios 1, 2 or 3. Therefore, there will be no direct harm to heritage assets during operation.

There is potential for the setting of the six nearby heritage assets to be adversely effected during operation of scenarios 1, 2 and 3, particularly with regards to residential amenity. The settings of Lanelands to the south and Little Flitchings, Nuthurst, and Old House to the north could be harmed by noise and light produced by Rickman's Green Village.

As identified above, the heritage assets most sensitive to the development are Crouchland and its associated outbuilding. Scenario 1 would not have an effect on the setting of Crouchland and its outbuilding.

Scenarios 2 and 3 includes the potential for a primary school to be located within Rickman's Green Village which would result in loss of part of the open agricultural land that forms the current setting of the house (albeit the agricultural land will still remain to the north, west and south of the heritage asset) through the introduction of built development. There is also the potential for the setting of Crouchland and associated outbuilding to be impacted by noise and lighting during operation of the primary school.

Positive effects would also arise from all scenarios, including the extensive tree planting and scheme of landscape improvements including the restoration of historic hedgerow boundaries, provide screening and reducing the level of harm to the heritage asset to less than substantial.

12.7.3 Impact 3: Archaeology

There would be no risk to archaeological remains during the operational stage as an appropriate programme of site investigation and recording (secured by planning conditions) would be undertaken prior to construction work commencing.

12.7.4 Mitigation

An extensive amount of mitigation features have been integrated into the scheme to reduce the effect of development on the setting of the Plaistow Conservation Area and the setting of nearby listed buildings (particularly Crouchland and the associated outbuilding) during operation, as set out below:

- the architectural styles of the proposed dwellings are sensitive to the local vernacular (as well as taking cues from the Plaistow Conservation Area and other nearby listed buildings) as set out in the supporting Design and Access Statements and Planning Statements;
- a sensitive lighting scheme will be designed in accordance with the supporting Lighting Impact Assessment and Lighting Spill Strategy;
- extensive tree planting is proposed to the west of the parcel of land for the primary school to act as a buffer and screen the development; and
- ***[INSERT FURTHER MITIGATION MEASURES FROM TECHNICAL REPORTS].***

12.7.5 Residual Impact

The significance of the Plaistow Conservation Area is **high**, but its sensitivity is **low**. [**The proposed development will not have any direct effect on the Conservation Area during its operation and, where there is potential for the setting of the Conservation Area to be adversely effected**].

The significance of nearby listed buildings is **high**, however the sensitivity is **low**. Development scenarios 1, 2 and 3 will not have any direct impact on these buildings during operation and, where there is potential for the setting of these buildings to be adversely effected, sufficient mitigation measures will be put in place to ensure that harm is limited during the operational stage.

The significance of Crouchland is highest, and the significance of the associated outbuildings is **moderate** to **high**. The sensitivity of these heritage assets is **moderate** to **high** scenarios 2 and 3, but **low** for scenario 1. Rickman's Green will not have direct impacts on these buildings during operation and, where there is potential for the setting of these buildings to be adversely effected through changes to the character of the site, sufficient mitigation measures will be put in place to ensure that only less than substantial harm is caused during the operational stage.

As the archaeological potential of the application site will not present an impediment to Rickman's Green Village, there will be no harm to archaeological remains on site during operation. As such there are **no significant** adverse environmental effects to heritage assets during operation.

12.8 Summary

This chapter has identified heritage assets in close proximity to Rickman's Green, and considered the likely effects of the development scenarios on each of these. Once all mitigation measures are put in place (which will be required by planning conditions), there will be no residual impact to the Plaistow Conservation Area, nearby statutorily listed buildings, scheduled monuments, or any non-designated heritage assets during the construction stage.

For the operation stage, the only residual impact after mitigation measures are put in place relates to the change in the setting of Crouchland. This impact will be limited by the tree planting and landscape enhancements included within Rickman's Green Village, which seeks to restore elements of the historic landscape in the setting of the house. As such this effect would not constitute a significant adverse environmental effect. Mitigation measures mean that there will be no residual impacts in terms of noise, odour and light.

On the whole, the proposal will have no significant adverse environmental effects on heritage assets.

13 Landscape and Visual Setting

13.1 Introduction

Sheils Flynn was commissioned to carry out a landscape and visual impact assessment (LVIA) of a proposal for Rickman's Green Village at Crouchlands Farm, Plaistow, West Sussex. The development will be a new high quality sustainable village clustered around the existing farm complex and its separate proposals for new farm shops and leisure facilities, as part of the 'Whole Farm Plan'. The development will provide up to 600 new homes, a new school and extensive infrastructure landscape supporting open space and play provision, drainage and ecological enhancements (the 'Proposed Development').

The site for the Proposed Rickman's Green Village (the Site) is in areas of farmland (mostly improved pasture) immediately to the north, east and south of the existing farm complex with an additional area of land to the east of Rickmans Lane. The total area of Rickman's Green Village is approximately 33.5 ha with access proposed via Rickman's Lane. The Site is traversed by a network of public rights of way, including byways.

Crouchlands Farm is a former dairy farm that was subsequently developed as a commercial biogas plant. Biogas production ceased in 2017 following an enforcement notice being served by Sussex County Council. The new owners, Artemis Land and Agriculture Ltd, have now spent two years remediating damage to the farm caused by the former operators of the biogas plant with the aim of returning a traditional agricultural focus to farm operations whilst at the same time improving biodiversity. The proposed wider farm development would also bring forward plans for the operation of rurally orientated and environmentally sustainable business enterprises which will act as a focus for the new village whilst also, supporting the local wider community and provide sound employment opportunities.

The LVIA will consider the landscape and visual effects resulting from the construction and operation of Rickman's Green Village at Crouchlands Farm. Landscape and visual effects are independent but related issues; landscape effects are changes in the landscape, its character and quality, while visual effects relate to the appearance of these changes and the resulting effects on specific views and the visual amenity experienced by people. These two components of the LVIA will be assessed separately.

The LVIA has been prepared in parallel with the design process and has informed the layout and design of the proposals. The assessment identifies the components of the landscape likely to be affected by the development – the 'landscape receptors' and considers how and to what extent they might be affected. Similarly, it identifies the people within the vicinity of the development who will be affected by changes to views or visual amenity –the 'visual receptors'.

The LVIA is structured to provide:

- a summary of the assessment methodology used, which distinguishes between an assessment of effects on the landscape resource (landscape effects) and on specific views and the visual amenity experienced by people (visual effects);
- an appraisal of the baseline landscape conditions;
- an appraisal of the visual baseline – visibility of the proposed development and the selection of representative viewpoints;
- an assessment of predicted landscape effects during the construction phase and post construction;
- an assessment of predicted visual effects during and post construction
- a mitigation and enhancement strategy for the proposed development; and
- conclusions.

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Note that an assessment of the potential night time lighting impacts of Rickman's Green Village is excluded from this LVIA. This type of assessment requires specialist input and is provided separately[25]. The LVIA includes these annexes and list of figures.

Annex A1 Figures – Baseline assessment
Annex A2 Figures – Visual assessment
Annex B LVIA Methodology

List of Figures

13.2 Landscape planning policy context

Figure 3 shows the geography of the landscape planning policies that apply to the area which forms the context for the Site, as set out in Chichester District Council's adopted Local Plan[26]. Policies that are of relevance to the landscape and visual impact assessment are described below.

The ***Vision for Places – North of Plan Area***[27], which covers the part of the district that includes the Site, states that *the emphasis will be primarily upon maintaining the rural character of the existing villages, whilst enabling the local communities to be more self-reliant in meeting their local needs….. It will remain an area popular with self-employment and jobs created through tourism and rural diversification.*

Policy 40 – Sustainable Design and Construction, requires developers to demonstrate (proportionate to the scale of development) adherence to the principles of sustainable design, including protection and enhancement of the historic and built environment, open space and landscape character, conservation of the natural environment and biodiversity, with improvements to biodiversity areas and green infrastructure. This policy also requires development to be *appropriate and sympathetic in terms of scale, height, appearance, form, siting and layout and is sensitively designed to maintain the tranquillity and local character and identity of the area.*

As **Figure 3** shows, the Site is in the Countryside policy area and so is subject to ***Policy 45 – Development in the Countryside***, which requires development to be small in scale and to meet local need. In particular

[25] *Crouchlands Farm Redevelopment Lighting Impact Assessment, Royal Haskoning April 2021*
[26] *Chichester Local Plan – Key Policies 2014-2029, Adopted July 2015*
[27] *Op. cit. footnote 3, paragraph 3.12 – 3.14*

it requires proposals to *ensure that their scale, siting, design and materials would have minimal impact on the landscape and rural character of the area*. ***Policy 46 – Alterations, Change of Use and/or Re-use of Existing Buildings in the Countryside*** requires proposals to demonstrate that the form, bulk and general design of the building is in keeping with its surroundings and the proposal and any associated development will not harm its landscape character and setting. Policy 46 also requires that proposals do *not damage the fabric or character of any traditional building or the historic character and significance of the farmstead and in the case of a Heritage Asset, whether designated or not, the proposal will not damage the architectural, archaeological or historic interest of the asset or its setting.*

Policy 47 – Heritage and Design supports *new development which recognises, respects and enhances the local distinctiveness and character of the area, landscape and heritage assets*.

Policy 48 – Natural Environment is particularly relevant*. It states:*
Planning permission will be granted where it can be demonstrated that all the following criteria have been met:

1. *There is no adverse impact on: - The openness of the views in and around the coast, designated environmental areas and the setting of the South Downs National Park; and - The tranquil and rural character of the area.*
2. *Development recognises distinctive local landscape character and sensitively contributes to its setting and quality;*
3. *Proposals respect and enhance the landscape character of the surrounding area and site, and public amenity through detailed design;*
4. *Development of poorer quality agricultural land has been fully considered in preference to best and most versatile land; and*
5. *The individual identity of settlements, actual or perceived, is maintained and the integrity of predominantly open and undeveloped land between settlements is not undermined.*

Figure 3 shows that the northern part of the Site is within the area covered by Plaistow and Ifold Parish Neighbourhood Plan[28]. ***Policy EH2 - Protection of the Natural Environment*** supports development that protects and enhances the natural environment, conserves the landscape setting of the South Downs National Park, conserves or enhances biodiversity within designated nature conservation areas and does not result in the loss or deterioration of irreplaceable habitats. It also specifically encourages *the retention and management of field hedgerows to create wildlife and ecological pathways between the ancient woodlands* that are characteristics of the landscape in this part of the Low Weald. ***Policy EH3 – Protection of Trees, Woodlands and Natural Vegetation*** also recognises and seeks to conserve the high quality of tree and woodland cover in the parish.

Figures 4a and 4b show the relevant environmental designations – for areas that are of landscape, nature conservation and heritage value within the area that forms the context for the Site. **Figure 4a** shows the location of the designated conservation areas in the villages of Plaistow and Kirdford to the north and south of the Site respectively. It also shows the location of three Grade II listed buildings adjacent to the Site – Crouchland, a timber-framed dwelling dating from 1652 and an outbuilding in its garden are to the SW of the existing Crouchlands Farm complex, and Lanelands, a 17th century timber-framed dwelling to the south. **Figure 4a** also shows the alignment of the network of PROW within the site and the remnant areas of common land, which are typically wooded. Most PROW that cross the Site are byways which were historically drove roads used to move livestock between pastures and also woodlands, where they were fed on acorns[29].

[28] Plaistow and Ifold Neighbourhood Plan 2014-2029 Regulation Submission: 17 September 2019, Final version, Plaistow and Ifold Parish Council
[29] 121 Low Weald National Character Area Profile, Natural England (p.6 Key Characteristics)

Figure 4b shows the relatively dense interconnected matrix of semi-natural habitat, including ancient woodland, lowland meadow and woodpasture[30] which are characteristic of the Low Weald in this area. Ancient semi-natural woodlands within the Site are Limekiln Wood and Hardnip's Copse to the north west of Crouchlands Farm, Ravensnest Copse to the east and Middleground Hanger, Middleground Copse and Whithurst Copse to the south. The remnant traditional orchards to the east of Lanelands (the listed building to the south of Crouchlands Farm) are also designated as S41 Habitat.

The woodland and lowland meadow habitats of Whithurst Park and Steers Common on the southern edge of the Site and the Sparrwood Hanger and Roundwyke Copse Complex Woodland and Meadows to the west are designated as Sites of Nature Conservation Interest (SNCI). There are nationally important ancient woodland habitats to the north of the Site which are designated as Sites of Special Scientific interest (SSSI) and to the west, the ancient woodlands and woodpasture habitats of Ebernoe Common to the west and The Mens to the east are designated as a Special Area of Conservation, of international importance. Both of these SACs are noted as being exceptionally important for bats, including the rare Barbastelle and Bechstein's bats. Studies indicate that Barbastelle bats roost in Ebernoe Common and forage along the River Kird corridor and associated wood and hedge lines[31].

13.3 The Site and Proposed Development

Figure 1 shows the Illustrative layout for Rickman's Green Village (as described in **Section 13.5** below).

Figure 2 shows the Site within its wider landscape context of the Low Weald, the broad, low-lying clay vale which lies to the north of the South Downs. This part of the Low Weald has a gently undulating topography, dissected by numerous winding tributaries of the River Arun. Crouchlands Farm is at an elevation of 50m AOD and is on the undulating slopes of a ridge of higher land which rises to 85m AOD north of the village of Plaistow; the landform generally falls to an elevation of 20-30m AOD towards the south and east, near the village of Kirdford. The site is within the setting of the South Downs National Park (SDNP) the boundary of which is approximately 2km to the west and 4km to the south of the Site. The SDNP boundary defines the margins of the elevated chalkland 'spine' of the South Downs.

Maintenance and improvements to the on-site public rights of way (PROW) - notably the PROW 3519, 564, 633 and 643.

13.4 Methodology

LVIA is a tool for predicting and evaluating the effects of a development on the landscape itself, and on views and visual amenity. The assessment process aims to achieve avoidance, reduction or mitigation of detrimental effects identified, through feeding back into the Site design process

The LVIA considers the landscape and visual effects resulting from the construction and operation of the proposed development. Landscape and visual effects are independent but related issues. Landscape assessment judges effects on the landscape as a resource in its own right, (regardless of whether it is, or can be, viewed by people or not) and particularly focuses on effects to landscape character. Visual assessment judges the effects on specific views and on the general amenity of the landscape as experienced by people. It explains how particular views of the landscape might change and how the enjoyment and visual amenity of those using it might be affected by the proposals. It also considers whether

[30] *Designated as Habitats of Principal Importance Section 41 of the Natural Environment and Rural Communities (NERC) Act, 2006*
[31] *Kirdford Neighbourhood Plan – Sustainability Appraisal, Final Report, 2013, Terrafiniti pp. 20-28. The study cited is Tantram, D. (2012). Kirdford Neighbourhood Plan – Development proposals and Barbastelle bats. Report to Kirdford NPSG and Natural England, Terrafiniti.*

cumulative impacts from other proposed developments are likely to result. These two components of the LVIA are assessed separately.

The LVIA was carried out in accordance with the approach outlined in the Guidelines for Landscape and Visual Impact Assessment Third Edition 2013[32]. The full methodology is set out in Annex B.

The LVIA process has been an integral component of the design process, which has been undertaken in an iterative way, with the layout and design of the development proposals shaped by the preliminary findings of the LVIA. The process has been repeated to test alternative design scenarios with the objective of reducing predicted adverse effects and achieving the optimal balance of benefits and constraints. The resulting proposed landscape layout in **Figure 1** shows proposed tree groups and hedgerow boundaries which are composed and aligned to soften views to Rickman's Green Village and link visually with existing patterns of vegetation in the surrounding countryside. It is described fully in **Section 13.5** below.

13.5 Proposed landscape layout

13.5.1 Infrastructure Landscape Design development

The landscape strategy (**Figure 1**) has been designed in conjunction with the LVIA, as an iterative process, with the Proposed Development areas carefully sited to retain the existing landscape pattern and to mitigate predicted landscape and visual effects. The overall landscape objectives of the landscape layout are to:

- Conserve and enhance the nationally important biodiversity of the ancient woodlands within and surrounding the Site, incorporating a 30m buffer zone and low light corridors for bats.
- Protect the historic landscape pattern – by planting new woodland and hedgerows to maintain a sense of the characteristic irregular small-scale mosaic of pasture, woodland and shaws in particular with the objective of screening the new village in views from the wider landscape.
- Where possible safeguard the rural character and landscape setting of the PROW on the site and provide safe vehicular access, with minimal damage to the characteristic enclosed character of local roads.
- Protect and enhance the existing network of drainage ditches and streams integrating SUDs features as positive new riparian and wetland habitats as key structuring landscape features.
- Create a high-quality environment, with an orderly, functional character inspired by traditional village forms and which provides a safe, attractive environment.
- Use the existing and new landscape infrastructure in order to integrate the new village into its landscape context creating a strong and contemporary identity. Recognising at the same time that the change in character in localised views is an opportunity to create a positive new contribution to the pattern of settlement in the local landscape.

13.5.2 A new linear green

New access routes into Rickman's Green Village off Rickman's Lane would be sited approximately 20m to the south of the existing farm access with a similar northern junction diagonally opposite closer to Streeters Farm. These routes have been aligned to conserve existing trees and would be bordered by new native

[32] *Guidelines for Landscape and Visual Impact Assessment, 3rd edition Landscape Institute and Institute of Environmental Management and Assessment, 2013*

woodland planting and lined by new specimen trees. The existing farm access track would continue as a working farm access route and a public right of way. Visibility splay requirements at the new junctions necessitate the removal of part of the existing hedgerows creating a more open feel to Rickmans Lane with a mix of meadow amenity grass, backed by new hedgerows, this would become one of a sequence of irregular small 'greens' that are characteristic of the roads and tracks throughout the settled Low Weald landscape. This will be the gateway to Rickman's Green Village via a linear green stretching south to a new formal open space offering a gateway to the wider farm and northwards to link with a destination open space on the boundary of the development creating opportunities to link with the wider countryside vial local PROW.

The linear green, as a landscape feature, is inspired by traditional linear greens locally and will become the focus for circulation in Rickman's Green Village with vehicular and pedestrian routes linking the development across the greens. The linear green will also provide a landscape framework integrated with wider masterplan and urban design strategies - in some areas the woodlands and trees will screen the development infrastructure but in other key locations and gateways the new development will be visible in controlled views recognising the change in local character to that of a traditionally inspired new village as a positive new contribution to the local landscape.

13.5.3 Landscape destinations

The linear green will link 3 key destinations;

Central Village Green
The circular site of the former biogas plant tank is now a wetland depression, which would be the focus for a new village green which comprises extensive meadow, framed by informal groups of trees and with a positive development frontage creating a strong sense of village focus. This central green will link the new development on its northern side with the existing farm complex to the south. Farm operations would be concentrated in the existing Crouchlands Farm site. The open brownfield site to the south of the existing cattle barn is earmarked for a potential future barn and the whole of this farm operations area would be integrated within a more enclosed context. The existing farm track and PROW to the west of the farm complex would continue to be used as the principal access for stock and machinery, with neat, functional surfacing and fencing. The existing barns in the southern part of the Site is earmarked to become the Rural Enterprise Centre along with a Rural Food and Retail Centre just south of the existing farm access track. Car parking for this complex would be alongside the access route to the north east of the barns and also within the courtyard that they enclose. The access route and car parking would be separated from the operational farm hub and link with circulation within the wider development proposals. Delivery of the central village green will be coordinated with the adjacent Whole Farm Plan (WFP) and therefore forms part of that separate application. This application however recognises the opportunity and its importance as a key linking open space between the proposed village and existing farm.

Southern Open Space
A more formal open space will be established at the southern end of the linear green in the pasture just west of the farm complex and immediately north of the original Crouchland Farm building. This area is envisaged as a gateway to the wider farm whilst also having sufficient space capable of providing for a range of activities such as a cricket or junior football pitch. This will otherwise be a low key space with perimeter meadows and hedgerows managed and maintained so as to retain the existing character of the surrounding landscape. New footpath connections will be made around the edges of the pasture linking to the existing PROW network.

Royal HaskoningDHV

Northern Open Space
Devised as a mitigating landscape buffer zone to the north of the Proposed Development this will be a multifunctional open space offering opportunities for informal activity as well as play space and allotments. Drainage attenuation will be integrated to create a variety of swales and seasonally wet ponds adding visual focus and biodiversity value. This space will also function as a hub in terms of recreational footpaths linking through the various new landscape corridors in the northern development area whilst also offering an opportunity to connect onward to the existing PROW which runs along the northern site boundary.

13.5.4 Ecotones (integrating drainage and development edge recreational routes)

The extensive network of ancient semi-natural woodlands and mature hedgerows will be protected by a 30m wide “Ecotone” buffer and all components of Rickman’s Green Village should be sited beyond this zone to ensure that there is no damage to the root protection zones of veteran and ancient woodland trees and to protect bat movement corridors. Other mature tree lines and hedgerows are protected by similar a 10m wide buffer zone.

Around the edges of Rickman’s Green Village area these buffer zones create opportunities to establish new native woodlands integrated with the LVIA strategy to screen and enclose the development in longer vies as well as enhancing biodiversity. To the north and west of Rickman’s Green Village these woodlands would transition though a scrubby zone to meet the development boundaries as a thick hedgerow. This would be a secure line with fencing to prevent residents and domestic animals from intruding as well as helping prevent light spill.

Elsewhere in the masterplan these “Ecotones” create attractive opportunities for the new development to front onto these extensive landscape corridors. In these situation’s the masterplan envisages that a 4m wide (minimum) recreation route would mark the edge of the ecotone. Development drainage would be collected in swales which will also align along these recreation routes linking onwards to attenuation ponds, These ponds and swales along with associated “ha-ha” style retaining walls and parkland fencing will help create a distinctive and attractive means of enjoying the rich landscape of the ecotones whilst also preventing access. The drainage swales and attenuation areas will be seasonally wet and will therefore create a variety of opportunities to establish new habitats and add to biodiversity. On the development side of these recreational routes the development masterplan anticipates that a thick native hedgerow will define garden plots to further prevent any light spill or other domestic activities from impacting the ecotones. The “ecotone” recreational routes will become an integral part of the identity of Rickman’s Green Village as there will be multiple connections into the new residential areas and therefore a wide variety of opportunities for circular walking routes will be established linking back to the main village greens and destination open spaces.

13.5.5 PROW within the masterplan

The concept for Rickman’s Green Village accepts that the PROW which shares the existing farm access routes will, in the future, have a different character as it will be part of linear green at the centre of the new village. Elsewhere however the landscape strategy will be to screen the development areas from extensive view and this will also apply to the north/south historic drove to the west of the existing farm. To the north new woodland planting will over time, screen the development and enclose the PROW. To the south adjacent to a Grade II listed original Crouchland farm building there is a distinctive narrow pasture alongside the PROW/drove which will be managed as a new orchard with new woodland and tree planting along its eastern boundary combining to close down any views to buildings within Rickmans Green Village beyond. However, the central part of this route will continue to share the day to day traffic of the working farm and the farm complex itself will remain open to views

13.5.6 Phase 1

The landscape design strategy for the Phase 1 of Rickman's Green Village very much reflects the wider infrastructure landscape principles for the masterplan as describe above and looks to create and maintain a landscape that provides a rich and stimulating environment for residents, The landscape is not considered as a cosmetic addition but an integrated part of the design, management and function of the development. Opportunities for Informal play and social interaction are prominent throughout the scheme offering residents of various ages an opportunity to play, socialise and interact with the wider community. The landscape design principles can therefore be split and described in terms of the following key components;

Access and Linear Green

The new farm access route to the south of the exiting entrance will set up the opportunity to implement the first phase of the new Linear Green. As you enter off Rickman's Lane Phase 1 will dominate the view to the right of this new road whilst to the left the hedges and trees of the existing farm access will be retained and combined with additional woodland planting to create a strong linear greenspace. The new and existing planting will in turn combine with other offsite planting to the north west of the existing access route in order to effectively screen the Phase 1 area, over time, in views further from the north. The new access route reconnects with the existing farm access just south of the central landscape corridor after which new understorey and woodland planting to the south will, overtime, screen the Phase 1 neighbourhood from users of this route. Potential future access points linking to any wider masterplan will be carefully considered in order to minimise landscape and visual impact but will not be fully implemented as part of phase1.

Central Landscape Corridor

The central landscape corridor aligns on the existing field boundary and splits the Phase 1 development area north west to south east into separate northern and southern blocks. These blocks are linked midway by the main Phase 1 street which crosses this central landscape corridor at this point. The single crossing allows the corridor to otherwise retain a unity of form into which it's possible to integrate the Phase 1 SUS/drainage strategy. A linear swale collects surface drainage as a carrier route connecting under the main street linking onwards into an attenuation pond positioned at the south eastern end of the spine next to an attractive stand of oak trees. These retained trees provide a very strong structuring element and visual focus which is complement by a new line of multi stemmed trees aligned along the swale, to the north of the main street. This SUDS corridor along with the new trees provide an opportunity to establish an attractive visual focus to the landscape as well as creating opportunities for ecological enhancement. The main pedestrian recreational routes will align either side of the swale, which in turn creates an opportunity for positive development frontage onto this important neighbourhood space. A play area and allotments are located adjacent to each other on the north side of the main pedestrian link and together they establish an important community focus. A bold pedestrianised zone enables safe connection onwards across the new farm access to the adjacent central linear green with easy connection to the wider PROW network.

Ecotone and Recreational Routes

The Phase 1 development area is set back on the line of the "ecotone" buffer zones. The edge of the southern block is 30m from the tree line with the northern block 10m from the tree line. These buffer zones provide extremely attractive landscape views and the Phase 1 layout demonstrates the opportunity for development to positively front onto extensive landscape corridors that will also become key recreational routes. For the southern block the ecotone edge is defined by the neighbourhood SUDs drainage swales along which the recreation route also aligns. A low "ha-ha" style gabion retaining wall on the development side of the swales retains the path with a parkland style rail on top allowing open views whilst at the same time deterring access. The swales link onwards to an attenuation pond in the very southern corner of the site. The drainage swales and attenuation areas will be seasonally wet and will therefore create a variety of opportunities to establish new habitats and add biodiversity as well as creating points of visual interest and focus. The recreational route is designed to create a variety of widths and scales of spaces along it length with places to sit, socialise and enjoy the view. The multiple connections back into the wider neighbourhood create positive permeability and attractive points of easy access. A thick biodiverse native hedgerow will define garden plots as a backdrop to the route and assist with further preventing any light spill or other domestic activities from impacting the ecotones. The "ecotone" recreational routes will become an integral part of the identity of the new village and provide a wide variety of opportunities for circular walking routes linking back to the main village greens and destination open spaces. The northern block is served by a very similar recreational route with a "ha-ha" style wall and rail which loops northwards enabling linkage back to Rickman's Lane in the north east corner of the site before returning to link with the linear green at the entrance to the village.

Village Streets
Within the Phase 1 neighbourhood the streetscape will be simple and low key. The overall layout is structured around a main street and a series of mews/courtyards which, combined with the variation of house types and the gentle slope of the site to create a good balance of order and informality.

Specimen street trees of a variety of sizes are carefully located as integral components of the street scene. Garden boundaries fronting the public realm will be defined by a mixture of hedges, walls and parkland type railings. For all areas of planting the aim will be to choose habitat rich species in order to encourage local wildlife into gardens by creating linkage with site's surrounding ecotone and woodland habitats. The linear rain garden in the main street will be one such opportunity to create a striking visual and ecological feature which will connect directly, visually and functionally, with the wider landscape corridors.

Sections 13.7 and **13.8** assess the predicted landscape and visual effects of Rickman's Green Village at three stages in the implementation process:

- **during construction**
- **at completion**, when the proposed landscape is fully implemented but appears 'raw' and immature
- **after 15 years**, when the planting is fully mature and the intended effect (to soften, integrate and/or provide a visual screen) has been achieved.

13.6 Baseline Environment

13.6.1 Landscape assessment baseline

Landscape character

The county-wide Landscape Character Assessment[33] (LCA) identifies the landscape character areas within the vicinity of the Site. Each reflects variations in landscape character which relate to the underlying geology and soils of the area and the evolving patterns of settlement and land use.

Figure 5a shows that the Site falls within the North Western Low Weald landscape character area (LW2). *It comprises a gentle, rolling, enclosed rural landscape, with a sense of unity conferred by strong patterns of woodland, streams and rolling pasture interspersed with more open arable fields. Natural colours and textures of mature semi-natural woodland and pasture predominate. Many pastures contain field oak trees and are enclosed by sometimes dense networks of hedgerows, hedgerow trees, shaws, and frequent small and medium sized woodlands. Overall, the area has a remote and tranquil character[34].*

The LCA identifies the following key characteristics of the North Western Low Weald landscape character areas which are relevant within the context of this LVIA:

- *Gently undulating pastoral landscape.*
- *Dense network of medium sized woodlands, shaws and hedges with mature hedgerow trees.*
- *Mature and over-mature oak trees.*
- *Woodlands often following winding streams.*
- *Ancient semi-natural woodland and old woodland pasture.*
- *Oak - hazel coppice.*
- *Small and medium sized fields of predominantly pasture with some larger arable fields.*
- *Wealden villages, some centred on village greens, scattered farmsteads and cottages.*
- *Varied local building materials of stone, brick, weatherboard and half-timber.*
- *Dominant east-west pylon line.*
- *Winding narrow lanes linking scattered hamlets and farms.*

The adopted LCA records the following landscape and visual sensitivities that are relevant within this landscape character area:

- *Loss of tranquillity.*
- *Loss of individual trees in fields and hedgerows.*
- *Over maturity of hedgerow trees with little evidence of new young trees.*
- *Unsympathetic development, changes in settlement pattern and addition of suburban features.*
- *Changes in farming practices leading to the expansion or addition of modern farm buildings.*
- *Quality of public rights of way network vulnerable to reduced drainage management and increased use.*

The set of land management guidelines in the adopted LCA begins with a principal objective to *conserve existing tranquil rural and predominantly wooded character of the area.* Other relevant guidelines are:

- *Encourage conversion of arable fields to permanent pasture.*
- *Encourage the conservation and management of existing hedgerows and shaws.*
- *Replant hedgerows with a diverse mix of native species where these have been removed or depleted.*
- *Encourage the planting of hedgerow oaks to ensure a new generation of individual specimens.*

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[33] *The West Sussex Landscape – Land Management Guidelines, West Sussex County Council, 2005*
[34] *Op. cit. Footnote 10*

- *Restore historic field patterns where possible and maximise linkages with existing small woods.*
- *Plant and manage isolated trees in pasture.*
- *Conserve and encourage sound management of all woodland. Support and promote woodland industries.*
- *Conserve species rich pasture.*
- *Conserve and manage streamside vegetation and ponds. Encourage appropriate management to perpetuate conservation and landscape interests.*
- *Seek to reduce the extent, intensity and impact of horse grazing. Encourage the planting of tree belts and hedgerows around paddocks.*
- *Promote the use of current Stewardship schemes or equivalent.*
- *Consider the cumulative impact on landscape character of small developments and change. Avoid the introduction of suburban styles and materials.*
- *Increase tree cover in and around villages, agriculture and other development.*
- *Minimise the effects of adverse incremental change by seeking new development of high quality that sits well within the landscape and reflects local distinctiveness.*
- *Protect the character of rural lanes and manage road verges to enhance their conservation value.*

There is a hierarchy of landscape character areas which are relevant within the context of the Site: the North Western Low Weald landscape character area (described above) sits within the wider Low Weald landscape character area that is classified in the West Sussex Landscape Character Guidelines[35] and this in turn sits within the *Low Weald* National Character Area[36]. Relevant extracts from these broader scale LCA studies are:

- ***Low Weald (West Sussex LCA)*** notes (within the list of key characteristics) the *small-scale, intimate and pastoral character of the landscape*, the *natural character of watercourses* and the numerous *field ponds.* The notes on historic character include reference to historic glassworks and *ancient routes*, *including droveways and associated linear fields*
- ***Low Weald National Character Area Profile*** notes the industrial heritage of this landscape which supported iron working, brick and glass making, lime kilns and quarries from Roman times through to the early 19th century. It highlights the diversity of tree cover within the matrix of woodlands and hedgerows, including *extensive broadleaved oak over hazel and hornbeam coppice, shaws, small field copses and tree groups, and lines of riparian trees along water courses* and notes that *veteran trees are a feature of hedgerows and in fields.* The profile states that many of the *frequent north-south routeways and lanes* originated as drove roads along which livestock were moved to downland grazing or to forests to feed on acorns. It also notes the *many small rivers, streams and watercourses with associated watermeadows and wet woodland* and the *abundance of ponds*, including many that are a legacy of the Wealden iron industry.

The elevated wooded slopes of the SDNP form a distant backdrop in views to the south and west of this Low Weald landscape. A detailed visual analysis (see **Section 13.8**) demonstrates that Rickman's Green Village would not be visible from the SDNP, but the Low Weald landscape (including the Site) nevertheless contributes to the wider landscape setting of the SDNP because the distinctive landscape pattern of this area has been shaped by contrasts in historic land use between the chalklands of the South Downs and the enclosed woodlands, pastures and settlements of the Low Weald. For example, some of the PROW that cross the Site are a remnant of the historic droveways that connect the pastures of the downlands and the Low Weald.

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[35] Op. cit. Footnote 10
[36] National Character Area Profile: 121, Low Weald, Natural England, 2013

Figure 5b shows the extent of more detailed LCA work which was undertaken in 2011 to consider landscape sensitivity and capacity for residential development around settlements in Chichester District[37]. A small area of woodland and farmland on the northern edge of the Site is covered by this detailed assessment: the local landscape character area (156) which covers part of the Site is assessed as having 'substantial' landscape sensitivity, 'moderate' landscape value and 'low' capacity to accommodate development.

The set of photographs in **Figure 6** illustrates the character and condition of the existing Low Weald landscape in the vicinity of the Site. The dense matrix of mature woodlands, shaws and hedgerows defines an enclosed, irregular landscape pattern within a gently undulating clay vale drained by small streams and ponds that are typically hidden within the trees. There is a dispersed settlement pattern; the larger villages of Plaistow, Ifold and Kirdford are connected by a network of narrow hedged lanes and woodland tracks (public rights of way and byways) which also link individual farmsteads, cottages and hamlets. Examples are Rumbolds Farm to the north of the Site, Streeter's Farm and the row of dwellings along Rickman's Lane to the east and the hamlet of Mackerel's Common to the south. Many of the farmsteads in the countryside surrounding the Site comprise a cluster of large farm buildings but all are well hidden from public view.

Extensive areas of woodland have in the past been neglected and left unmanaged (or even in one area, planted with conifers) and some areas (including the slurry lagoon known as 'Lagoon 2') have undergone a recent process of decontamination and restoration following the closure of the former biogas processing plant. For many years this area has been an industrial site and it is now a busy and active farm and therefore it does not display the remote, tranquil character that is typical of other parts of the Low Weald landscape.

Within the broader Site, the character and condition of the areas that would be the site of specific development proposals are:

- Crouchlands Farm - the site of the former biogas plant. The biogas plant buildings and structures have been cleared and its site is currently occupied by farm buildings, including extensive hard standing and large cattle sheds which have been refurbished to a high standard. There is a small tributary valley and depression to the west of the farm buildings.
- The land immediately to the south of the Crouchlands Farm buildings and to the south of the access road from Rickman's Lane is an area of hardstanding with one large agricultural building. This part of the site is in poor condition, with areas of hard core and scrub. However it is bordered to the east by a narrow belt of ancient woodland which links the access road with Ravensnest Copse.

An arboricultural constraints report maps the locations of the ancient woodlands and their buffer zones, assesses the main areas of woodland that relate to the glamping element of the proposals and compartmentalises and describes Limekiln Wood and Hardnip's Copse[38].

14.6.2 Visual assessment baseline

Visibility and visual receptors

The existing visibility of the Site was assessed by a desktop study of Ordnance Survey maps, digital visibility mapping and [Google Earth] aerial photograph coverage in order to identify the area in which the development may be visible, the different groups of people who may experience views of the development, the viewpoints where they will be affected and the nature of views at those points.

Figure 7 in Annex A2 shows a computer generated Zone of Theoretical Visibility (ZTV) for the Site which shows the areas from which Rickman's Green Village may theoretically be visible on the basis of combined

[37] *Chichester District Landscape Capacity Study Extension, HDA, 2011*
[38] *Arboricultural Constraints Report for Pre-Application Advice at Crouchlands Farm, Plaistow, SJA Trees, July 2019*

data for topography ('bare earth') and modelled height for selected blocks of woodland in the vicinity of the site[39]. The ZTV mapping is the desk study component of the visibility analysis and cannot be relied upon to demonstrate the actual visibility of Rickman's Green Village because many other factors, including buildings and vegetation, influence visibility. **Figure 7** also shows the location of 7 scoping viewpoints, which were visited to test and explore the visibility of the site and potential Proposed Development 'on the ground'. The process of digital ZTV mapping and site visits to scope and test visibility 'on the ground' was repeated so that the relevant woodland heights could be checked and added to the digital visibility model. Visibility is limited in this wooded landscape, but multiple viewpoints were assessed as part of the visibility analysis. **Figure 8** provides a set of photographs that show the views from each of these scoping viewpoints; in all cases they demonstrate that Rickman's Green Village would not be visible. Analysis of the views from the Scoping Viewpoints demonstrates that Rickman's Green Village would not be visible from the SDNP.

Figure 9 in Annex A2 shows the zone of visibility (ZV) for the Site. It defines the area within which receptors might reasonably expect to be visually affected by Rickman's Green Village. The extent of the ZV was influenced by the ZTV and the analysis of views from the scoping viewpoints.

Given the importance of tree cover within this well wooded landscape, this assessment was undertaken during the winter months to give a 'worst case scenario', when the screening provided by tree canopies would be at a minimum level. As **Figure 9** shows, views to the Site are generally well contained by the dense matrix of mature hedgerows, trees and woodlands.

Within the ZTV, the people who would be likely to experience changes in views and visual amenity are:

- Residents of the properties accessed via the farm access road – Crouchlands, Moors Cottage and Lanelands
- Pedestrians and farm traffic using the PROW's (including byways) which cross the site.
- Recreation users of the PROW's which are in close proximity to the site within the wider landscape
- Motorists, cyclists and walkers travelling along Rickman's Lane and Foxbridge Lane
- Residents in the group of dwellings adjacent to Streeter's Farm on Rickman's Lane and also along Foxbridge Lane.

13.7 Predicted landscape effects

13.7.1 Landscape receptors

Reference to **Figure 1** and analysis of the wide range of factors considered within the baseline landscape assessment suggests that the landscape receptors, or components of the local landscape that are likely to be affected by Rickman's Green Village are:

- **The extensive network of ancient semi-natural woodlands**, which have exceptionally high biodiversity and cultural value.
- **The strong network of mature woodland, copses, shaws and hedgerows**, with a diverse mix of woodland types and species, which define the historic landscape and drainage pattern in this part of the Low Weald landscape.
- **The rural character of narrow enclosed lanes and tracks,** including historic drove roads (PROW) and their associated linear fields.
- **The small scale, intimate and pastoral landscape character** with livestock grazing the heavy clay soils.

[39] Note LiDAR data was not used because this type of data was not available for parts of the area and, where it was available, did not include the heights of relevant vegetation

- **The time-depth of the landscape,** including the landscape setting of Crouchland (Grade II Listed house) to the west of the Crouchlands Farm complex and the historic integrity and managed character of the surrounding agricultural and woodland landscapes.
- **The landscape setting of the South Downs National Park,** which is c. 5km to the south and west of the Site. Rickman's Green Village would not be visible in daytime views from the SDNP[40], but the distinctive landscape pattern of the Low Weald landscape, including the historic drove roads, nevertheless contributes to the wider landscape setting of the SDNP.

13.7.2 Significance of landscape effects

Judging the significance of landscape effects requires a systematic assessment of each identified effect in terms of the sensitivity of the landscape receptors and the magnitude of the effect on the landscape.

13.7.3 Sensitivity of the landscape receptors

Table 13-1 assesses the sensitivity of the landscape receptors, combining judgements about their susceptibility to the changes arising as a result of Rickman's Green Village and the value attached to these components of the landscape. Refer to Table B1.2 in Annex B (Methodology) which sets out the criteria for judging the sensitivity of landscape receptors.

[40] Note that an assessment of the potential night time lighting impacts of the Proposed Development which addresses the potential impact on the SDNP Dark Skies is provided separately (Crouchlands Farm Redevelopment Lighting Impact Assessment, Royal Haskoning April 2021). An assessment of potential night time lighting impacts is excluded from this LVIA.

Table 13-1 Sensitivity of landscape receptors

Landscape receptors	Susceptibility to proposed change	Value	Sensitivity of landscape receptor
Extensive ancient semi-natural woodlands	LOW The landscape layout incorporates a 30m buffer Ecotone between ancient woodland and the edge of proposed built development to ensure that the character and ecological integrity of the ancient semi-natural woodlands would be protected from the impacts of built development.	HIGH With the exception of a small area close to the south boundary of the Site, the semi natural ancient woodlands on the Site are not designated but they are recognised to be irreplaceable habitat of exceptionally high biodiversity, cultural and heritage value which are protected as a material consideration in planning decisions (Paragraph 175C NPPF).	MODERATE
Strong network of mature woodland, copses, shaws and hedgerows	LOW The existing strong network of mature woodland, shaws and hedgerows would be conserved and reinforced through a programme of restoration and long-term sustainable management. Any losses (of trees or hedgerow) would be minor and fully compensated by new planting.	MODERATE No designation. Highlighted as a distinctive local landscape characteristic in the adopted LCA.	MODERATE
Rural character of narrow, enclosed lanes and tracks	HIGH Rickman’s Green Village would lead to an increase in residents and a loss of rural character in particular because of the need to comply with visibility (sight	MODERATE No designations. The historic drove roads and are noted as a distinctive characteristic in the adopted LCA. Some evidence for degraded of rural	HIGH

Landscape receptors	Susceptibility to proposed change	Value	Sensitivity of landscape receptor
	line) requirements for vehicles at the site entrance from Rickman's Lane and the relative visibility of the new residential development from the lanes and tracks generally especially along the existing Crouchlands farm access.	character of tracks and lanes in vicinity of the Crouchlands Farm as a result of HGV use (farm traffic and the works associated with ongoing restoration of the slurry lagoons to the west of the Site).	
Small-scale, intimate pastoral landscape character	HIGH The new homes and other infrastructure (e.g. vehicular access, lighting, signage) associated with Rickman's Green Village will change the small-scale, intimate character of the landscape on part of the Site. Its layout and design would aim to minimise such adverse impacts and a programme of landscape restoration and management would support the conservation and long term sustainability of the distinctive pastoral Low Weald character.	HIGH No designations. The small-scale, intimate pastoral landscape character of this area is noted as a distinctive characteristic in the adopted LCA.	HIGH
Time depth of the landscape	MODERATE The site is not located in a Conservation Area. There are no listed buildings within the application site and no works are proposed to nearby listed buildings or their curtilages.	HIGH Two Grade II Listed buildings are adjacent to the application site – Crouchlands Farm (house) to the west of the Crouchlands Farm complex and a Grade II Listed	HIGH

Landscape receptors	Susceptibility to proposed change	Value	Sensitivity of landscape receptor
	Rickman's Green Village would however result in some adverse impacts on the time-depth of the local landscape, including on the landscape setting of a Grade II Listed buildings (at Crouchland and Lanelands) during the construction stage and the introduction of new built infrastructure. However, the masterplan layout retains and reflects the existing pattern of fields, woodlands, shaws and tracks on the Site. The master plan will also bring opportunities to introduce now local landscape elements, including ponds, wetlands, hedgerows, orchards, species-rich meadows and green lanes	dwelling (Lanelands) to the south. The historic relationship between Crouchland and Crouchland Farm (House) has long been severed, but remains of some relevance in terms of historic landscape setting. The historic landscape pattern is noted as a distinctive characteristic in the adopted LCA.	
Landscape setting of the SDNP	MODERATE The scoping viewpoint analysis undertaken as part of the visual assessment demonstrates that Rickman's Green Village would not be visible in daytime views from the SDNP. Some of the PROW that cross the Site are a remnant of the historic droveways that connect the pastures of the downlands and the Low Weald. Rickman's Green Village will lead to some loss of rural character along the	HIGH The SDNP is a nationally important landscape, protected for its scenic quality and recreational value.	MODERATE

Landscape receptors	Susceptibility to proposed change	Value	Sensitivity of landscape receptor
	PROWs because of the proximity of the new residential buildings and other infrastructure associated with the development		

13.7.4 Magnitude of landscape effects

Table 13-2 shows the judgements involved in assessing the magnitude of landscape effects. Each effect on landscape receptors is assessed in terms of its size or scale, the geographical extent of the area influenced, its duration and reversibility – during the construction phase, at year 1 (following completion) and after 15 years, when any new planting can be expected to have matured. Refer to Table B1.2 in Annex B (Methodology) which sets out the criteria for judging the magnitude of landscape effects.

Table 13-2 Magnitude and significance of landscape effects

Landscape receptors RECEPTOR SENSITIVITY	Predicted landscape effects MAGNITUDE OF CHANGE			Significance of landscape effect RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))
	Construction phase	At completion	After 15 years	
Extensive ancient semi-natural woodlands *Receptor: susceptibility to proposed change – LOW* *Receptor: value - HIGH*	The 30m wide ancient woodland buffer zones would ensure that there is no damage to the root protection zones of veteran and ancient woodland trees. The construction works for parts of Rickman's Green Village would cause some disruption to the character, landscape setting and condition of the ancient woodlands at a local scale.	The ancient woodlands would be fully protected by the 30m wide buffer zones, However, at completion the proposed tree woodland planting would not be influential at a landscape scale and the new built development and infrastructure would appear relatively 'raw'. Overall there is predicted to be a minor adverse landscape effect at this stage in terms of visual disruption to the character, landscape setting and condition of the ancient woodlands	When mature, the new tree and woodland planting will extend and reinforce the existing matrix of semi-natural woodland, protecting this valued landscape habitat. The proposed long-term programme of sustainable woodland management would have a moderate beneficial effect on the semi-natural woodlands on the site.	The significance of landscape effect for the receptor:
	Short-term, irreversible effect	*Long-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographic extent MODERATE	*Geographic extent* MODERATE	*Geographic extent* MODERATE	*Construction phase –* MEDIUM-LOW
	Size or scale of change MODERATE	*Size or scale of change* MODERATE	*Size or scale of change* MODERATE	*At completion –* MEDIUM-LOW
Receptor sensitivity is MODERATE	*Magnitude and nature of effect* *MODERATE ADVERSE*	*Magnitude and nature of effect* *MODERATE ADVERSE*	*Magnitude and nature of effect* *MINOR ADVERSE*	*After 15 years –* LOW

Terminology for Landscape Effect :				
Susceptibility to change	*High/Moderate/Low*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Value of landscape	*High/Moderate/Low*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Overall sensitivity of receptor	*High/Moderate/Low*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
		Geographic extent	*Minor (change affects small area)/Moderate/ Major (change affects extensive area)*	*Medium-low/Low/*
		Magnitude of effect	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
		Nature of effect :	*Beneficial/Neutral/Adverse*	

Landscape receptors RECEPTOR SENSITIVITY	Predicted landscape effects MAGNITUDE OF CHANGE Construction phase	At completion	After 15 years	Significance of landscape effect RECEPTOR SENSITITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))
Strong network of mature woodland, copses shaws and hedgerows *Receptor: susceptibility to proposed change – LOW* *Receptor: value - MODERATE*	During the construction phase, 90m existing hedgerow would be removed (for sight lines) along Rickman's Lane. It is estimated that a further 250m hedgerow may be removed to enable implementation of built infrastructure (access routes, drainage, services) elsewhere on the Site. No woodlands or shaws would be affected. The predicted loss of existing trees and hedgerows represents a small proportion of the overall network on the site.	At completion, the extensive new hedgerow, tree and woodland planting would extend and reinforce the existing network; The proposed landscape layout incorporates approximately 3,100m new hedgerow, 5,400 m^2 of new native woodland understorey planting and 365no specimen trees. However, the new planting would not be an effective influence on local landscape character and condition at completion as the newly planted trees and hedgerows would not have sufficient bulk/canopy to create a sense of enclosure and a backdrop to local views. Overall there is predicted to be a minor adverse landscape effect at this stage.	Once mature, the new planting will reinforce and extend the existing network of mature woodland, copses, shaws and hedgerows, However the characteristic pattern of enclosure will have changed and some residential development will visually impact this landscape receptor permanently. The proposed long-term programme of sustainable landscape management would however have a beneficial effect on the network of vegetation across the entire site.	The significance of landscape effect for the receptor:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographic extent MODERATE	*Geographic extent* MODERATE	*Geographic extent* MODERATE	*Construction phase –* MEDIUM - LOW
	Size or scale of change MODERATE	*Size or scale of change* MODERATE	*Size or scale of change* MINOR	*At completion –* MEDIUM - LOW
Receptor sensitivity is MODERATE	*Magnitude and nature of effect* *MODERATE ADVERSE*	*Magnitude and nature of effect* *MODERATE ADVERSE*	*Magnitude and nature of effect* *MINOR ADVERSE*	*After 15 years –* LOW
Terminology for Landscape Effect :				
Susceptibility to change	*High/Moderate/Low*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Value of landscape	*High/Moderate/Low*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*

Overall sensitivity of receptor	*High/Moderate/Low*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
		Geographic extent	*Minor (change affects small area)/Moderate/ Major (change affects extensive area)*	*Medium-low/Low/*
		Magnitude of effect	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
		Nature of effect :	*Beneficial/Neutral/Adverse*	

Landscape receptors RECEPTOR SENSITIVITY	**Predicted landscape effects MAGNITUDE OF CHANGE**			**Significance of landscape effect RECEPTOR SENSITIY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Rural character of narrow enclosed tracks and lanes *Receptor: susceptibility to proposed change – HIGH* *Receptor: value - MODERATE*	Compliance with requirements for sightlines at the vehicular entrance to the site on Rickman's Lane would require the removal of 90m hedgerow, resulting in some disruption to the character and quality of this part of the road. Vehicular construction traffic would be restricted to minimise disruption to the rural character of roads and tracks elsewhere on the site and drainage, surfacing, fencing, lighting and signage would be designed to minimise disruption to rural character. Nevertheless, for a short period, the tracks and lanes on the site would be dominated by construction plant, signage, traffic controls and materials.	At completion, improvements to the circulation would lay the foundation for high quality user-friendly routes through the site which would ensure minimal damage to the surrounding habitats and landscape features. However, it is acknowledged that such improvements, in particular along the existing farm access track from Rickman's Lane would have a 'raw' appearance at the completion stage and that there would be a major adverse effect on the character of the lane in this particular area.	After 15 years, once the new road/trackside tree and hedgerow planting is mature, the enclosed character and condition of the tracks and lanes at Crouchlands Farm would be partially restored. However, the roads and tracks in the vicinity of the existing farm access track will have a more urban/village character meaning that this area in particular will change character permanently.	The significance of landscape effect for the receptor:
	Short-term, temporary effect	*Long-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographic extent MAJOR	*Geographic extent* MAJOR	*Geographic extent* MAJOR	*Construction phase –* HIGH
	Size or scale of change MAJOR	*Size or scale of change* MAJOR	*Size or scale of change* MODERATE	*At completion –* HIGH

Receptor sensitivity is HIGH	*Magnitude and nature of effect MAJOR ADVERSE*	*Magnitude and nature of effect MAJOR ADVERSE*	*Magnitude and nature of effect MODERATE ADVERSE*	*After 15 years –* MEDIUM-HIGH
Terminology for Landscape Effect :				
Susceptibility to change	*High/Moderate/Low*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Value of landscape	*High/Moderate/Low*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Overall sensitivity of receptor	*High/Moderate/Low*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
		Geographic extent	*Minor (change affects small area)/Moderate/ Major (change affects extensive area)*	*Medium-low/Low/*
		Magnitude of effect	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
		Nature of effect :	*Beneficial/Neutral/Adverse*	

Landscape receptors **RECEPTOR SENSITIVITY**	Predicted landscape effects **MAGNITUDE OF CHANGE**			Significance of landscape effect **RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Small-scale intimate pastoral character *Receptor: susceptibility to proposed change – HIGH* *Receptor: value - MODERATE*	During construction, the (temporary mobile) cranes, fencing, scaffolding, equipment and materials may temporarily be prominent, disrupting the relatively small-scale, intimate pastoral character of parts of the Crouchlands Farm landscape. Overall, the change is judged to be major adverse.	At completion, the extensive new woodland tree and hedgerow planting would not be an effective influence on landscape character and the new residential architecture, access roads and other associated infrastructure would be perceived as a large area of built development. The new buildings and infrastructure would disrupt the small-scale, intimate character of this part of landscape.	After 15 years, the extensive woodland, tree and hedgerow planting would restore the landscape structure in some areas and would screen and soften local views to the development so that they are well integrated within their landscape context. Rickman's Green Village would disrupt the small-scale intimacy of parts of the site in particular those areas likely to remain visible (at least partially) along the existing farm access from Rickman's Lane, Rickman's Lane itself and, Foxbridge Lane. Elsewhere the pastoral, working farm character would be conserved and sustained long term.	The significance of landscape effect for the receptor:
	Short-term, temporary effect	*Long-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographic extent *MAJOR*	*Geographic extent* *MAJOR*	*Geographic extent* *MAJOR*	*Construction phase –* HIGH
	Size or scale of change MAJOR	*Size or scale of change* MAJOR	*Size or scale of change* MODERATE	*At completion –* HIGH
Receptor sensitivity is HIGH	*Magnitude and nature of effect* *MAJOR ADVERSE*	*Magnitude and nature of effect* *MAJOR ADVERSE*	*Magnitude and nature of effect* *MODERATE ADVERSE*	*After 15 years –* MEDIUM-HIGH

Terminology for Landscape Effect :				
Susceptibility to change	*High/Moderate/Low*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Value of landscape	*High/Moderate/Low*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Overall sensitivity of receptor	*High/Moderate/Low*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
		Geographic extent	*Minor (change affects small area)/Moderate/ Major (change affects extensive area)*	*Medium-low/Low/*
		Magnitude of effect	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
		Nature of effect :	*Beneficial/Neutral/Adverse*	

Landscape receptors RECEPTOR SENSITIVITY	Predicted landscape effects MAGNITUDE OF CHANGE Construction phase	At completion	After 15 years	Significance of landscape effect RECEPTOR SENSITITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))
Time depth of the landscape *Receptor: susceptibility to proposed change – MODERATE* *Receptor: value - HIGH*	The construction infrastructure would temporarily cause disruption to the landscape setting of Crouchland (Grade II Listed building) it would have a degrading influence on the approach to the buildings. The construction works would also adversely impact the enclosed 'greenway' character of the historic north-south drove road in the area close to the construction works. The setting of other Grade 2 listed buildings to the north and north east of the site on Rickman's Lane and Foxbridge lane may also be impacted.	At completion, the quality of the approach to the Listed Buildings (at Crouchland) would be much improved; however the character of the approach would have a less rural character as you approach along the access track from Rickman's Lane. To the east of Crouchland the historic landscape pattern would be enhanced, with extensive new planting including the replanting/reinforcing of a neglected tree belt along with the planting of a traditional apple orchard and a new allotment. Elsewhere extensive woodland planting will eventually screen the development from wider impacts. However, at this early stage, the new planting would have a limited effect and the time-depth of the Crouchlands Farm landscape in particular would be less strongly perceived.	Once mature, the extensive new planting would have reinforced the historic landscape pattern and the different component parts of Rickman's Green Village would have been separated and integrated within their landscape context so that the perceived scale of the buildings/development and infrastructure is reduced. The new infrastructure landscape would have an enhanced time depth, with extensive and carefully managed semi-natural habitats that reflect the full spectrum of landscape features and elements that should be characteristic of the Low Weald farmland landscape including field ponds and wetlands, shaws, orchards and species-rich meadows.	The significance of landscape effect for the receptor:
	Short-term, temporary effect	*Long-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographic extent *MODERATE*	*Geographic extent* *MODERATE*	*Geographic extent* *MODERATE*	*Construction phase –* MEDIUM HIGH
	Size or scale of change *MODERATE*	*Size or scale of change* MODERATE	*Size or scale of change* MINOR	*At completion –* MEDIUM-HIGH
Receptor sensitivity is HIGH	*Magnitude and nature of effect* *MODERATE ADVERSE*	*Magnitude and nature of effect* MODERATE *ADVERSE*	*Magnitude and nature of effect* *MINOR- ADVERSE*	*After 15 years –* *MEDIUM-LOW*
Terminology for Landscape Effect :				

Landscape receptors RECEPTOR SENSITIVITY	Predicted landscape effects MAGNITUDE OF CHANGE Construction phase	At completion	After 15 years	Significance of landscape effect RECEPTOR SENSITITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))
Susceptibility to change	*High/Moderate/Low*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Value of landscape	*High/Moderate/Low*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Overall sensitivity of receptor	*High/Moderate/Low*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
		Geographic extent	*Minor (change affects small area)/Moderate/ Major (change affects extensive area)*	*Medium-low/Low/*
		Magnitude of effect	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
		Nature of effect :	*Beneficial/Neutral/Adverse*	

Landscape receptors RECEPTOR SENSITIVITY	Predicted landscape effects MAGNITUDE OF CHANGE Construction phase	At completion	After 15 years	Significance of landscape effect RECEPTOR SENSITITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))
Landscape setting of the SDNP *Receptor: susceptibility to proposed change – LOW* *Receptor: value - HIGH*	The construction phase of Proposed Development would not be visible in daytime views from the SDNP as even the (temporary mobile) crane would not be discernible above the tree canopy in the distant views.	At completion, Rickman's Green Village would not be visible in the distant daytime views from the SDNP.	After 15 years, there would be no discernible change to the existing landscape setting of the SDNP.	The significance of landscape effect for the receptor:
	Short-term, temporary effect	*Long-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographic extent *MINOR*	*Geographic extent* *MINOR*	*Geographic extent* *MINOR*	*Construction phase –* NEUTRAL
	Size or scale of change *NEGLIGIBLE*	*Size or scale of change* NEGLIGIBLE	*Size or scale of change* NEGLIGIBLE	*At completion –* NEUTRAL
Receptor sensitivity is MODERATE	*Magnitude and nature of effect* *NEUTRAL*	*Magnitude and nature of effect* *NEUTRAL*	*Magnitude and nature of effect* *NEUTRAL*	*After 15 years –* *NEUTRAL*
Terminology for Landscape Effect :				
Susceptibility to change	*High/Moderate/Low*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Value of landscape	*High/Moderate/Low*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Overall sensitivity of receptor	*High/Moderate/Low*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
		Geographic extent	*Minor (change affects small area)/Moderate/ Major (change affects extensive area)*	*Medium-low/Low/*
		Magnitude of effect	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
		Nature of effect :	*Beneficial/Neutral/Adverse*	

13.7.5 Significance of landscape effects

Judging the significance of landscape effects requires a systematic assessment of each identified effect in terms of the sensitivity of the landscape receptors and the magnitude of the effect on the landscape. **Table 13-2** shows how the separate judgements about sensitivity of the landscape receptors and the magnitude of the predicted landscape effects have been combined to provide an overall judgement about whether each predicted landscape effect is significant (Refer also to Table B1.4 in the LVIA Methodology provided in Annex B) which shows the matrix that has been used to combine these judgements.

For the purposes of this LVIA, a significant impact value that is higher than medium adverse is considered significant and significant impacts for the construction phase are given less weight than those for completion and after 15 years, as the former is a temporary effect.

The assessment predicts that there would be a significant but temporary adverse landscape effect on one landscape receptor during the construction stage of Rickman's Green Village;

- Time depth of the landscape.

Significant adverse landscape effect is predicted to persist at year 15 for two landscape receptors;

- Rural character of narrow enclosed lanes and tracks; and
- Small- scale intimate pastoral landscape character.

There are predicted to be no significant adverse landscape effects during construction stage on the;

- Extensive ancient semi-natural woodlands; or
- Strong network of mature woodland, copses, shaws and hedgerows.

There are predicted to be no significant adverse landscape effects during construction stage and any impacts remaining are predicted to reduce to a low level after 15 years, once the extensive proposed tree and woodland planting has matured.

There are not predicted to be any changes as a result of the development which will impact the setting of the SDNP.

13.8 Predicted visual effects

13.8.1 Visual receptors

Figure 9 also shows the location of the representative viewpoints which have been selected to represent the places from which Rickman's Green Village would be seen by these different groups. The viewpoint numbers correspond with the photographs presented in **Figures 10.1 – 10.16**. The representative viewpoints are those which provide the clearest views of the Site and which are most accessible to the public. They record the way the Site is currently perceived by 'local receptors' within its landscape context and thus provide a baseline visual assessment for use as a point of comparison when considering the effects of the development.

The list of representative viewpoints set out below also includes a brief assessment of their sensitivity, categorised as high, medium, low or negligible. Sensitivity depends on the:

- Location and context of the viewpoint, for example viewpoints which are closer to the site are generally more sensitive.
- The numbers of viewers who commonly use the viewpoint. Some viewpoints are commonly used by the public, such as formal viewing areas, picnic areas or recreational rights of way. Other viewpoints may be difficult to gain access to.
- The nature of the viewpoint and the expectations, occupation or activity of the receptor. Residential properties are sensitive to visual impacts as the residents experience the impacts on a regular and prolonged basis. Public footpaths can also be sensitive, since the users attention is often focused on the landscape. By contrast views from transport routes or places of work are less sensitive.
- Movement of viewers at the viewpoint. More transitory views for example from a motorway or train, are generally less sensitive than views experienced from residential properties and footpaths
- The importance or cultural significance of the view/viewpoint, including its appearance in guidebooks, tourist maps, or cultural and historical associations.

13.8.2 Representative viewpoints – visual assessment

This section describes the selected viewpoints and indicates the relative sensitivity of the visual receptors, taking account of the susceptibility of the visual receptors to change and the value attached to views.

Representative Viewpoint 1 (Figure 10.1) – View looking north west along Rickman’s Lane just east of the existing access road to Crouchlands Farm. The hedgerow in the foreground would be removed to provide required visibility splays from the proposed new access lane to the north part of the Rickman’s Green Village. The existing property to the right of the view will be demolished as part of the masterplan development.

Visual receptors would be motorists and cyclists on Rickman’s Lane. Their susceptibility is judged to be moderate as they are travelling on a local, rural lane and may potentially have some appreciation of the surrounding scenery (for instance, compared to motorists on a commuter route). The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate

Representative Viewpoint 2 (Figure 10.2) – View looking west towards the existing Crouchlands Farm complex from the public right of way connecting the existing Crouchland Farm access road with Rickman’s Lane. The existing farm buildings, which are partially visible in the middle distance. The foreground field is part of the current Rickman’s Green Village masterplan.

Visual receptors would be pedestrians walking along a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 3 (Figure 10.3) – View looking east from the public right of way connecting the existing Crouchland Farm access road with Rickman’s Lane across the open field foreground field which will become part of Rickman’s Green Village.

Visual receptors would be pedestrians walking along a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 4 (Figure 10.4) – View looking north west across the open landscape and east along the existing access lane to Crouchlands Farm - typical of a of a sequence of views along this route.

The existing Crouchlands Farm complex and Moores Green Cottage is just to the left beyond the view. The fields to the north of the lane will become part of Rickman's Green Village.

Visual receptors would be motorists, cyclists and pedestrians as this route is used by farm traffic, local residents and pedestrians. Their susceptibility is judged to be high as some users of this route are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 5 (Figure 10.5) – View looking south east across the open fields and along the existing access lane to Crouchlands Farm - typical of a sequence of views along this route. The fields beyond the foreground trees are part of Rickman's Green Village (Phase 1).

Visual receptors would be motorists, cyclists and pedestrians as this route is used by farm traffic, local residents and pedestrians. Their susceptibility is judged to be high as some users of this route are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 6 (Figure 10.6) – View looking northwards towards the Crouchlands Farm - one of a sequence of views moving northwards along the PROW.

Visual receptors would be pedestrians walking along a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be moderate; it is not subject to any planning designations, but is of particular amenity value as this route is part of the historic network of drove roads which connect the settled pastoral clay vale of the Low Weald with the chalk downland to the south (now the SDNP). Locally, this is the principal public right of way connection between the villages of Kirdford (to the south) and Plaistow (to the north). Overall visual receptor sensitivity is judged to be high.

Representative Viewpoint 7 (Figure 10.7) – View looking east along the byway to the north of Crouchland (house). The view also looks north across what will become Rickman's Green Villages formal open space

Visual receptors would be motorists, cyclists and pedestrians as this route is used by farm traffic, local residents and pedestrians. Their susceptibility is judged to be high as some users of this route are likely to be walking for recreational purposes. The value of the view is judged to be high as it is adjacent to (and within the setting of) Crouchland, a Grade II listed building. Overall visual receptor sensitivity is judged to be high.

Representative Viewpoint 8 (Figure 10.8) – View looking east towards Limekiln Wood from the PROW that is aligned north-south across the centre of the Site. The field to the right of the PROW is part of Rickman's Green Village.

Visual receptors would be pedestrians walking along a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be moderate; it is not subject to any planning designations, but is of particular amenity value as this route is part of the historic network of drove roads which connect the settled pastoral clay vale of the Low Weald with the chalk downland to the south (now the SDNP). Locally, this is the principal public right of way connection between the villages of Kirdford (to the south) and Plaistow (to the north). Overall visual receptor sensitivity is judged to be high.

Representative Viewpoint 9 (Figure 10.9) – View looking south west from Rickman's Lane at the junction with a PROW which connects Rickman's Lane with the PROW that is aligned north-south across the centre of the site. The existing farm buildings are partially visible between the belts of mature woodland and shaws within the site. The northern boundaries Rickman's Green Village are just beyond the hedgerow in the middle if the view.

Visual receptors would be motorists and cyclists on Rickman's Lane and pedestrians using the public foot-path. Their susceptibility is judged to be high as some users are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 10 (Figure 10.10) – View looking south from the public right of way connecting east west in the fields to the north of the site. This is a relatively localised view in which Rickman's Green Village - Phase 1 will be visible on the higher ground in the centre of the view.

Visual receptors would be pedestrians walking along a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 11 (Figure 10.11) – View looking south from the public right of way connecting east west in the field due north of the site along the northern boundary of Rickman's Green Village site. This is a relatively localised view in which Rickman's Green Village northern areas will be visible on the higher ground in the centre of the view.

Visual receptors would be pedestrians walking along a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 12 (Figure 10.12) – View looking west from Foxbridge Lane with the hedgerow and mature trees in the centre of the view defining the eastern boundary of Rickman's Green Village site.

Visual receptors would be motorists and cyclists using Foxbridge Lane. Their susceptibility is judged to be moderate as they are travelling on a local, rural lane and may potentially have some appreciation of the surrounding scenery (for instance, compared to motorists on a commuter route). The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 13 (Figure 10.13) – View looking north west along Rickman's Lane just west of the junction with Foxbridge Lane. The hedgerow in the foreground will be retained with Rickman's Green Village in the centre of the view beyond.

Visual receptors would be motorists and cyclists on Rickman's Lane. Their susceptibility is judged to be moderate as they are travelling on a local, rural lane and may potentially have some appreciation of the surrounding scenery (for instance, compared to motorists on a commuter route). The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 14 (Figure 10.14) – View looking north west along Rickman's Lane just south of Streeters Farm. Rickman's Green Village is behind the hedge to left of the view This hedgerow will be substantially retained other than where a section would be removed to provide the required visibility splays from the proposed new access lane.

Visual receptors would be motorists and cyclists on Rickman's Lane. Their susceptibility is judged to be moderate as they are travelling on a local, rural lane and may potentially have some appreciation of the surrounding scenery (for instance, compared to motorists on a commuter route). The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 15 (Figure 10.15) – View looking south west towards the existing Crouchlands Farm entrance on Rickmans Lane from the small triangle of common land opposite. Rickman's Green Village will sit behind the retained edge to the left of the entrance. The hedge to the right will be removed in order to provide the required visibility splay form the proposed new access lane which will be just off the view behind the foreground hedge to the left. A new hedge and substantial woodland will be planted to the right of the existing farm entrance.

Visual receptors would be motorists and cyclists on Rickman's Lane. Their susceptibility is judged to be moderate as they are travelling on a local, rural lane and may potentially have some appreciation of the surrounding scenery (for instance, compared to motorists on a commuter route). The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 16 (Figure 10.16) – View looking east and south along the existing farm access track with a view through the field gate into Rickman's Green Village - typical of a sequence of views along this route. The hedge and trees are substantial and will be retained but this will a more open view of Rickman's Green Village site in winter.

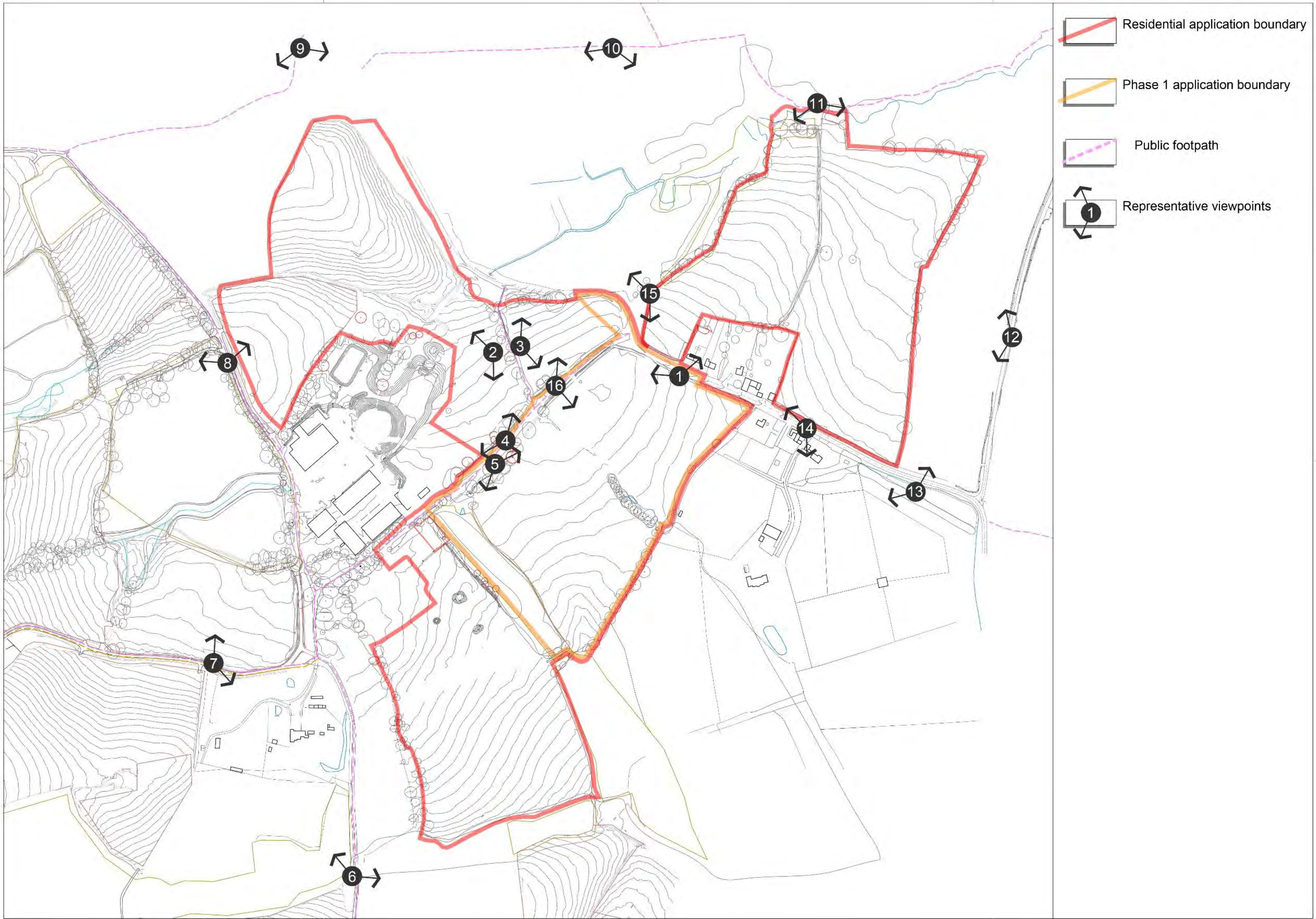
Visual receptors would be pedestrians walking along farm access track as a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Table 13-3 Representative Viewpoints Summary

Viewpoints	Masterplan	Phase 1	Phase 2
Representative Viewpoint 1			
Representative Viewpoint 2			
Representative Viewpoint 3			
Representative Viewpoint 4			
Representative Viewpoint 5			
Representative Viewpoint 6			
Representative Viewpoint 7			
Representative Viewpoint 8			

Viewpoints	Masterplan	Phase 1	Phase 2
Representative Viewpoint 9			
Representative Viewpoint 10			
Representative Viewpoint 11			
Representative Viewpoint 12			
Representative Viewpoint 13			
Representative Viewpoint 14			
Representative Viewpoint 15			
Representative Viewpoint 16			

Red - masterplan and Phase 2 representative views (red line on plan)
Orange - Phase 1 representative views (orange line on plan)



Residential application boundary
Phase 1 application boundary
Public footpath
Representative viewpoints
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16

13.8.3 Magnitude of predicted visual effects

For each of the selected representative viewpoints, the effect on visual receptors is assessed in terms of its size or scale, the geographical extent of the area influenced and its duration and reversibility– during the construction phase, at year 1 (following completion) and after 15 years, when any new planting can be expected to have matured. Refer to Table A3 in Annex B - LVIA Methodology, which sets out the criteria for judging the magnitude of visual effects.

13.8.4 Significance of predicted visual effects

Table 13-4 shows how the separate judgements about sensitivity of the visual receptors and the magnitude of the predicted visual effects have been combined to provide an overall judgement about whether each predicted visual effect is significant or not.

For the purposes of this LVIA, a significant impact value that is higher than medium-high is considered significant. In addition, effects that are of a temporary nature (i.e., those that occur during construction and in the years immediately after completion before any new planting can be expected to provide an effective visual screen) are given less weight than any permanent residual effects which remain after new planting has matured.

As the assessment in **Table 13-4** shows, there are predicted to be significant adverse visual effects during the construction stage and at completion from Viewpoint 4 (looking north west on Crouchlands farm access), Viewpoint 6 (Looking north from the PROW to the north of Lanelands) Viewpoint 8 (Looking north from the PROW (that crosses the site north-south) towards Limekiln Wood. Viewpoint 16 (View looking east and south along the existing farm farm access road to Crouchlands Farm. Viewpoints 4 and 16 are judged to remain Medium High where Rickman's Green Village is intended to remain visible in this very close view. These locally retained close views need to be considered therefore in the context of the LVIA strategy overall to contain wider landscape views so the any remaining visible development will be perceived as appropriate to the immediate landscape character type. Viewpoints 6 and 8 will reduce to medium low once the extensive proposed new tree and woodland planting has matured.

For the majority of other viewpoints there are predicted to be medium-high impacts during construction and at completion but these will reduce to medium-low or low once the extensive proposed new tree and woodland planting has matured.

For viewpoints 10 (view looking south from the public right of way connecting east west in the fields to the north of the site) and 12 (view looking west from Foxbridge Lane) there are predicted to be medium-low impacts during construction and at completion but these will reduce to low once the extensive proposed new tree and woodland planting has matured.

Table 13-4 Magnitude and significance of visual effects

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 1 *Looking north east from Rickman's Lane just north of the existing access road to Crouchlands Farm.* *Moderate susceptibility to change* *Low value*	The site clearance and equipment on site during the construction of the new farm access road and its junction with Rickman's Lane would be prominent in this full view to part of the construction. It is one of the sequence of views along Rickman's Lane. This would be a major change which would disrupt the rural character of Rickman's Lane over a distance of approximately 150m for a short period of time.	At completion, the change to a more open junction with visible development would seem relatively raw as the new hedgerow, woodland and tree planting implemented as part of the new linear green linking across Rickman's Lane and dominating the background of view will not yet be effective in providing enclosure and a backdrop to views. The buildings and associate development infrastructure would dominate the right portion of the view representing a major change in character.	This part of Rickman's Lane that forms the context for the existing and new junctions required for the development would have a more open character with visible development. After 15 years, the new hedgerow and woodland planting along the linear green would provide enclosure and a backdrop to views along Rickman's Lane. The form and scale of this planting would help integrate the change within the wider landscape and in the sequential landscape corridor of the road.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **MEDIUM-HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MODERATE**	*At completion is* **MEDIUM-HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MODERATE - ADVERSE**	*After 15 years is* **MEDIUM-LOW**
Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

<table>
<tr><th rowspan="2">Views/visual receptors
RECEPTOR SENSITIVITY</th><th colspan="3">Predicted visual effects
MAGNITUDE OF CHANGE</th><th rowspan="2">Significance of visual effect
RECEPTOR SENSITITY X MAGNITUDE OF CHANGE
(ref Table B1.4 (Annex B))</th></tr>
<tr><th>Construction phase</th><th>At completion</th><th>After 15 years</th></tr>
<tr><td rowspan="4">Representative Viewpoint 2
Looking west from the PROW connecting the existing farm access road and Rickman’s Lane
High susceptibility to change
Low value</td><td>The site clearance, and equipment on site during the construction of the new development would be prominent in this full view so and any disruption is likely to be significant in scale. The footpath elsewhere is relatively enclosed so this is a relatively localised open view through gate.</td><td>At completion the built development/new residential areas will dominate this localised view. Over time the extensive understorey and woodland planting along the foreground boundary of the site will partially screen the development from view but this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent. The masterplan envisages that a new footpath/cycle route will link development areas through this existing gateway.</td><td>As it matures, the extensive new woodland planting in the foreground of the view will partially screen and frame the views of the development either side of the new footpath/cycleway link, whilst also creating a more enclosed existing footpath character. This represents a permanent change in character, combining enclosing woodland with open pasture but which remains typical of the Low weald landscape.</td><td rowspan="2">The significance of visual effect for the viewpoint:</td></tr>
<tr><td>Short-term, temporary effect</td><td>Medium-term, irreversible effect</td><td>Long-term, irreversible effect</td></tr>
<tr><td>Geographical extent is MODERATE</td><td>Geographical extent is MODERATE</td><td>Geographical extent is MODERATE</td><td>Construction phase is MEDIUM-HIGH</td></tr>
<tr><td>Scale of change is MAJOR</td><td>Scale of change is MAJOR</td><td>Scale of change is MODERATE</td><td>At completion is MEDIUM-HIGH</td></tr>
<tr><td>Receptor sensitivity is
MODERATE</td><td>Magnitude and nature of effect is MAJOR-ADVERSE</td><td>Magnitude and nature of effect is MAJOR-ADVERSE</td><td>Magnitude and nature of effect is MODERATE ADVERSE</td><td>After 15 years is MEDIUM-L0W</td></tr>
</table>

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Obli*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*

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Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	**At completion**	**After 15 years**	
Representative Viewpoint 3 *View looking east from the public right of way connecting the existing Crouchland Farm access road with Rickman's Lane* *High susceptibility to change* *Low value*	The site clearance, and equipment on site during the construction of the new development would be prominent in this full view so and any disruption is likely to be significant in scale. The footpath elsewhere is relatively enclosed so this is a relatively localised open view through gate.	At completion the built development/new residential areas will dominate to the right of this local view. Over time the extensive understorey and woodland planting along the foreground boundary of the site will partially screen the development from view but this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent. The masterplan envisages that a new footpath/cycle route will link development areas through this existing gateway with a drainage attenuation area combined with woodland buffer corridor in the left of the view	As it matures, the extensive new woodland planting in the foreground of the view will partially screen and frame the views of the development to the right. Views of the existing trees in the left of the view across the woodland buffer and drainage attenuation zones will be retained. Over all the new landscape will create a more enclosed existing footpath character along its length representing a permanent change in character but one which remains typical of the Low weald landscape - combining enclosing woodland with open pasture.	The significance of visual effect for the viewpoint:

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITIY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	**At completion**	**After 15 years**	
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **MEDIUM-HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MODERATE**	*At completion is* **MEDIUM-HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **MAJOR ADVERSE**	*Magnitude and nature of effect is* **MAJOR-ADVERSE**	*Magnitude and nature of effect is* **MODERATE-BENEFICIAL**	*After 15 years is* **MEDIUM - LOW**
Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Obli*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 4 *Looking north west along the existing farm access road to Crouchlands Farm which combines as a PROW. One of a sequence of views along this route.* *High susceptibility to change* *Low value*	The site clearance, and equipment on site during the construction of the new development would be prominent in this full view so any disruption is likely to be significant in scale. The existing farm access route will remain relatively enclosed by retained hedges and trees but this is likely to be the location of the construction access route linking across the existing farm access – both for construction and subsequently retained for future vehicular access to the northern part of the development.	At completion the built development/new residential areas will dominate this view which is typical of a sequence of views from this public right of way/farm access route. Over time the extensive understorey and woodland planting along the foreground boundary of the site will partially screen the development from view either side of the new development access route (envisage in the development masterplan). However, this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent.	As it matures, the extensive new woodland planting in the foreground of the view will partially screen and frame the views of the development either side of the proposed access route which will be in the centre of the view. Overall, the new woodland planting will create a more enclosed landscape along this part of the PROW representing a permanent change in character	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MAJOR**	*At completion is* **HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **SEVERE- ADVERSE**	*Magnitude and nature of effect is* **SEVERE - ADVERSE**	*Magnitude and nature of effect is* **MAJOR- ADVERSE**	*After 15 years is* **MEDIUM-HIGH**

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Obli*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 5 *View looking south east across the open fields and along the existing access lane to Crouchlands Farm.* *High susceptibility to change* *Low value*	The site clearance, and equipment on site during the construction of the new development would be prominent in this view (which will be more open in winter) so any disruption is likely to be significant in scale. The farm access/PROW elsewhere will remain relatively enclosed by the existing hedge and/or trees. But this is a typical view of the masterplan Phase 1 looking south over the top of hedges or between trees.	At completion the built development/new residential area (Phase 1) will dominate this view which is typical of a sequence of views between trees or over the hedge from this public right of way/farm access route. At this location the development edge is set back on a 30m woodland buffer (Ecotone) line. The buffer is planted with extensive woodland and understorey planting. Over time this planting along the foreground boundary of the site will substantially screen the development from view. However, this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent.	As it matures, the extensive new woodland planting in the foreground of the view will substantially screen the development. Overall, the new woodland planting will create a more enclosed landscape along this part of the farm access/PROW representing a permanent change in character. but one which remains typical of the Low weald landscape - combining enclosing woodland with open verge/pasture.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **MEDIUM -HIGH**

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	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MODERATE**	*At completion is* **MEDIUM-HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MINOR – NEGLIGIBLE/ ADVERSE**	*After 15 years is* **LOW**

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 6 (will need cumulative impact) *Looking north from the PROW to the north of Lanelands One of a sequence of views.* *High susceptibility to change* *Moderate value*	The works associated with the construction of the school and adjacent residential development would be visible from this viewpoint, just beyond the tree line in the middle of the field. The visual change would therefore be relatively prominent in the middle distance and would affect an extensive part of some views along this PROW.	At completion the development will dominate the background of this view beyond the tree line in the middle of the field. Over time the extensive new woodland and tree planting along the existing tree line (in the middle of field) which defines the western development boundary would filter and screen views to the buildings beyond. At this viewpoint that screening impact will be further enhanced by the proposed orchard. However, this new planting would be ineffective as a visual screen at completion. The buildings of the school and residential areas would be visible above and through the new planting and this is therefore judged to be a major scale of	After 15 years the proposed woodland and tree planting along the western development boundary would close down the view to the buildings but will also result in a change of scale and therefore the character of the local landscape. Part of the remaining foreground narrow pasture alongside the PROW/drove road would be planted as a traditional apple orchard - further enhancing the pasture in views from this important PROW.	The significance of visual effect for the viewpoint:

		visual change compared to the baseline.		
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MAJOR**	*Geographical extent* is **MAJOR**	*Geographical extent* is **MAJOR**	*Construction phase is* **HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MODERATE**	*At completion is* **HIGH**
Receptor sensitivity is **HIGH**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MINOR-ADVERSE**	*After 15 years is* **MEDIUM - LOW**

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

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Views/visual receptors RECEPTOR SENSITIVITY	Predicted visual effects MAGNITUDE OF CHANGE			Significance of visual effect RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))
	Construction phase	At completion	After 15 years	
Representative Viewpoint 7 (will need cumulative impact) *Looking east along the byway to the north of Crouchland (house). One of a sequence of views* *High susceptibility to change* *High value*	There may be filtered and glimpsed winter views of activity associated with the construction of the school through the trees in the distance of this view, with visibility increasing moving eastwards along the byway. The site clearance, and earth moving equipment on site during the construction of the new formal recreational area/country park would be prominent in the foreground pasture beyond the hedge in the centre of this view so any construction disruption is likely to be significant in scale.	At completion, there may be filtered and glimpsed winter views of the school buildings through the trees in the distance of this view, with visibility increasing moving eastwards along the byway. Over time the extensive new woodland and tree planting along the existing tree line which defines the western development boundary would completely screen any remaining filtered winter views. However, this new planting would be ineffective as a visual screen at completion. On completion the formal recreation/open space in the pasture beyond the hedgerow will remain open and feel relatively unchanged in the view although management of the field will change so that part of it can be used for more formal recreation activities.	After 15 years the proposed woodland and tree planting along the western development boundary would close down any remaining glimpsed winter views through the existing trees towards the school. Part of the foreground pasture alongside the PROW will have been managed in a low-key way as open space capable of more formal recreation in support of the wider development – its perimeter meadows and new tree planting will have matured with a reasonably neutral impact.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **MEDIUM-HIGH**
	Scale of change is **MODERATE**	*Scale of change* is **MINOR**	*Scale of change* is **MINOR**	*At completion is* **LOW**
Receptor sensitivity is **HIGH**	*Magnitude and nature of effect is* **MODERATE - ADVERSE**	*Magnitude and nature of effect is* **MODERATE- NEGLIGIBLE/ADVERSE**	*Magnitude and nature of effect is* **NEGLIGIBLE-NEUTRAL**	*After 15 years is* **NEUTRAL**
Terminology for Visual Effect :				

Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Obliqu*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITIY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 8 *Looking north from the PROW (that crosses the site north-south) towards Limekiln Wood* *High susceptibility to change* *Moderate value*	The site clearance, and equipment on site during the construction of the new development would be prominent to the right in this view (which will be more open in winter) so any disruption is likely to be significant in scale. This is a typical sequential view from the PROW/historic Drove of this northern part of the development area looking north east over the top of hedgerows or between trees.	At completion the built development/new residential area will dominate this view to the right of the PROW. At this location the development edge is however set back on a 30m woodland buffer (Ecotone) line. The buffer is planted with extensive woodland and understorey planting. Over time this planting along the foreground PROW boundary of the site will substantially screen the development from view. However, this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent.	As it matures, the extensive new woodland planting in the foreground of the view will substantially screen the development. Overall, the new woodland planting will create a more enclosed landscape along this part of the /PROW representing a permanent change in character but one which remains typical of the Low weald landscape - combining enclosing woodland with open verge/pasture.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MINOR-**	*At completion is* **HIGH**
Receptor sensitivity is **HIGH**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MINOR - ADVERSE**	*After 15 years is* **MEDIUM-LOW**
Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**

Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 9 *Looking south west towards the north east part of the Site, from Rickman's Lane at the junction with a PROW* *High susceptibility to change* *Low value*	The site clearance, and equipment on site during the construction of the new development would be prominent in the centre of this view so any disruption is likely to be significant in scale. This is a typical sequential view from this PROW looking south towards the northern part of the development area over the top of hedgerows or between trees and will be more open in winter	At completion the built development/new residential area will dominate this view to the centre of the image beyond the boundary hedgerow and trees in the centre of the view. The relatively high elevation of the centre of the site will increase the visibility of the development skyline against the backdrop woodlands beyond. The development edge is however set back on a 30m woodland buffer (Ecotone) line. The buffer is planted with extensive woodland and understorey planting. Over time this planting along the foreground PROW boundary of the site will substantially screen the development from view. However, this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent.	As it matures, the extensive new woodland planting in the 30m wide northern boundary ecotone will substantially screen the development. Over-all the new woodland planting will create a more enclosed landscape in views from this PROW representing a permanent change in character but one which remains typical of the Low weald landscape - combining enclosing woodland with open verge/pasture	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **MEDIUM-HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MODERATE**	*At completion is* **MEDIUM-HIGH**

Project related

Receptor sensitivity is **MODERATE**	Magnitude and nature of effect is **MAJOR - ADVERSE**	Magnitude and nature of effect is **MAJOR ADVERSE**	Magnitude and nature of effect is **MODERATE-MINOR/ADVERSE**	After 15 years is **LOW**
Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors RECEPTOR SENSITIVITY	Predicted visual effects MAGNITUDE OF CHANGE Construction phase	 At completion	 After 15 years	Significance of visual effect RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))
Representative Viewpoint 10 *View looking south from the public right of way connecting east west in the fields to the north of the site.* *High susceptibility to change* *Low value*	Phase 1 of Rickman's Green Village will be visible on the higher ground in the centre of the view. The site clearance, and equipment on site during the construction would be prominent in the centre of this view. This is a relatively elevated view which is, however localised to this part of the PROW looking south towards the northern part of the Phase 1 development area. The development will sit on the highest part of the masterplan area framed between major trees groups which screen the rest of the masterplan area. The site will however be open to view in winter affording slightly wider development visibility.	At completion the built development/new residential area will dominate the centre if this view. The relatively high elevation of the site will increase the visibility of the development skyline against the backdrop woodlands and sky beyond. The northern development edge is however set back behind a series of overlapping blocks of native woodland and understorey planting. Over time this planting will substantially screen the development from view. However, this new tree planting would be ineffective as a visual screen at completion.	As it matures, the extensive new woodland planting on the northern boundary of the Phase 1 development area will substantially screen the development. Over-all the new woodland planting will create a more enclosed landscape in views from this PROW. Whilst this will represent a permanent change in character it is very localised and overall, the character of the landscape will remain typical of the Low weald landscape - combining enclosing woodland, open pasture and limited views of Rickman's Green Village	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MINOR**	*Geographical extent* is **MINOR**	*Geographical extent* is **MINOR**	*Construction phase is* **MEDIUM-LOW**
	Scale of change is **MODERATE**	*Scale of change* is **MODERATE**	*Scale of change* is **MINOR**	*At completion is* **MEDIUM-LOW**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **MODERATE - ADVERSE**	*Magnitude and nature of effect is* **MODERATE - ADVERSE**	*Magnitude and nature of effect is* **MINOR - ADVERSE**	*After 15 years is* **LOW**

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*

Overall sensitivity of receptor	*High/Moderate/Low*	Nature of effect :	*Beneficial/Neutral/Adverse*

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 11 *View looking south from the public right of way connecting east west in the field due north of the site along the boundary of the Rickman's Green Village masterplan site* *High susceptibility to change* *Low value*	The site clearance, and equipment on site during the construction of the new development would be prominent in this view (which will be more open in winter) so any disruption is likely to be significant in scale. This PROW abuts the northern site and the view is typical looking south over the top of hedges, between trees or through occasional gaps and gate openings towards the development. A footpath link at this location between the PROW and development is anticipated in the masterplan proposal.	At completion the built development will dominate this view. At this location the development edge to the left in the view is set back on a 10m hedgerow (Ecotone) line. In the centre of the view this set back buffer increases to approximately 100m allowing for drainage attenuation and overlapping native woodland planting. To the right in the view an extensive northern open space sets the development line back to align with the mature field oak tree in the centre of the view. This general buffer zone is planted with extensive overlapping woodland and understorey planting. Over time this planting will substantially screen the development from view. However, this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent.	As it matures, the extensive new woodland planting in the foreground of the view will substantially screen the development. Overall, the new woodland planting will create a more enclosed landscape along this part of the PROW representing a permanent change in character but one which will remain typical of the Low weald landscape - combining enclosing woodland, open pasture and limited/contained views of any new buildings.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MINOR**	*Construction phase is* **MEDIUM-HIGH**
	Scale of change is **MODERATE**	*Scale of change* is **MODERATE**	*Scale of change* is **MINOR**	*At completion is* **MEDIUM-HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MINOR - ADVERSE**	*After 15 years is* **LOW**

Terminology for Visual Effect :

Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	Duration	*Short term/Medium term/Long term*	Significance value :
Proportion visible	*All/Most/Part/None*	Reversibility	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	Size or scale of change	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	Geographic extent	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*

Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 12 *View looking west from Foxbridge Lane with the hedgerow and mature trees in the center of the view defining the eastern boundary of the Rickman's Green Village site.* *High susceptibility to change* *Low value*	Some of the site clearance, and equipment on site during the construction of the new development would be visible beyond the hedgerow and mature trees in the centre of the view. This view is typical of others along Foxbridge Lane but these are very much glimpsed views, primarily by drivers (as there are no footpaths), - looking between trees or through occasional gaps and gate openings towards the development.	At completion the built development will be partially visible beyond the mature hedgerow and trees at the centre of the view with significant more visibility anticipated in winter. At this location the development edge to the left in the view is set back 15m to allow for drainage attenuation and a 10m hedgerow (Ecotone) line. This general buffer zone is planted with a 5m belt of native understorey planting and specimen trees serving to increase the depth of the boundary hedgerow. Over time this planting will substantially enhance the screening of the development. However, this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent.	As it matures, the new boundary native understorey and tree planting will substantially screen the development. Overall, the new understorey and specimen tree planting will create a more enclosed development but parts of the new buildings and roofscape will remain visible into the longer term.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **LOW**
	Scale of change is **MODERATE**	*Scale of change* is **MODERATE**	*Scale of change* is **MINOR**	*At completion is* **MEDIUM - LOW**
Receptor sensitivity is **Moderate**	*Magnitude and nature of effect is* **MODERATE-MINOR/ ADVERSE**	*Magnitude and nature of effect is* **MODERATE - ADVERSE**	*Magnitude and nature of effect is* **MINOR - ADVERSE**	*After 15 years is* **LOW**

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*

Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 13 *View looking north west along Rickman's Lane just west of the junction with Foxbridge Lane of the existing access road to Crouchlands Farm.* *High susceptibility to change* *Low value*	The site clearance, and equipment on site during the construction of the new development would be prominent in this view (which will be more open in winter) so any disruption is likely to be significant in scale. This is one of a sequence of views along Rickman's Lane	At completion the built development will dominate this view. At this location the development edge is set back 15 to 20m allowing a substantial screening belt of native woodland and tree planting. Over time this planting will substantially screen the development from view. However, this new tree planting would be ineffective as a visual screen at completion.	As it matures, the extensive new woodland planting on the boundary will substantially screen the development. Overall, the new woodland planting will create a more enclosed landscape in views from Rickman's Lane. Whilst this will represent a permanent change in character it will remain typical of the Low weald landscape - combining enclosing woodland, open pasture and limited views of any new buildings.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **Moderate**	*Geographical extent* is **MODERATE**	*Construction phase is* **MEDIUM-LOW**
	Scale of change is **MODERATE**	*Scale of change* is **MAJOR**	*Scale of change* is **MODERATE**	*At completion is* **MEDIUM - HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **MODERATE - ADVERSE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MINOR - ADVERSE**	*After 15 years is* **LOW**

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITITY X MAGNITUDE OF CHANGE** **(ref Table B1.4 (Annex B))**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 14 *View looking north west along Rickman's Lane just south of Streeters Farm.* . *Moderate susceptibility to change* *Low value*	The site clearance and equipment on site during the construction of the new farm access road and its junction with Rickman's Lane would be prominent in this full view to part of the construction. It is one of the sequence of views along Rickman's Lane. This would be a major change which would disrupt the rural character of Rickman's Lane over a distance of approximately 150m for a short period of time.	At completion, the change to the view would seem relatively raw as the new hedgerow, woodland and tree planting will not yet be effective in providing enclosure and a backdrop to views along the road. The buildings and associate development infrastructure would dominate the left portion of the view behind the retained hedge representing a major change in character.	After 15 years, the new hedgerow and woodland planting would provide enclosure and a backdrop to views along Rickman's Lane. The form and scale of this planting would help integrate the change within the sequential landscape corridor of the road but some development will remain visible in the framed views between trees beyond the retained hedge to the left pf the view.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **MEDIUM-HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MODERATE**	*At completion is* **MEDIUM-HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MAJOR - ADVERSE**	*Magnitude and nature of effect is* **MODERATE - ADVERSE**	*After 15 years is* **MEDIUM-LOW**

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Oblique*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects*	*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors RECEPTOR SENSITIVITY	Predicted visual effects MAGNITUDE OF CHANGE			Significance of visual effect RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE (ref Table B1.4 (Annex B))
	Construction phase	At completion	After 15 years	
Representative Viewpoint 15 *View looking south west towards the existing Crouchlands Farm entrance on Rickman's Lane from the small triangle of common land opposite* *High susceptibility to change* *Low value*	The site clearance, and equipment on site during the construction of the new development would be prominent in this full view so and any disruption is likely to be significant in scale	At completion the built development/ will dominate this localised view. Over time the extensive understorey and woodland planting along the foreground boundary of the site will partially screen the development from view but this new tree planting would be ineffective as a visual screen at completion and the tree guards would be prominent.	As it matures, the extensive new woodland planting in the foreground of the view will partially screen and frame the views of the development. This permanent change in character. will combine Rickman's Green Village with enclosing woodland in such a way as it will be perceived as typical of the Low weald settled landscape character.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **MEDIUM-HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MODERATE**	*At completion is* **MEDIUM-HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **MAJOR-ADVERSE**	*Magnitude and nature of effect is* **MAJOR-ADVERSE**	*Magnitude and nature of effect is* **MODERATE ADVERSE**	*After 15 years is* **MEDIUM-LOW**

Terminology for Visual Effect :				
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Obli*	**Duration**	*Short term/Medium term/Long term*	**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*	*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*	*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*	*Medium-low/Low/*

Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*	*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*	

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE**			**Significance of visual effect** **RECEPTOR SENSITITY X MAGNITUDE OF CHANGE** **(ref Table A.4 (Annex B)**
	Construction phase	At completion	After 15 years	
Representative Viewpoint 16 *View looking east and south along the existing farm farm access road to Crouchlands Farm which combines as a PROW. One of a sequence of views along this route.* *High susceptibility to change* *Low value*	The site clearance, and equipment on site during the construction of the new development would be prominent in this full view so and any disruption is likely to be significant in scale. The footpath elsewhere is relatively enclosed so this is a relatively localised open view through gate.	At completion Rickman's Green Village will dominate this typical view beyond the existing foreground hedges and trees which will be retailed but. Rickman's Green Village layout however retains an open landscape corridor along the line of the view through the gap in the hedge. Therefore, a view of the retained trees and tree line beyond will protected as part of this important landscape corridor linking south across Rickman's Green Village	As it matures, Rickman's Green Village tree planting will partially screen and frame the views of the development either side of the new central landscape corridor. Views of the existing trees in the centre of the view will also be retained along this corridor. Overall, Rickman's Green Village will represent a permanent change in character in this view. This locally retained close view of Rickman's Green Village needs to be considered in the context of the LVIA strategy to contain wider landscape views so that any remaining visible development will be perceived as being typical of the Low weald settled landscape character.	The significance of visual effect for the viewpoint:
	Short-term, temporary effect	*Medium-term, irreversible effect*	*Long-term, irreversible effect*	
	Geographical extent is **MODERATE**	*Geographical extent* is **MODERATE**	*Geographical extent* is **MODERATE**	*Construction phase is* **HIGH**
	Scale of change is **MAJOR**	*Scale of change* is **MAJOR**	*Scale of change* is **MAJOR**	*At completion is* **HIGH**
Receptor sensitivity is **MODERATE**	*Magnitude and nature of effect is* **SEVERE-ADVERSE**	*Magnitude and nature of effect is* **SEVERE-ADVERSE**	*Magnitude and nature of effect is* **MAJOR-ADVERSE**	*After 15 years is* **MEDIUM - HIGH**

Terminology for Visual Effect :					
Nature of the view	*Full/Partial/Glimpsed/Framed/Filtered/Obli*	**Duration**	*Short term/Medium term/Long term*		**Significance value :**
Proportion visible	*All/Most/Part/None*	**Reversibility**	*Yes, within (timescale)/No*		*Very High/High/*
Type of view	*Stationary/Transient/One of a sequence*	**Size or scale of change**	*Negligible/Minor/Moderate/ Major/Severe*		*Medium high/Medium/*
Susceptibility of the viewer	*High/Moderate/Low*	**Geographic extent**	*Minor (visual change affects small area)/Moderate/ Major (visual change affects extensive area)*		*Medium-low/Low/*
Value of view	*High/Moderate/Low*	**Magnitude of effect**	*Negligible/Minor-negligible/Minor/Moderate-minor/Moderate/Major-moderate/Major/Severe*		*Neutral/ Beneficial*
Overall sensitivity of receptor	*High/Moderate/Low*	**Nature of effect :**	*Beneficial/Neutral/Adverse*		

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13.9 Summary and mitigation strategy

13.9.1 Mitigation design principles - Whole Masterplan

The LVIA process has been an integral component of the design process, which has been undertaken in an iterative way, so that the layout and design of the development proposals has been shaped by the preliminary findings of the LVIA. The process has been repeated to test alternative design scenarios with the objective of reducing predicted adverse effects and achieving the optimal balance of benefits and constraints.

Drawing on a detailed site analysis, baseline LVIA assessment and the assessment of predicted landscape and visual effects (**Sections 13.7** and **13.8**) this final section of the LVIA sets out the mitigation design principles that should underpin the layout and design of Rickman's Green Village in order to integrate the scheme, over time, within its wider landscape context and minimise any predicted adverse landscape and visual effects.

13.9.2 Mitigating predicted landscape effects – Whole Masterplan

The assessment of predicted landscape effects (**Table 13-2**) is based on the assumption that Rickman's Green Village incorporates the following landscape design principles, which would, over time, minimise negative landscape effects on the identified landscape receptors:

- **The extensive network of ancient semi-natural woodlands** – all components of Rickman's Green Village should be sited beyond a 30m wide ancient woodland and "Ecotone" buffer zone to ensure that there is no damage to the root protection zones of veteran and ancient woodland trees.
- **The strong network of mature woodland, copses, shaws and hedgerows** – The layout of the masterplan has been designed to integrate with the existing pattern of fields and woodlands on the Site. The proposals incorporate extensive new woodland planting, including a programme for the sustainable management of all the woodlands within the wider (blue line) landownership boundary.
- **The rural character of the narrow, enclosed tracks and lanes** – Rickman's Green Village would lead to a loss of rural character, along the central landscape corridor which serves as the main focus for access and circulation and from which there will be control views of the new village. Elsewhere however native woodland, tree and hedgerow planting would restore the enclosed character of tracks and lanes and drainage, surfacing, fencing, lighting and signage should be selected and designed to minimise disruption to rural character.
- **The small scale, intimate and pastoral landscape character** – The buildings and infrastructure associated with the new village would reduce the small-scale, intimate character of the landscape on parts of the site in particular along the central village landscape corridor. Elsewhere proposed extensive woodland, tree and hedgerow planting would over time maintain and restore the landscape structure by screening and softening local views to the new buildings so that they are well integrated within their landscape context. The continuity of working farm operations on the Site and a programme of landscape restoration and management would support the conservation and long-term sustainability of the distinctive pastoral Low Weald character.

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- **The time-depth of the landscape** – Rickman's Green Village would result in some adverse impacts on the time-depth of the local landscape, including (temporary impacts) on the landscape setting of a Grade II Listed buildings (at Crouchland) during the construction stage and at completion of the new development. However, the masterplan retains and reflects the existing pattern of fields, woodlands, shaws and tracks on the Site and the proposed ambitious infrastructure landscape strategy for the development would bring opportunities to introduce new landscape elements typical of the local area, including field/drainage ponds, wetlands, hedgerows, orchards, species-rich meadows and green lanes, and to reintroduce traditional sustainable modes of woodland management, including coppicing.

Landscape impacts are predicted to be the same for all layout/phasing options.

13.9.3 Mitigating predicted visual effects – Whole Masterplan

The assessment of predicted visual effects (**Table 13-4**) is based on the assumption that the masterplan for Rickman's Green Village incorporates the following landscape design principles, which would, over time, reduce negative visual effects on the identified visual receptors:

- **Views towards the northern boundaries of the Site** from the PROWs north of the site (Representative viewpoints 9, 10 and 11). The development edge is set back by 30m from the site boundaries in these viewpoints in order to establish the "Ecotones" required as part of the ecological mitigation strategy. These buffer zones present the opportunity to establish screening belts of native woodland averaging 15m wide which will overlap with the existing mature trees and hedgerows on the boundaries to substantially screen the development in these views creating a more enclosed landscape and reinforcing the characteristic matrix of woodland and pasture around the Site.
- **Views of main access and central part of the Site** from the existing farm access track/PROWs (Representative viewpoints 2, 3, 4, 5, 15 and 16).The proposed hedgerow, tree and woodland planting would provide enclosure and a backdrop to views along Rickman's Lane and the access road to Crouchlands Farm; the new junction (with new hedgerow planting set back from the road and new woodland planting between the two junctions) would be perceived as one of the sequence of irregular small 'greens' that are characteristic of the settled Low Weald landscape. These viewpoints are at the heart of the new development so the landscape strategy aims to balance controlled/framed views of the new residential architecture in places with native woodland screen planting in the "ecotones" running along the main hedgerow and tree belts. The aim is to establish a strong sense of a linear village green linking landscape and architecture typical of many local settlements.
- **Views south western parts of the Site** from the PROW's running east west and north south which meat north of Crouchland (Representative viewpoints 6 and 7). – View 6 in particular is on a historic drove road adjacent to a Grade II listed buildings with a distinctive narrow pasture alongside. Part of the foreground narrow pasture alongside the PROW/drove road would be managed as a new orchard and, as it matures, the proposed woodland and tree planting along the eastern boundary of the narrow pasture would close down the view to buildings within Rickman's Green Village. Small parts of any buildings may be glimpsed through the trees and amidst the tree canopy, particularly during the winter months. However, no buildings would break the skyline and, given the existing character of this landscape, which has a mix of woodland and

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farm buildings, such residual visual effects are judged to be insignificant. Viewpoint 7 is located next to the pasture which will become a key open space destination within the masterplan providing for more formal recreational opportunities. This will be a key linking space between the new village and wider farm and it will be managed in a low-key way in order to ensure a minimum change in local landscape character. Native meadows and some additional tree planting around the perimeter will combine with the retained hedges and trees to prevent any views of more formally maintained shorter meadow/amenity grass areas in the centre of the pasture.

- **Views to the north western parts of the Site** from the PROW (Representative viewpoint 8). The development edge is set back by 30m from the site boundary in this viewpoint in order to establish the "Ecotones" required as part of the ecological mitigation strategy. These buffer zones present the opportunity to establish screening belts of native woodland averaging 15m wide which will overlap with the existing mature trees and hedgerows on the boundaries to substantially screen the development in these views creating a more enclosed landscape and reinforcing the characteristic matrix of woodland and pasture around the Site.

13.9.4 Residual landscape and visual effects – Whole Masterplan

With the incorporation of the mitigation measures set out in **Sections 13.9.2– 13.9.3**, it is predicted that many of the higher initial impacts of the development within the wider landscape will significantly reduce over time and become medium-low or low. The existing farm access track/PROW will become the heart of the new village – a linear green along which development will, in carefully considered locations, remain visible in the landscape. Therefore landscape and visual impacts perceived from some specific central green and gateway locations are predicted to remain Medium-High (View 4 and 16) reflecting a residual long-term change in character from existing open pasture to a new, traditionally inspired, village form.

Table 13-5 Landscape Effects Summary

Landscape receptors RECEPTOR SENSITIVITY	Impact significance - Completion	Impact significance - Year Fifteen
Extensive ancient semi-natural woodlands	MEDIUM-LOW	LOW
Strong network of mature woodland, copses, shaws and hedgerows	MEDIUM-LOW	LOW
Rural character of narrow, enclosed lanes and tracks	HIGH	MEDIUM-HIGH
Small-scale, intimate pastoral landscape character	HIGH	MEDIUM-HIGH
Time depth of the landscape	MEDIUM-HIGH	MEDIUM-LOW
Landscape setting of the SDNP	NEUTRAL	NEUTRAL

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Table 13-6 Visual Effects Summary

Viewpoints	Impact significance - Completion	Impact significance - Year Fifteen
Representative Viewpoint 1	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 2	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 3	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 4	HIGH	MEDIUM-HIGH
Representative Viewpoint 5	MEDIUM-HIGH	LOW
Representative Viewpoint 6	HIGH	MEDIUM-LOW
Representative Viewpoint 7	MEDIUM-HIGH	NEUTRAL
Representative Viewpoint 8	HIGH	MEDIUM-LOW
Representative Viewpoint 9	MEDIUM-HIGH	LOW
Representative Viewpoint 10	MEDIUM-LOW	LOW
Representative Viewpoint 11	MEDIUM-HIGH	LOW
Representative Viewpoint 12	MEDIUM-LOW	LOW
Representative Viewpoint 13	MEDIUM-HIGH	LOW
Representative Viewpoint 14	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 15	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 16	HIGH	MEDIUM-HIGH

13.9.5 Summary – Whole Masterplan

The layout, massing and design of Rickman's Green Village has been guided by the LVIA, in order to minimise, over time, predicted adverse landscape and visual effects.

The site is not within a protected landscape or an area designated for scenic landscape value. However, the distinctive landscape elements and features that are sensitive to the proposal are the extensive ancient woodlands; the network of woodland, shaws and hedgerows; the rural character of the narrow-enclosed tracks and lanes; the historic landscape setting of locally listed buildings; and the intimate and pastoral character of this low-lying clay vale landscape. The pattern of woodland and hedgerow within the wider landscape means that the site is relatively enclosed with a relatively limited extent of landscape and visual impact.

Parts of the site are currently in a degraded condition. For example, woodlands have been neglected and left unmanaged and some areas have undergone a process of decontamination and restoration following the closure of the former biogas processing plant. For many years this has been an industrial site and it therefore does not display the same remote, tranquil character that is typical of other parts of the Low Weald landscape.

This is a landscape-led masterplan which seeks to integrate Rickman's Green Village and, overtime, to conserve, the distinctive landscape character and important biodiversity of the site. For example, a 30m buffer zones around all ancient woodlands would ensure protection and low light corridors for bats; and allow the planting of new woodlands, shaws and hedgerows maintaining connections with the local ecological network. The masterplan also safeguards the rural character of the public rights of way on the site and respects the landscape setting of historic drove roads, listed buildings and locally important heritage features, such as coppiced woodlands and ponds.

Rickman's Green Village will be a new village with a layout inspired by other local settlements. A linear central green will link the landscape in south west of the development with that in the north east. This green space also connects the existing farm and separately proposed food and retail hubs into the masterplan, providing a bold visual centre to the new community. Aligned along this green axis each component of the development has been carefully considered in order to balance the need to minimise landscape and visual impacts whilst at the same time allowing the new buildings, routes, and pathways a carefully composed presence in the landscape. A distinct traditional village character is visible but within a landscape strategy tailored to reduce the perceived scale and integrate the development within its landscape setting.

13.9.6 Mitigating predicted visual effects – Phase 1 only

The assessment of predicted visual effects (**Table 13-4**) is based on the assumption that the masterplan for Rickman's Green Village incorporates the following landscape design principles, which would minimise negative visual effects on the identified visual receptors:

- **Views of main access and central part of the Site** from Rickman's Lane and the existing farm access track/PROWs (Representative viewpoints 5, 14, 15 and 16).The proposed hedgerow, tree and woodland planting would provide enclosure and a backdrop to views along Rickman's Lane and the access road to Crouchlands Farm; the new junction (with new hedgerow planting set back from the road and new woodland planting between the two junctions) would be perceived as one of the sequence of irregular small 'greens' that are characteristic of the settled Low Weald landscape. These viewpoints are at the heart of the new development so the landscape strategy aims to balance controlled/framed views of the new residential architecture in places with native woodland screen planting in the "ecotones" running along the main hedgerow and tree belts. The aim is to establish a strong sense of a linear village green linking landscape and architecture typical of many local settlements.
- **Views towards the northern boundaries of the Site** from the PROWs north of the site (Representative viewpoints 9 and 10). On and of site woodland planting strategy buffer zones present the opportunity to establish screening belts of native woodland averaging 15m wide which will overlap with the existing mature trees and hedgerows on the boundaries to substantially screen the development in these views creating a more enclosed landscape and reinforcing the characteristic matrix of woodland and pasture around the Site.

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Table 13-7 Visual Effects Summary

Viewpoints	Impact significance - Completion	Impact significance - Year Fifteen
Representative Viewpoint 5	MEDIUM-HIGH	LOW
Representative Viewpoint 9	MEDIUM-HIGH	LOW
Representative Viewpoint 10	MEDIUM-LOW	LOW
Representative Viewpoint 11	MEDIUM-HIGH	LOW
Representative Viewpoint 14	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 15	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 16	HIGH	MEDIUM-HIGH

13.9.7 Residual landscape and visual effects – Phase 1 only

With the incorporation of the mitigation measures set out in **Section 13.9.6**, it is predicted that many of the higher initial impacts of Phase 1 within the wider landscape will significantly reduce over time and become medium-low. The existing farm access track/PROW will become the heart of the new village – a linear green along which development will, in carefully considered locations, remain visible in the landscape. Therefore Landscape and Visual impacts perceived from some specific central green and gateway locations are predicted to remain Medium-High (View 16) reflecting a residual long-term change in character from existing open pasture to a new, traditionally inspired, village form.

13.9.8 Mitigating predicted visual effects – Phase 2 *(masterplan without Phase 1)*

The assessment of predicted visual effects (**Table 13-4**) is based on the assumption that the masterplan for Rickman's Green Village incorporates the following landscape design principles, which would minimise negative visual effects on the identified visual receptors:

- **Views towards the northern boundaries of the Site** from the PROWs north of the site (Representative viewpoints 10, 11 and 12). The development edge is set back by 30m from the site boundaries in these viewpoints in order to establish the "Ecotones" required as part of the ecological mitigation strategy. These buffer zones present the opportunity to establish screening belts of native woodland averaging 15m wide which will overlap with the existing mature trees and hedgerows on the boundaries to substantially screen the development in these views creating a more enclosed landscape and reinforcing the characteristic matrix of woodland and pasture around the Site.
- **Views of main access and central part of the Site** from the existing farm access track/PROWs (Representative viewpoints 2, 3, and 4).The proposed hedgerow, tree and woodland planting would provide enclosure and a backdrop to views along Rickman's Lane and the access road to Crouchlands Farm; the new junction (with new hedgerow planting set back from the road and new woodland planting between the two junctions) would be perceived as one of the sequence of irregular small 'greens' that are characteristic of the settled Low Weald landscape. These viewpoints are at the heart of the new development so the landscape strategy aims to balance

controlled/framed views of the new residential architecture in places with native woodland screen planting in the “ecotones” running along the main hedgerow and tree belts. The aim is to establish a strong sense of a linear village green linking landscape and architecture typical of many local settlements.

- **Views south western parts of the Site** from the PROW’s running east west and north south which meat north of Crouchland (Representative viewpoints 6 and 7). – View 6 in particular is on a historic drove road adjacent to a Grade II listed buildings with a distinctive narrow pasture alongside. Part of the foreground narrow pasture alongside the PROW/drove road would be managed as a new orchard and, as it matures, the proposed woodland and tree planting along the eastern boundary of the narrow pasture would close down the view to buildings within Rickman’s Green Village. Small parts of any buildings may be glimpsed through the trees and amidst the tree canopy, particularly during the winter months. However, no buildings would break the skyline and, given the existing character of this landscape, which has a mix of woodland and farm buildings, such residual visual effects are judged to be insignificant. Viewpoint 8 is located next to the pasture which will become a key open space destination within the masterplan providing for more formal recreational opportunities. This will be a key linking space between the new village and wider farm and it will be managed in a low-key way in order to ensure a minimum change in local landscape character. Native meadows and some additional tree planting around the perimeter will combine with the retained hedges and trees to prevent any views of more formally maintained shorter meadow/amenity grass areas in the centre of the pasture.
- **Views to the north western parts of the Site** from the PROW (Representative viewpoint 8). The development edge is set back by 30m from the site boundary in this viewpoint in order to establish the “Ecotones” required as part of the ecological mitigation strategy. These buffer zones present the opportunity to establish screening belts of native woodland averaging 15m wide which will overlap with the existing mature trees and hedgerows on the boundaries to substantially screen the development in these views creating a more enclosed landscape and reinforcing the characteristic matrix of woodland and pasture around the Site.

13.9.9 Residual landscape and visual effects – Phase 2

With the incorporation of the mitigation measures set out in **Sections 13.9.2 - 13.9.3**, it is predicted that many of the higher initial impacts of the development within the wider landscape will significantly reduce over time and become medium-low or low. The existing farm access track/PROW will become the heart of the new village – a linear green along which development will, in carefully considered locations, remain visible in the landscape. Therefore landscape and visual impacts perceived from some specific central green and gateway locations are predicted to remain medium-high (View 4) reflecting a residual long-term change in character from existing open pasture to a new, traditionally inspired, village form.

Table 13-8 Visual Effects Summary

Viewpoints	Impact significance - Completion	Impact significance - Year Fifteen
Representative Viewpoint 1	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 2	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 3	MEDIUM-HIGH	MEDIUM-LOW
Representative Viewpoint 4	HIGH	MEDIUM-HIGH
Representative Viewpoint 6	HIGH	MEDIUM-LOW
Representative Viewpoint 7	MEDIUM-HIGH	NEUTRAL
Representative Viewpoint 8	HIGH	MEDIUM-LOW
Representative Viewpoint 9	MEDIUM-HIGH	LOW
Representative Viewpoint 10	MEDIUM-LOW	LOW
Representative Viewpoint 11	MEDIUM-HIGH	LOW
Representative Viewpoint 12	MEDIUM-LOW	LOW
Representative Viewpoint 13	MEDIUM-HIGH	LOW

14 Cumulative Impact Assessment

In addition to the determination of the potential impacts from Rickman's Green Village in isolation, the EIA Regulations require that an assessment is made of the potential for cumulative effects, which considers the impacts from Rickman's Green Village cumulatively with other proposed projects.

A useful ground rule in EIA is that the environmental impacts of any other development that is already built and operational is effectively included within the baseline conditions, so such effects are already taken account of in the EIA process and can be excluded from the CIA; however, projects that are in the planning process need to be considered. Any that are ahead of the development being assessed (i.e. likely to be submitted or receive consent before the development being assessed or are currently being built) must be taken into account during a CIA. Any that are substantially further back in the planning process and are unlikely to be submitted or get consent until after the development being assessed, can be disregarded because the developer of that project should be taking the effects of the current development into account in their own EIA.

The key aspects for consideration when undertaking CIA are:

- the temporal and geographic (spatial) boundaries of the effects of activities;
- interactions between the activities and the environment;
- the environmental effects of the project (including future projects and activities); and
- thresholds of sensitivity of the existing environment.

CIA is limited to those plans and projects for which sufficient information exists to allow consideration of the potential for such an effect to arise. In the absence of such publicly available data, it is not possible to undertake a detailed cumulative assessment, but it is possible to make judgements on the likely potential impacts on the basis of the characteristics of the other projects being considered and whether there is the potential for the impacts of the various projects to interact spatially or temporally.

14.1 Assessment Methodology

This CIA has been undertaken using a three-stage phased approach described below:

- there is no defined methodology in the UK as to how cumulative impacts should be assessed. Therefore, in determining a suitable approach to this element of the assessment the following guidance has been taken into account Guidelines for the Assessment of Indirect and Cumulative Impacts as well as Impact Interactions (European Commission 1999); and
- cumulative Effects Assessment Practitioners Guide (Canadian Environmental Assessment Agency 1999).

The "long list" of developments is presented in **Table 14-1**.

Table 14-1 Long list of projects for consideration of cumulative effects

Proposed Project	Distance to Proposed Development	Description
22/01735/FULEIA Regeneration of Crouchlands Farm, Rickmans Lane Plaistow Billingshurst West Sussex RH14 0LE	0 km (adjacent)	Planning application pending consideration for demolition of selected buildings, extension, refurbishment and remodelling of selected buildings and the erection of new buildings to provide up to a total of 17,169 sq m (including retained / refurbished existing buildings) comprising the existing farm hub (sui generis), a rural enterprise centre (Use Classes E, C1 and F1), a rural food and retail centre (Use Class E and F1), an equestrian centre (Use Class F2 and C1) and a glamping site (Use Class E and sui generis).
22/01423/EIA Foxbridge Golf Club Foxbridge Lane Kirdford Billingshurst West Sussex RH14 0LB	0.20 km	Request for an EIA Screening Opinion in relation to a proposed redevelopment of former Foxbridge Golf Club.
20/02134/DOM Redlands Farm Rickmans Lane Plaistow RH14 0LD	0.36 km	Detached outbuilding, gym and office
21/01624/DOM Foxbridge Farm Foxbridge Lane Plaistow RH14 0LB	0.58 km	Construction of swimming pool and erection of shed for pool equipment.
21/01080/DOM Foxbridge Farm Foxbridge Lane Plaistow RH14 0LB	0.58 km	Internal works, alterations to partition walls and french doors to be replaced. Erection of new entrance porch. Extension to rear terrace area, landscaping improvements and vehicular access to the property with new crossover. External alterations to garage outbuilding and to replace windows like for like.
20/02165/DOM Pear Tree Cottage Rickmans Lane Plaistow Billingshurst West Sussex RH14 0NT	0.76 km	Conversion of existing garage roof to home office/ancillary guest accommodation
20/01937/DOM Foxhanger Barn Foxbridge Lane Plaistow RH14 0LB	0.98 km	Proposed orangery to north east elevation
20/02154/DOM May Cottage The Street Plaistow Billingshurst West Sussex RH14 0NS	1.14 km	Addition of two single storey extensions and main roof modifications at the front and rear.
20/02200/DOM Byfield Plaistow Road Kirdford RH14 0JY	1.16 km	Installation of domestic package treatment plant
20/00250/DOM 4 Nell Ball Plaistow RH14 0QB	1.47 km	Double storey side extension, block up existing vehicle access and creation of a new vehicle access.
21/01439/DOM The Lodge Whithurst Plaistow Road Kirdford Billingshurst West Sussex RH14 0JW	1.55 km	Proposed side and rear extensions to existing 2 storey single family dwelling with detached garage.

Proposed Project	Distance to Proposed Development	Description
21/00396/DOM Oakburn Plaistow Road Ifold Loxwood RH14 0TY	1.58 km	Side extension to existing bungalow and conversion into a chalet bungalow style house, works include raising the ridge height of the bungalow and insertion of dormers to the front and rear elevations, erection of front and west side porches.
20/00663/DOM The Burrows Plaistow Road Ifold Loxwood RH14 0TU	1.60 km	Demolition of the existing conservatory and erection of replacement single storey extension
20/03380/DOM El Tambo 7 Ifoldhurst Ifold Loxwood RH14 0TX	1.62 km	Single storey side extension. Removal of chimney stack. Replacement of existing windows and doors.
20/00724/DOM Waldron Chalk Road Ifold Loxwood RH14 0UA	1.70 km	Single storey rear extension and new attached garage to front.
20/02891/DOM Mariposa The Ride Ifold Loxwood Billingshurst West Sussex RH14 0TF	1.81 km	Removal of existing timber shed and the construction of a garden office in south-east corner of the plot.
20/02535/DOM Thane The Drive Ifold Loxwood RH14 0TB	1.86 km	Single storey extensions to rear and both sides of property. Loft conversion works incorporating raising of existing eaves and ridge. New detached garage.
21/01557/DOM Peacocks Plaistow Road Loxwood RH14 0TS	1.87 km	Construction of new 3 bay garage with home office/study above.
21/01871/FUL Foxley, Poundfield Lane, Ifold, Loxwood RH14 0NZ	1.90 km	Single dwelling with ground floor annex
20/00734/DOM Howick Farm Scratching Lane Kirdford Petworth West Sussex GU28 9JY	1.90 km	External alterations and extension to existing domestic annexe and storage building.
20/02552/DOM Hillside The Drive Ifold Loxwood RH14 0TE	1.93 km	New front porches. Single storey rear extension. Insertion of 2 no. front dormers and 2 no. rear dormers to facilitate conversion of part of the loft space to habitable room.
20/02614/DOM Howick Farm Scratching Lane Kirdford Petworth West Sussex GU28 9JY	1.96 km	Proposed porch on side elevation.
20/02274/DOM Longmeadow House 3 Oakdene Place Ifold Loxwood RH14 0BA	2.37 km	Single storey orangery extension to rear.
20/00846/DOM Siskins 19 The Drive Ifold Loxwood Billingshurst West Sussex RH14 0TE	2.03 km	Erection of single storey front and side extensions and detached double garage following demolition of existing single garage, boundary wall and outbuilding. Erection of 1800 high close boarded boundary fence.

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Proposed Project	Distance to Proposed Development	Description
21/00516/FUL Woodpeckers Chalk Road Ifold Loxwood Billingshurst West Sussex RH14 0UE	2.11 km	Proposed detached chalet bungalow with associated landscaping, bin stores and cycle store.
20/00316/DOM Nanridge The Drive Ifold Loxwood RH14 0TD	2.15 km	Single storey side extension and single storey front porch.
21/00959/PLD Staples Hill Cottage Staples Hill Kirdford RH14 0JL	2.22 km	Erection of detached car port, work shop and store building ancillary to the house
21/00469/DOM Willow Cottage The Drive Ifold Loxwood RH14 0TE	2.25 km	Proposed double garage
21/01807/FUL Belchambers Farm Staples Hill To Plaistow Road Kirdford RH14 0NL	2.26 km	Construction of a replacement ancillary storage barn following the demolition of an existing storage barn.
20/01079/DOM Forest Lodge Shillinglee Road Plaistow RH14 0PQ	2.32 km	Two storey rear extension and single storey porch.
20/02025/DOM Springhill Nursery The Lane Ifold Loxwood RH14 0UL	2.35 km	Erection of single storey rear extension.
20/00603/DOM Evergreen 1A Loxmeadow Close Ifold Loxwood RH14 0RL	2.37 km	Single storey extension to the rear of the property.
20/02074/FUL Orchard House Stables Kirdford Billingshurst West Sussex RH14 0NJ	2.38 km	Equestrian sand school.
21/01750/FUL Three Oaks Farm The Lane Ifold Loxwood RH14 0UH	2.42 km	Demolition and replacement single storey dwelling with associated landscaping and driveway.
21/01355/FUL Land On The East Side Of Plaistow Road Plaistow Road Kirdford West Sussex	2.43 km	Erection of 54 no. residential dwellings, associated access roads, car parking, landscaping and public open space all with unrestricted phasing. Application under Section 73 for minor material amendments to planning permission KD/19/00086/FUL to vary Condition 2 (approved plans) to enable various changes to decided plans in respect of layout, elevational treatment and car parking arrangements.
21/00858/FUL Land Adjacent To Waters Edge The Drive Ifold Loxwood West Sussex RH14 0TD	2.44 km	Erection of detached chalet bungalow with detached garage and new access with boundary fence. Renewal of application PS/18/00508/FUL.
20/01162/FUL Land South East Of Oakview The Lane Ifold West Sussex	2.46 km	Erection of Equestrian stabling barn.

Proposed Project	Distance to Proposed Development	Description
20/01472/DOM Ash Park Shillinglee Road Plaistow RH14 0PQ	2.68 km	Construction of two new maintenance and vehicle storage buildings.
21/02352/DOM 7 Townfield Kirdford RH14 0NE	2.81 km	Erection of a single storey rear/side extension.
21/02426/FUL Sports Pavilion Plaistow Road Loxwood RH14 0SX	2.85 km	Overflow carpark.
21/00918/FUL. Cranbrook Stud Skiff Lane Loxwood Billingshurst West Sussex RH14 0AG	2.93 km	Demolition of equestrian barn and lean-to stables. Construction of covered sand school and stables.
20/00389/FUL Lower Barn (Near Chandlers Barn) Skiff Lane Wisborough Green Billingshurst West Sussex RH14 0AA	2.98 km	Demolition of Lower Barn and construction of 1 no. dwelling as alternative to Class Q Prior Approval (KD/19/00484/PA3Q).
21/00918/FUL Cranbrook Stud Skiff Lane Loxwood Billingshurst West Sussex RH14 0AG	3.00 km	Demolition of equestrian barn and lean-to stables. Construction of covered sand school and stables.
20/00723/FUL Boxall Stud Village Road Kirdford Billingshurst West Sussex RH14 0NN	3.19 km	Change of use of 2 no. existing buildings from equestrian use to agricultural use.
20/00072/FUL Walcot Guildford Road Loxwood RH14 0SB	3.28 km	Demolition of existing bungalow and construction of 2 no. semi-detached two storey dwellings.
20/01997/FUL Land East Of Lady Lea House Brewhurst Lane Loxwood West Sussex	3.31 km	Demolition of existing B8 unit. Erection of new B8 Storage and distribution unit.
20/00581/FUL Hoveto Dunsfold Road Plaistow Billingshurst West Sussex RH14 0PW	3.34 km	Demolition of existing dwelling and proposed replacement dwelling with 3 bay carport.
20/01481/FUL Land South West Of Guildford Road Loxwood West Sussex	3.41 km	Demolition of existing dwelling and the erection of 50 dwellings to include 35 private units and 15 affordable units, creation of proposed vehicular access, internal roads and footpaths, car parking, sustainable drainage system, open space with associated landscaping and amenity space (resubmission of planning application reference LX/19/01240/FUL).
SDNP/19/06079/FUL Dales Farm Pipers Lane Northchapel Petworth West Sussex GU28 9LA	3.51 km	Change of use of agricultural land to camping site to include 4 no. shepherd's huts for holiday accommodation.
20/00811/FUL Birchlands Glasshouse Lane Kirdford Billingshurst West Sussex RH14 0LW	3.71 km	Demolition of an existing building with lawful use as a dwelling, and the erection of a replacement dwelling.

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Proposed Project	Distance to Proposed Development	Description
21/00788/FUL Woolspinners, Guildford Road, Loxwood RH14 0SA	3.9 km	Proposed 2 no. 3-bed detached dwellings and 2 no. 3-bed semi-detached dwellings, access, landscaping and associated works.
22/00618/FUL - Land At Stable Field Kirdford Road Wisborough Green West Sussex	4.57 km	Erection of 8 no. dwellings with associated vehicular and pedestrian access, infrastructure, car parking and landscaping.
21/01303/DOM North Pound Cottage Shillinglee Road Shillinglee Chiddingfold Godalming Surrey GU8 4SZ	4.75 km	Erection of detached annexe building.
WA/2020/1116 Maple Tree Cottage, Plaistow Road, Dunsfold GU8 4PF	5.06 km	Erection of two storey outbuilding
21/00889/FUL Home Farm House Shillinglee Road Shillinglee Northchapel GU8 4SY	5.24 km	Replacement of existing 1 no. stables, 2 no. storage structures and a storage container with 1 no. American barn.
20/01078/FUL Muttons Cottage Fittleworth Road Wisborough Green RH14 0ER	5.43 km	Change use of part of existing agricultural building to 1 no. two-bed residential unit in half of the building with workshop and ancillary office in the other half for an integrated Live Work Unit.
21/02164/FUL Goslings Newpound Wisborough Green RH14 0AT	5.68 km	Replacement dwelling, retention of existing dwelling to provide ancillary home office, retention of workshop and removal of 2 no. mobile homes, 2 no. sheds and lean to
SDNP/19/04441/FUL Lower Diddlesfold Farm Diddlesfold Lane Northchapel West Sussex	5.88 km	Demolition of existing 2 no. dwellings and garages and erection of a 1 no. dwelling with associated out building and 1 no. agricultural tied dwelling with associated access and landscaping.
20/02773/FUL Copse Cottage Harsfold Lane Wisborough Green RH14 0BD	5.92 km	Erection of an ancillary building to provide a home office and storage.
SDNP/20/05811/FUL Westview London Road Northchapel GU28 9HL	5.97 km	Proposed 2 storey extension to enable existing 1 no. dwelling house to be split into 2 no. dwellings.
WA/2015/2395 at Dunsfold Park, Stovolds Hill, Surrey	6.20 km	Outline proposal for 1,800 residential units, care accommodation; and a local centre comprising facilities including a two-form entry Primary School.
SDNP/19/04244/FUL 4 Cylinders Cottages Fisher Street Northchapel GU28 9EL	6.46 km	Two bay extension to existing carport.
WA/2020/0971 The Long House, The Common, Dunsfold GU8 4LE	6.57 km	Erection of extensions and alterations following partial demolition of existing dwelling (revision of wa/2019/1901).

Proposed Project	Distance to Proposed Development	Description
WA/2021/01638 Wheelwrights The Common, Dunsfold, Godalming GU8 4LL	6.83 km	Erection of outbuilding following demolition of existing outbuilding.
DC/20/1284 Hole Farm Lordings Road Newbridge Billingshurst West Sussex RH14 9JA	7.00 km	Conversion of existing ancillary barn to a 2 bedroom dwelling with associated alterations. Replacement of existing garage with a 2 bay garage and home office.
DC/21/2482 at Land South of Guildford Road, Bucks Green, Rudgwick, RH12 3JE	7.50 km	Erection of 43 dwellings, creation of a new pedestrian and vehicle access, public open space, landscaping and associated development.
DC/21/0748 at Land To The South of Hilland Farm, Stane Street, Billingshurst, RH14 9HN	8.50 km	Outline Application for up to 9,825 m^2 of Class E (Industrial Processes), B2, and B8 use floorspace with all matters reserved except for access.
*A detailed search has been undertaken for an area up to 2 km from the site, but a more refined search has been conducted (not including householder applications).		

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The second stage of the process was to identify which of these projects (**Table 14-2**) should be carried forward to the next stage of assessment. This selection process followed the relevant guidance documents as listed above and included plans and projects entered into the planning system and those future projects considered reasonably foreseeable where full data sets are available that have been fully analysed and interpreted.

When seeking to establish those projects which merit further consideration in an assessment of cumulative effects, the following questions were asked:

- Is the proposal/ plan of the scale to have the potential to have a cumulative impact with Rickman's Green Village?
- Has a planning application been submitted, and is there any readily available/accessible environmental information/data sets specific to each project contained in the long list?
- When considering the nature of the projects is there a reasonable prospect that any of the projects on the long list are likely to be constructed in a similar timeframe to Rickman's Green Village? And,
- Are the projects located within a reasonable spatial extent (in this case 3.5 km) such that cumulative environmental effects might be likely?

Projects and plans were removed from the long list based on the answers to the questions above, with those answering "no" removed. The resulting "short list" is presented in **Table 14-2**.

Table 14-2 Screening Assessment undertake to identify the scope of the CIA

Proposed Project	Development Summary	Screening Assessment
22/01735/FULEIA Regeneration of Crouchlands Farm, Rickmans Lane Plaistow Billingshurst West Sussex RH14 0LE	Planning application pending consideration for demolition of selected buildings, extension, refurbishment and remodelling of selected buildings and the erection of new buildings to provide up to a total of 17,169 sq m (including retained / refurbished existing buildings) comprising the existing farm hub (sui generis), a rural enterprise centre (Use Classes E, C1 and F1), a rural food and retail centre (Use Class E and F1), an equestrian centre (Use Class F2 and C1) and a glamping site (Use Class E and sui generis).	This 17,169 sq m development could have potential cumulative environmental impacts.
21/01355/FUL Land On The East Side Of Plaistow Road, Plaistow Road Kirdford, West Sussex.	Erection of 54 no. residential dwellings, associated access roads, car parking, landscaping and public open space.	Provision of 54 dwellings on site 2.4 km from the site could have potential cumulative environmental impacts.
20/01481/FUL Land South West Of Guildford Road, Loxwood, West Sussex.	Demolition of existing dwelling and the erection of 50 dwellings to include 35 private units and 15 affordable units	Provision of 50 dwellings on site 3.4 km from the site could have potential cumulative environmental impacts.

Stage three of the process comprises an assessment of the likelihood of potentially significant environmental impacts occurring cumulatively with those identified in this ES, on a topic-by-topic basis.

14.2 Assessment of Cumulative Impacts

Table 14-3 details the likelihood of potentially significant environmental impacts occurring cumulatively with those identified in this ES during construction and operation phase of the Rickman's Green Village.

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Table 14-3 Cumulative Impact Assessment

Chapter No.	Topic	Construction	Operation
21/01355/FUL Land On The East Side Of Plaistow Road, Plaistow Road Kirdford, West Sussex			
7	Land Quality and Hydrogeology	Due to the distance of Rickman's Green Village to this project, no cumulative Land Quality and Hydrogeology impacts are considered to be not significant for any of the potential development scenarios.	
8	Transport and Access	To be provided within the Traffic and Transport chapter within a separate Addendum report.	
9	Air Quality	Due to the distance between the application sites, cumulative impacts during construction are considered to be not significant.	The cumulative impact of operational phase traffic emissions have not been assessed at this stage. This will be included in the addendum to the EIA.
10	Noise and Vibration	Due to the large distance between the two development sites, no cumulative impacts are anticipated.	Due to the large distance between the two development sites, no cumulative impacts are anticipated.
11	Nature Conservation and Biodiversity	The development is situated 2km south of Rickman's Green Village and will lead to an increased residential capacity within the local area. During construction this has the potential to further disrupt and fragment foraging and commuting opportunities for bats, including Barbastelle and Bechstein's. During the surveys undertaken at Crouchland's Farm a female pregnant Barbastelle was radio tagged from Crouchland's Farm and picked up in Kirdford (behind the Forester's Arms – 300m from this development). The application is supported by a Bat Mitigation Strategy that set out detailed mitigation further to a request by Natural England. This Mitigation Strategy concludes that the mitigation, management and future monitoring as set out within this document should lead to 'impacts being non-significant on barbastelle and Bechstein's bats at the national level'. Unmitigated, the cumulative impacts of this development on Nature Conservation and Biodiversity are considered likely to result in potentially significant effects.	The development will increase residential capacity in the area and as such recreational pressure on the surrounding habitat and the nearby designated sites such as Ebernoe Common SAC and The Mens SAC. The development of both sites has the potential to further fragment habitat for foraging and commuting bats, through the pressures associated with residential development. Unmitigated, the cumulative impacts of this development on Nature Conservation and Biodiversity are considered likely to result in potentially significant effects.
12	Cultural Heritage and Archaeology	None unless if junction improvements would be required in the Plaistow Conservation Area as a result of the development (information to follow).	None unless junction improvements would be required in the Plaistow Conservation Area as a result of the development (information to follow).
13	Landscape and Visual Setting	Due to the distance between the application sites, cumulative impacts during construction are considered to be not significant.	Due to the distance between the application sites, cumulative impacts during construction are considered to be not significant.

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Chapter No.	Topic	Construction	Operation
20/01481/FUL Land South West Of Guildford Road, Loxwood, West Sussex.			
7	Land Quality and Hydrogeology	Due to the distance of Rickman's Green Village to this project, no cumulative Land Quality and Hydrogeology impacts are considered to be not significant for any of the potential development scenarios.	
8	Transport and Access	To be provided within the Traffic and Transport chapter within a separate Addendum report.	
9	Air Quality	Due to the distance between the application sites, cumulative impacts during construction are considered to be not significant.	The cumulative impact of operational phase traffic emissions have not been assessed at this stage. This will be included in the addendum to the EIA.
10	Noise and Vibration	Due to the large distance between the two development sites, no cumulative impacts are anticipated.	Due to the large distance between the two development sites, no cumulative impacts are anticipated.
11	Nature Conservation and Biodiversity	The developments are 2.8km in distance apart. During construction this has the potential to further disrupt and fragment more common foraging and commuting opportunities for bats, though it is noted that the location and habitats upon and adjacent to this site are not typical for Bechstein's bats (a largely arboreal species) and very little activity recorded (less than 1% of observations) was by barbastelle bats. The cumulative impacts on Nature Conservation and Biodiversity in the absence of mitigation is considered unlikely to be significant.	The development will increase residential capacity in the area and as such recreational pressure on the surrounding habitat and the nearby designated sites such as Ebernoe Common SAC and The Mens SAC. The development of both sites will further fragment habitat for foraging and commuting bats, through the pressures associated with residential development. The cumulative impacts on Nature Conservation and Biodiversity in the absence of mitigation are considered to be potentially significant.
12	Cultural Heritage and Archaeology	None unless if junction improvements would be required in the Plaistow Conservation Area as a result of the development (information to follow).	None unless if junction improvements would be required in the Plaistow Conservation Area as a result of the development (information to follow).
13	Landscape and Visual Setting	Due to the distance between the application sites, cumulative impacts during construction are considered to be not significant.	Due to the distance between the application sites, cumulative impacts during construction are considered to be not significant.
22/01735/FULEIA Regeneration of Crouchlands Farm, Rickman's Lane Plaistow Billingshurst West Sussex			
7	Land Quality and Hydrogeology	Due to the nature and proximity of the proposed regeneration of Crouchlands Farm there is the potential for the project to have direct and / or indirect cumulative effects on the receptors identified. However, due to the proposed mitigation measures incorporated into the Crouchlands project, the potential for cumulative effects to occur is considered to be limited.	
8	Transport and Access	To be provided within the Traffic and Transport chapter within a separate Addendum report.	
9	Air Quality	Assessment provided below in **Section 14.3.1.**	The cumulative impact of operational phase traffic emissions have not been assessed at this stage. This will be included in the addendum to the EIA.

Chapter No.	Topic	Construction	Operation
10	Noise and Vibration	Assessment provided below in **Section 14.3.2.**	Assessment provided below in **Section 14.3.3.**
11	Nature Conservation and Biodiversity	This application site is within the same landholding as the Rickman's Green Village site. Further construction in the area has the potential to cause further disruption to commuting and foraging habitat for bats, impacting further terrestrial habitat for great crested newts within the local area and further habitat removal will reduce nesting bird opportunities. The cumulative impact on Nature Conservation and Biodiversity are considered to be significant without the inclusion of sufficient mitigation and compensation measures.	This application site is within the same landholding as the Rickman's Green Village site. Further development within the site will further increase recreational pressure which will have an impact on bat, great crested newt and breeding bird populations. The cumulative impact on Nature Conservation and Biodiversity are considered to be significant without the inclusion of sufficient mitigation and compensation.
12	Cultural Heritage and Archaeology	None unless if junction improvements would be required in the Plaistow Conservation Area as a result of the development (information to follow).	None unless if junction improvements would be required in the Plaistow Conservation Area as a result of the development (information to follow).
13	Landscape and Visual Setting	The relevant cumulative landscape receptors, or components of the local landscape that are likely to be most susceptible to the types of changes that are predicted to occur as a result of the development of the site in conjunction with the proposed development at Crouchlands Whole farm Plan are listed below along with the measures of landscape sensitivity (substantial/ moderate/ minor) that were established for the LVIA: The cumulative landscape and visual impact assessment considers the impacts after both developments have been completed for 15 years.	Assessment provided below in **Section 14.3.4** below.

14.3 Cumulative Impact Assessment with Crouchlands Farm, Whole Farm Plan

14.3.1 Air Quality – Cumulative Effects during Construction

14.3.1.1 Development Scenario 1 Cumulative Effect with Crouchlands Farm, Whole Farm Plan

There is potential for cumulative effects to arise as a result of construction dust generated by other proposed projects. With reference to the IAQM Guidance (IAQM, 2016), cumulative impacts should be considered where the project boundary is located within 700 m. There is therefore the potential for cumulative dust impacts associated with Crouchlands Farm, Whole Farm Plan which bounds Rickman's Green Village Phase 1 to the north-west and south-west.

The application for the Crouchlands Farm, Whole Farm Plan included a construction dust assessment which includes a suite of best practice mitigation methods to minimise emissions of dust and fine particulate matter during construction. IAQM guidance (IAQM, 2016) states that, with the implementation of the recommended mitigation, impacts would be not significant. It is therefore not anticipated that there would be significant cumulative impacts associated with construction phase dust emissions from this project combined with Rickman's Green Village Phase 1.

14.3.1.2 Development Scenario 2 Cumulative Effect with Crouchlands Farm, Whole Farm Plan

There is potential for cumulative effects to arise as a result of construction dust generated by other proposed projects. With reference to the IAQM Guidance (IAQM, 2016), cumulative impacts should be considered where the project boundary is located within 700 m. There is therefore the potential for cumulative dust impacts associated with Crouchlands Farm, Whole Farm Plan which bounds Rickman's Green Village Phase 2 to the west.

As described in Scenario 1 cumulative effects above, the planning application for the Crouchlands Farm, Whole Farm Plan included a construction dust assessment which includes a suite of best practice mitigation methods to minimise emissions of dust and fine particulate matter during construction. IAQM guidance (IAQM, 2016) states that, with the implementation of the recommended mitigation, impacts would be not significant. It is therefore not anticipated that there would be significant cumulative impacts associated with construction phase dust emissions from this project combined with Rickman's Green Village.

14.3.1.3 Development Scenario 3 Cumulative Effect with Crouchlands Farm, Whole Farm Plan

There is potential for cumulative effects to arise as a result of construction dust generated by other proposed projects. With reference to the IAQM Guidance (IAQM, 2016), cumulative impacts should be considered where the project boundary is located within 700 m. There is therefore the potential for cumulative dust impacts associated with Crouchlands Farm, Whole Farm Plan which bounds Scenario 3 to the west.

As described in Scenario 1 cumulative effects, the planning application for the Crouchlands Farm, Whole Farm Plan included a construction dust assessment which includes a suite of best practice mitigation methods to minimise emissions of dust and fine particulate matter during construction. IAQM guidance (IAQM, 2016) states that, with the implementation of the recommended mitigation, impacts would be not significant. It is therefore not anticipated that there would be significant cumulative impacts associated with construction phase dust emissions from this project combined with Rickman's Green Village.

14.3.2 Noise and Vibration - Cumulative Effects during Construction

14.3.2.1 Development Scenario 1 – Impact 1: Construction Noise

There is potential for cumulative effects to arise as a result of construction noise generated by other proposed projects. With reference to the DMRB, which specifies that the construction noise impact study area is 300 m, cumulative construction noise impacts are only likely to occur where the project boundary is located within 600 m. There is therefore the potential for cumulative noise impacts associated with Crouchlands Farm, Whole Farm Plan which bounds Phase 1 of the Masterplan to the north-west and south-west.

The application for the Crouchlands Farm, Whole Farm Plan included a construction noise assessment which includes a suite of BPM to minimise noise emissions during construction. With the implementation of the recommended mitigation, the Crouchlands Farm, Whole Farm Plan construction noise effects are not expected to be significant. The Crouchlands Farm, Whole Farm Plan construction phase is anticipated to start in 2023/24 with completion desired by 2026. The proposed topsoil stripping, reduced level excavations and formation is likely to be the loudest of the Crouchlands Farm, Whole Farm Plan construction activities, these will be done at the start of the works and will therefore be completed before construction of Phase 1 begins in May 2025. If the construction schedules do overlap, it will be necessary for the relevant contractors to liaise to minimise the potential for noisy works to be conducted in similar locations at similar times. It is therefore not anticipated that there would be significant cumulative effects associated with construction phase noise impacts from the Crouchlands Farm, Whole Farm Plan and Phase 1 of the masterplan.

14.3.2.2 Development Scenario 1 – Impact 2: Construction Vibration

There is potential for cumulative effects to arise as a result of construction vibration generated by other proposed projects. With reference to the DMRB, which specifies that the construction vibration impact study area is 100 m, cumulative construction noise impacts are only likely to occur where the project boundary is located within 200 m. There is therefore the potential for cumulative vibration impacts associated with Crouchlands Farm, Whole Farm Plan.

The application for the Crouchlands Farm, Whole Farm Plan included a construction vibration assessment which includes a suite of BPM to minimise vibration emissions during construction. With the implementation of the recommended mitigation, the Crouchlands Farm, Whole Farm Plan effects are not expected to be significant. As with construction noise, if the construction schedules do overlap, it will be necessary for the relevant contractors to liaise to minimise the potential for works with high vibration emissions to be conducted in similar locations at similar times. It is therefore not anticipated that there would be significant cumulative effects associated with construction phase noise impacts from the Crouchlands Farm, Whole Farm Plan and Phase 1 of the masterplan.

14.3.2.3 Development Scenario 1 – Impact 3: Construction Traffic

There is potential for cumulative effects with the Crouchlands Farm, Whole Farm Plan to arise as a result of construction traffic noise. The noise assessment to be submitted in the addendum will account for the cumulative traffic flows from Phase 1 of the masterplan and the Crouchlands Farm, Whole Farm Plan.

14.3.2.4 Development Scenario 2 – Impact 1: Construction Noise

There is potential for cumulative construction noise effects to arise associated with Crouchlands Farm, Whole Farm Plan which bounds Phase 2 of the masterplan to the west.

With the implementation of BPM by Crouchlands Farm, Whole Farm Plan, effects are not expected to be significant. Assuming the same liaison between contractors described in **Section 14.3.2.1**, it is not anticipated that there would be significant cumulative effects associated with construction phase noise impacts from Phase 2 of the masterplan and the Crouchlands Farm, Whole Farm Plan.

14.3.2.5 Development Scenario 2 – Impact 2: Construction Vibration

There is potential for cumulative construction vibration effects to arise associated with Crouchlands Farm, Whole Farm Plan which bounds Phase 2 of the Masterplan to the west.

With the implementation of BPM by Crouchlands Farm, Whole Farm Plan, effects are not expected to be significant. Assuming the same liaison between contractors described in **Section 14.3.2.1**, it is not anticipated that there would be significant cumulative effects associated with construction phase vibration impacts from Phase 2 of the masterplan and the Crouchlands Farm, Whole Farm Plan.

14.3.2.6 Development Scenario 2 – Impact 3: Construction Traffic

As per **Section 10.6.3**, the significance of the impact of construction traffic noise due to Phase 2 of the Masterplan will also be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm, Whole Farm Plan.

14.3.2.7 Development Scenario 3 – Impact 1: Construction Noise

There is potential for cumulative construction noise effects to arise associated with Crouchlands Farm, Whole Farm Plan which bounds the combined application to the west.

With the implementation of BPM by Crouchlands Farm, Whole Farm Plan, as described in the Crouchlands Farm, Whole Farm Plan EIA, effects due to its construction noise emissions are not expected to be significant. Assuming the same liaison between contractors described in **Section 14.3.2.1**, it is not anticipated that there would be significant cumulative effects associated with construction phase noise impacts from the combined application and the Crouchlands Farm, Whole Farm Plan.

14.3.2.8 Development Scenario 3 – Impact 2: Construction Vibration

There is potential for cumulative construction vibration effects to arise associated with Crouchlands Farm, Whole Farm Plan which bounds the combined application to the west.

With the implementation of BPM by Crouchlands Farm, Whole Farm Plan, effects are not expected to be significant. Assuming the same liaison between contractors described in **Section 14.3.2.1**, it is not anticipated that there would be significant cumulative effects associated with construction phase vibration impacts from the combined application and the Crouchlands Farm, Whole Farm Plan.

14.3.2.9 Development Scenario 3 – Impact 3: Construction Traffic

As per **Section 10.6.3**, the significance of the impact of construction traffic noise due to the combined application will also be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm, Whole Farm Plan.

14.3.3 Noise and Vibration - Cumulative Effects during Operation

14.3.3.1 Development Scenario 1 – Impact 1: Site Suitability for Residential Development

There is potential for cumulative effects to arise as a result of Crouchlands Farm, Whole Farm Plan due to the introduction of additional noise sensitive receptors in proximity to the Crouchlands Farm, Whole Farm Plan. The Crouchlands Farm, Whole Farm Plan includes the following noise sources with the potential to influence the suitability of the site for residential development:

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- Rural Enterprise and Education Centre (REEC)
- Equestrian Centre
- Rural Food and Retail Area (RFRA)

The Crouchlands Farm, Whole Farm Plan EIA identified that there was insufficient data available to assess the noise impact of the industrial activities which will be introduced by the REEC. It was proposed that a noise impact assessment would need to be undertaken once sufficient details were finalised. To avoid the potential for significant cumulative impacts to occur, this assessment will need to consider the potential impacts on the NSRs introduced by the Rickman's Green Village development.

The exceptions to the above are loudspeaker noise at the equestrian centre, building services plant and the proposed on-site roads. The potential for each of these impacts to result in significant effects at Phase 1, in terms of site suitability, have been considered.

The Crouchlands Farm, Whole Farm Plan EIA assumed that the equestrian centre public address system would be designed so that loudspeaker sound levels would be at least 10 dB below the ambient sound level at nearby NSRs. The closest NSR identified in the Crouchlands Farm, Whole Farm Plan EIA to the equestrian centre is NSR1 (Crouchlands House). The proposed loudspeaker noise level limit at this location was 34 dB L_{Aeq}. Measurement location ST1 is representative of the closest proposed dwelling in Phase 1 to the CFWFP Equestrian Centre. **Table 10-16** shows that, at this location, the measured baseline sound level was 44 dB L_{Aeq}; hence, the loudspeaker noise level should be no higher than 34 dB L_{Aeq}. Given that the closest proposed dwelling in Phase 1 of the masterplan to the Crouchlands Farm, Whole Farm Plan Equestrian Centre is further away than Crouchlands House, it follows that loudspeaker noise levels will be no higher than 34 dB L_{Aeq}. Hence, loudspeaker noise effects on the Phase 1 development are not significant.

The Crouchlands Farm, Whole Farm Plan EIA assumed that the building services plant (potentially associated with the REEC, equestrian centre and RFRA) would be designed so that plant sound levels would not exceed the *background sound level* at nearby NSRs and would only be operated during the daytime. The worst-affected NSRs to the building services plant noise level identified in the Crouchlands Farm, Whole Farm Plan EIA are NSR1 (Crouchlands House) and NSR5 (Crouchlands Farm). The proposed building services plant noise level limit at these locations were 32 dB and 37 dB L_{Aeq} respectively. Measurement location ST1 is representative of the proposed dwelling in Phase 1 with the greatest potential to be impacted by Crouchlands Farm, Whole Farm Plan building services noise. **Table 10-16** shows that, at this location, the measured daytime *background sound level* was 34 dB L_{A90}; hence, the building services plant noise level should be no higher than 34 dB L_{Aeq}. Depending on the eventual design of the building services plant, it is possible that its noise levels could be higher than this whilst operating within the limits identified in the Crouchlands Farm, Whole Farm Plan EIA. However, there is no reason why this additional constraint cannot be adopted within the design of the Crouchlands Farm, Whole Farm Plan building services plant. On the basis that the Crouchlands Farm, Whole Farm Plan building services noise does not exceed 34 dB L_{Aeq} at the closest Phase 1 receptor, cumulative effects will be not significant.

The Crouchlands Farm, Whole Farm Plan EIA includes predicted noise levels at existing NSRs due to the on-site roads. The worst-affected NSR was NSR5 (Crouchlands Farm) due to its proximity to the proposed access road. At this location, the predicted typical road traffic noise level was 49 dB $L_{Aeq,16h}$. The closest proposed Phase 1 NSR to the Crouchlands Farm, Whole Farm Plan access road is further away than NSR5; hence, on-site road traffic noise levels at the Phase 1 NSR will be lower than 49 dB $L_{Aeq,16h}$. This is below the desirable external noise level of 50 dB $L_{Aeq,16h}$ in BS 8233; hence, significant cumulative road traffic noise effects with the Crouchlands Farm, Whole Farm Plan are not anticipated.

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14.3.3.2 Development Scenario 1 – Impact 2: Fixed Plant Operational Noise

No fixed plant is proposed as part of the operation of Phase 1 which could result in audible noise levels at existing or proposed NSRs. Hence, cumulative effects are not anticipated.

14.3.3.3 Development Scenario 1 - Impact 3: Road Traffic Noise

The significance of the impact of operational traffic noise due to Phase 1 of the masterplan will be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm, Whole Farm Plan.

14.3.3.4 Development Scenario 2 - Impact 1: Site Suitability for Residential Development

There is potential for cumulative effects to arise as a result of Phase 2 of the masterplan and the Crouchlands Farm, Whole Farm Plan due to the introduction of additional noise sensitive receptors in proximity to the Crouchlands Farm, Whole Farm Plan.

Phase 2 of the masterplan introduces NSRs which are relatively close to the proposed REEC. As with Phase 1, the Crouchlands Farm, Whole Farm Plan EIA proposed that a noise impact assessment would need to be undertaken once sufficient details were finalised. To avoid the potential for significant cumulative impacts to occur, this assessment will need to consider the potential impacts on the NSRs introduced by the Rickman's Green Village development.

In terms of potential impacts from the Crouchlands Farm, Whole Farm Plan equestrian centre public address system, Phase 2 of the Masterplan is further from the centre than Phase 1 or the existing NSRs. Loudspeaker noise levels will be suitably controlled by designing the system such that the noise level criteria adopted in the Crouchlands Farm, Whole Farm Plan EIA are not exceeded. Hence, equestrian centre loudspeaker noise effects on the Phase 2 of the masterplan are not significant.

Depending on the eventual layout, Phase 2 of the masterplan could introduce NSRs which are relatively close to the building services plant associated with the Crouchlands Farm, Whole Farm Plan, represented by measurement location ST2. **Table 10-16** shows that, at this location, the measured daytime background sound level was 34 dB L_{A90}; hence, the building services plant noise level should be no higher than 34 dB L_{Aeq}. Depending on the eventual design of the building services plant, it is possible that its noise levels could be higher than this whilst operating within the limits identified in the Crouchlands Farm, Whole Farm Plan EIA. However, there is no reason why this additional constraint cannot be adopted within the design of the Crouchlands Farm, Whole Farm Plan building services plant. On the basis that the Crouchlands Farm, Whole Farm Plan building services noise does not exceed 34 dB L_{Aeq} at the closest Phase 2 NSR, cumulative effects will be not significant.

Depending on the eventual layout, Phase 2 of the masterplan could introduce NSRs which are relatively close to the access road. However, they are unlikely to be any closer than Crouchlands Farm; hence, on-site road traffic noise levels at the Phase 2 NSR are not anticipated to be any greater than 49 dB $L_{Aeq,16h}$. This is below the desirable external noise level criterion of 50 dB L_{Aeq},16h in BS 8233; hence, significant cumulative road traffic noise effects with the Crouchlands Farm, Whole Farm Plan are not anticipated.

14.3.3.5 Development Scenario 2 - Impact 2: Site Suitability for a School

There are no cumulative effects anticipated.

14.3.3.6 Development Scenario 2 - Impact 3: Fixed Plant Operational Noise

There is potential for cumulative effects to arise as a result of mechanical services plant noise generated by the Crouchlands Farm, Whole Farm Plan. Hence, the proposed building services plant noise level limits for

Phase 2 are cumulative with any building services plant noise from the Crouchlands Farm, Whole Farm Plan. Assuming that these limits are complied with, the cumulative noise effects will be not significant.

14.3.3.7 Development Scenario 2 - Impact 4: Road Traffic Noise

The significance of the impact of operational traffic noise due to Phase 2 of the masterplan will be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm, Whole Farm Plan.

14.3.3.8 Development Scenario 3 - Impacts 1 and 2: Site Suitability

The site suitability for Phases 1 and 2 has been assessed under Scenarios 1 and 2. Scenario 3 does not change the site suitability for each Phase, as reported under Scenarios 1 and 2.

14.3.3.9 Development Scenario 3 - Impact 3: Fixed Plant Operational Noise

The cumulative effect of fixed plant operational noise under development scenario 3 is the same as that identified under scenario 2, as described in **Section 14.3.3.6**. Hence, cumulative effects will be not significant.

14.3.3.10 Development Scenario 3 - Impact 4: Road Traffic Noise

The significance of the impact of operational traffic noise due to the combined application will be assessed in a Noise Addendum. This will include consideration of cumulative effects with Crouchlands Farm, Whole Farm Plan.

14.3.4 Landscape and Visual Setting

The adjacent Crouchlands Whole Farm Plan development is within the same landscape context as the site (Rickman's Green Village); it falls within the North Western Low Weald landscape character area (LW2). The baseline assessment of landscape character and landscape value set out in **Section 13.6** therefore provides and accurate baseline for the cumulative landscape assessment.

The relevant cumulative landscape receptors, or components of the local landscape that are likely to be most susceptible to the types of changes that are predicted to occur as a result of the development of the site in conjunction with the proposed development at Crouchlands Whole farm Plan are listed below along with the measures of landscape sensitivity (substantial/moderate/minor) that were established for the LVIA in **Section 13.7.1, Table 13-1**:

- **The extensive network of ancient semi-natural woodlands**, which have exceptionally high biodiversity and cultural value. MODERATE sensitivity
- **The strong network of mature woodland, copses, shaws and hedgerows**, with a diverse mix of woodland types and species, which define the historic landscape and drainage pattern in this part of the Low Weald landscape. MODERATE sensitivity
- **The rural character of narrow enclosed lanes and tracks,** including historic drove roads (PROW) and their associated linear fields. HIGH sensitivity
- **The small scale, intimate and pastoral landscape character** with livestock grazing the heavy clay soils. HIGH sensitivity
- **The time-depth of the landscape,** including the landscape setting of Crouchland (Grade II Listed house) to the west of the Crouchlands Farm complex and the historic integrity and managed character of the surrounding agricultural and woodland landscapes. HIGH sensitivity

The landscape setting of the South Downs National Park, which is c. 5km to the south and west of the Site. The Proposed Development would not be visible in daytime views from the SDNP[41], but the distinctive landscape pattern of the Low Weald landscape, including the historic drove roads, nevertheless contributes to the wider landscape setting of the SDNP. HIGH sensitivity

Table 14-4 shows the judgements involved in assessing the magnitude of cumulative landscape effects on the assumption that the cumulative assessment is made when both developments have been completed for 15 years. Cumulative landscape effects on the identified landscape receptors are assessed in terms of their size or scale and the geographical extent of the area influenced. For the purposes of this assessment, it is assumed that all developments are permanent and long-term, so the duration and reversibility of landscape effects is not considered.

Table 14-4 Magnitude of cumulative landscape effects

Landscape receptors RECEPTOR SENSITIVITY	Predicted landscape effects MAGNITUDE OF CHANGE	Significance of landscape effect RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE (Ref Table B1.4 (Annex B))
Extensive ancient semi-natural woodlands *Receptor sensitivity is* MODERATE	The new tree and woodland planting will extend and reinforce the existing matrix of semi-natural woodland, protecting this valued landscape habitat. The proposed long-term programme of sustainable woodland management would have a moderate beneficial effect on the semi-natural woodlands on the site. However, the juxtaposition of the remaining visible parts of the Whole Farm Plan Glamping and associated parking would reduce the distinctiveness of the ancient woodlands as a landscape feature and backdrop to local views *Magnitude and nature of effect* *MODERATE - MINOR ADVERSE* *(compared to minor adverse for Rickman's Green Village)*	LOW
Strong network of mature woodland, copses shaws and hedgerows *Receptor sensitivity is* MODERATE	The new planting associated with both developments will reinforce and extend the existing network of mature woodland, copses, shaws and hedgerows, However the characteristic pattern of enclosure will have changed and some development will visually impact this landscape receptor permanently. The proposed long-term programme of sustainable landscape management would however have a beneficial effect on the network of vegetation across the entire site. *Magnitude and nature of effect* *MODERATE -MINOR ADVERSE*	LOW

[41] *Note that an assessment of the potential night time lighting impacts of the Proposed Development which addresses the potential impact on the SDNP Dark Skies is provided separately (Crouchlands Farm Redevelopment Lighting Impact Assessment, Royal Haskoning April 2021). An assessment of potential night time lighting impacts is excluded from this LVIA.*

Landscape receptors RECEPTOR SENSITIVITY	Predicted landscape effects MAGNITUDE OF CHANGE	Significance of landscape effect RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE (Ref Table B1.4 (Annex B))
	(compared to minor adverse for Rickman's Green Village)	
Rural character of narrow enclosed tracks and lanes *Receptor sensitivity is* HIGH	The new Rickman's Green Village Road/trackside tree and hedgerow planting will partially restore, the enclosed character and condition of the tracks and lanes at Crouchlands Farm. However, the roads and tracks in the vicinity of the existing farm access track will have a more urban/village character meaning that this area in particular will change character permanently. In addition, some of the infrastructure of the Whole Farm Plan development including the glamping pods, cookery school, parking and associated paths/lighting will extend this change in character. *Magnitude and nature of effect* *MAJOR- MODERATE ADVERSE* *(compared to minor adverse for Rickman's Green Village)*	*HIGH (COMPARED TO MEDIUM -HIGH FOR RICKMANS GREEN VILLAGE)*

Landscape receptors RECEPTOR SENSITIVITY	Predicted landscape effects MAGNITUDE OF CHANGE	Significance of landscape effect RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE (Ref Table B1.4 (Annex B))
Small-scale intimate pastoral character *Receptor sensitivity is* HIGH	The extensive woodland, tree and hedgerow planting associated with the Rickman's Green Village and Whole Farm Plan would restore the landscape structure in some areas and would screen and soften local views to the development so that they are well integrated within their landscape context. The Proposed Developments would however disrupt the small-scale intimacy of parts of the site in particular those areas likely to remain visible (at least partially) along the track and lanes Lane. Elsewhere the pastoral, working farm character would be conserved and sustained long term. *Magnitude and nature of effect* *MAJOR-MODERATE ADVERSE* *(compared to minor adverse for Rickman's Green Village)*	*HIGH (COMPARED TO MEDIUM -HIGH FOR RICKMANS GREEN VILLAGE)*

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Landscape receptors **RECEPTOR SENSITIVITY**	**Predicted landscape effects** **MAGNITUDE OF CHANGE**	**Significance of landscape effect** **RECEPTOR SENSITITY X MAGNITUDE OF CHANGE** **(Ref Table B1.4 (Annex B))**
Time depth of the landscape *Receptor sensitivity is* HIGH	The extensive new planting associated with both developments will reinforced the historic landscape pattern and the different component parts of the Proposed Development would have been separated and integrated within their landscape context so that the perceived scale of the buildings/development and infrastructure is reduced. The new infrastructure landscape would have an enhanced time depth, with extensive and carefully managed semi-natural habitats that reflect the full spectrum of landscape features and elements that should be characteristic of the Low Weald farmland landscape including ponds and wetlands/ditches, shaws, orchards and species-rich meadows. *Magnitude and nature of effect* *MINOR- ADVERSE (no change)*	*MEDIUM-LOW*
Landscape setting of the SDNP *Receptor: susceptibility to proposed change – LOW* *Receptor: value - HIGH* *Receptor sensitivity is* MODERATE	There would be no discernible change to the existing landscape setting of the SDNP. Magnitude and nature of effect NEUTRAL (no change)	*NEUTRAL*

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There are significant adverse cumulative landscape effects for two cumulative landscape receptors that reflect the overall scale, pattern and character of the landscape;

- **Rural character of narrow enclosed tracks and lanes –** this receptor is accessed as having a high adverse cumulative landscape effect after 15 years, compared to a medium-high effect if the Rickman's Green Village development was assessed as a stand-alone development; and

- **Small-scale intimate pastoral character -** this receptor is also accessed as having a high adverse cumulative landscape effect after 15 years, compared to a medium-high effect if the Rickman's Green Village development was assessed as a stand-alone development.

In both cases the more adverse predicted cumulative landscape effects are the result of the relative visibility of the Whole Farm Plan in juxtaposition with the Rickman's Green Village development which results in a perceived extension of development (glamping pods and other associated infrastructure) westwards and some loss of the existing intimate rural character therefore.

Whilst the cumulative magnitude of impact of two of the other landscape receptors is predicted to increase there are no significant adverse cumulative landscape effects that reflect changes to the fabric of the landscape or which impact the setting of the AONB.

Figure 11 shows of the four viewpoints which have been selected to describe the cumulative visual effects of the proposed Rickman's Green Village development viewed in conjunction with the Crouchlands Whole Farm Plan development. In each case the viewpoints describe a combined cumulative visual effect, when the observer is able to see the two developments form one viewpoint. Figure 12 shows how these viewpoints site in the context of the Zone of Theoretical Visibility for the Rickman's Green Village development

These 4 cumulative viewpoints and the relative visibility of the visual receptors are;

Representative Viewpoint 4 (Figure 13.1) – View looking north west across the open landscape and east along the existing access lane to Crouchlands Farm - typical of a of a sequence of views along this route. The existing Crouchlands Farm complex and Moores Green Cottage is just to the left beyond the view. The fields to the north of the lane will become part of the Proposed Development. Part of the native woodland planting around the easter side of the existing farm complex planted as part of the Whole Farm Plan development will be visible to the left of the view.

Visual receptors would be motorists, cyclists and pedestrians as this route is used by farm traffic, local residents and pedestrians. Their susceptibility is judged to be high as some users of this route are likely to be walking for recreational purposes. The value of the view is judged to be low as it is not subject to any planning designations. Overall visual receptor sensitivity is judged to be moderate.

Representative Viewpoint 6 (Figure 13.2) – View looking northwards towards the Crouchlands Farm along the PROW (Historic Drove) and in which parts of the adjacent proposed Whole Farm Plan Cookery School and potentially the western end of the Food and Retail Centre, will be partially visible alongside the school and housing proposed as part of this Proposed Rickman's Green Village Development. One of a sequence of views moving northwards along the PROW.

Visual receptors would be pedestrians walking along a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be moderate; it is not subject to any planning designations, but is of particular amenity value as this route is part of the historic network of drove roads which connect the settled pastoral clay vale of the Low Weald with the chalk downland to the south (now the SDNP). Locally, this is the principal public right of way connection between the villages of Kirdford (to the south) and Plaistow (to the north). Overall visual receptor sensitivity is judged to be high.

Representative Viewpoint 7 (Figure 13.3) – View looking east along the byway to the north of Crouchland (house) towards the sites of the proposed Whole Farm Plan Cookery School, Rural Food and Retail Centre and the potentially the northern boundary of the Rickman's Green Village School proposed as part of this application. The view also looks north across what will become the proposed Rickman's Green village formal open space towards the site of the proposed Glamping Parking located just to the south of Hardin's Copse. Visual receptors would be motorists, cyclists and pedestrians as this route is used by farm traffic, local residents and pedestrians. Their susceptibility is judged to be high as some users of this route are likely to be walking for recreational purposes. The value of the view is judged to be high as it is adjacent to (and within the setting of) Crouchland, a grade II listed building. Overall visual receptor sensitivity is judged to be high.

Representative Viewpoint 8 (Figure 13.4) – View looking east towards Limekiln Wood from the PROW that is aligned north-south across the centre of the Site. The field in front of Limekiln Wood, to the left of the PROW, would be part of the adjacent proposed Whole Farm Plan Glamping Site whilst the field to the right of the PROW is part of the Rickman's Green Village development.

Visual receptors would be pedestrians walking along a public right of way. Their susceptibility is judged to be high as they are likely to be walking for recreational purposes. The value of the view is judged to be moderate; it is not subject to any planning designations, but is of particular amenity value as this route is part of the historic network of drove roads which connect the settled pastoral clay vale of the Low Weald with the chalk downland to the south (now the SDNP). Locally, this is the principal public right of way connection between the villages of Kirdford (to the south) and Plaistow (to the north). Overall visual receptor sensitivity is judged to be high.

Table 14-5 Representative Viewpoints Summary

Viewpoints	Cumulative
Representative Viewpoint 1	
Representative Viewpoint 2	
Representative Viewpoint 3	
Representative Viewpoint 4	
Representative Viewpoint 5	
Representative Viewpoint 6	
Representative Viewpoint 7	
Representative Viewpoint 8	
Representative Viewpoint 9	
Representative Viewpoint 10	
Representative Viewpoint 11	
Representative Viewpoint 12	
Representative Viewpoint 13	
Representative Viewpoint 14	
Representative Viewpoint 15	
Representative Viewpoint 16	

Residential application boundary

Phase 1 application boundary

Public footpath

Representative viewpoints

Representative viewpoints (cumulative)

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Table 14-6 shows the judgements involved in accessing the magnitude of cumulative visual effects on the assumption that the cumulative assessment when both developments have been completed for 15 years. Cumulative visual effects on the identified visual receptors are assessed in terms of their size or scale and the geographical extent of the of the area influenced. For the purposes of the assessment, it is assumed that all developments are permanent and long term, so the duration and reversibility of visual effects is not considered.

Table 14-6 Magnitude and significance of visual effects

Views/visual receptors **RECEPTOR SENSITIVITY**	**Predicted visual effects** **MAGNITUDE OF CHANGE** **(Assume 15 years post completion)**	**Significance of visual effect** **RECEPTOR SENSITIVITY X MAGNITUDE OF CHANGE** **(Ref Table B1.4 (Annex B))**
Representative Viewpoint 4 *Looking north west along the existing farm access road to Crouchlands Farm which combines as a PROW. One of a sequence of views along this route.* *Receptor sensitivity is* **MODERATE**	The extensive new woodland planting in the foreground of the view will partially screen and frame the views of Rickman's Green Village development either side of the proposed access route which will be in the centre of the view. Overall, the new woodland planting will create a more enclosed landscape along this part of the PROW representing a permanent change in character. The Whole Farm Plan woodlands to the right in the view will not significantly change over overall impacts. *Magnitude and nature of effect is* **MAJOR- ADVERSE**	**MEDIUM-HIGH**
Representative Viewpoint 6 (will need cumulative impact) *Looking north from the PROW to the north of Lane lands One of a sequence of views.* *High susceptibility to change* *Moderate value* *Receptor sensitivity is* **HIGH**	The proposed woodland and tree planting along the western development boundary of the Rickman's Green Village development would close down the view to the residential buildings but will also result in a change of scale and therefore the character of the local landscape. Part of the remaining foreground narrow pasture alongside the PROW/drove road would be planted as a traditional apple orchard - further enhancing the pasture in views from this important PROW. The Rickman's Green Village development will screen Whole Farm Plan Food and Retail Hub beyond it but the Cookery School has a more open southerly aspect and part of that building will remain visible to the left of the view. *Magnitude and nature of effect is* **MODERATE – MINOR/ADVERSE** (PREVIOUSLY MINOR ADVERSE)	**MEDIUM** (Compared to MEDIUM-LOW predicted for Rickman's Green Village alone at 15 years)
Representative Viewpoint 7 (will need cumulative impact) *Looking east along the byway to the north of Crouchland (house). One of a sequence of views* *High susceptibility to change*	Parts of the Whole Farm Plan Cookery School and possible the western elevations of the Food and Retail Centre may well be visible to the right of this view in winter. These elements of the Whole Farm Plan will likely block any views beyond but in any case, the proposed woodland and tree planting along the western Rickman's Green Village development boundary would prevent the possibility of any further glimpsed winter views through the existing trees towards the school remaining. Part of the foreground pasture alongside the PROW in the centre of the view will have been managed in a low-key way as open space capable of more formal recreation in	**LOW** (compared to NEUTRAL PREDICTED FOR Rickman's Green Village alone at 15 years)

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Views/visual receptors RECEPTOR SENSITIVITY	Predicted visual effects MAGNITUDE OF CHANGE (Assume 15 years post completion)	Significance of visual effect RECEPTOR SENSITITY X MAGNITUDE OF CHANGE (Ref Table B1.4 (Annex B))
High value *Receptor sensitivity is* **HIGH**	support of the wider Rickman's Green Village development – its perimeter meadows and new tree planting will have matured with a reasonably neutral impact. The glamping car park immediately south of Hardin's Copse, serving the Whole Farm Glamping development, is screened by the woodland planting along its southern. *Magnitude and nature of effect is* **MINOR – NEGLIGIBLE/ADVERSE** (PREVIOUSLY NEGLIGIBLE-NEUTRAL)	
Representative Viewpoint 8 Looking north from the PROW (that crosses the site north-south) towards Limekiln Wood *High susceptibility to change* *Moderate value* *Receptor sensitivity is* HIGH	The woodland planting in the foreground of the view to the right of the lane will substantially screen the Rickman's Green Village development. Overall, the new woodland planting will create a more enclosed landscape along this eastern side of the /PROW (right in view). The underground glamping pods and associated access paths which are part of the Whole Farm Plan Application will be visible in the rising pasture to the west of the lane (left in the view). Although they remain visible their impact is reduced because their above ground elevations are wholly of partially turned away from the viewer. It should be noted that because of the nature of the landform and vegetation immediately adjacent to the lane this open view is contained to a relatively short section of the lane north and south. *Magnitude and nature of effect is* **MODERATE- MINOR/ADVERSE** (PREVIOUSLY MINOR- ADVERSE)	**MEDIUM** (compared to MEDIUM-LOW predicted for Rickman's Green Village alone at 15 years)

There are no additional adverse cumulative visual effects predicted as a result of the development of the Rickman's Green Village in conjunction with the Whole Farm Plan development. View 4 remains unchanged with a medium high predicted cumulative visual impact. Views 6 and 8 cumulative visual impact is judged to have increased to Medium from Medium-Low and View 7 cumulative visual impact is judged to have increased to Low from Neutral.

14.3.4.1 Conclusion

As outlined, after 15 years following the completion of both the Whole Farm Plan and Rickman's Green Village developments and the maturation of the new landscape schemes there are predicted to be 2 residual adverse cumulative landscape impacts of HIGH. But it should be noted that this is a marginal increase to the predicted adverse impact of medium high for the Rickman's Green Village development alone after 15 years. Mitigation of these predicted impacts would require a reduction in scale of both developments in such a way that the current character of the impacted landscape receptors is sufficiently retained or otherwise protected.

After 15 years following the completion of both the Whole Farm Plan and Rickman's Green Village and the maturation of the new landscape schemes there is predicted to be a significant residual adverse visual effect from the existing Crouchlands Farm access track/PROW but this is unchanged from the Rickman's Green

Village development alone after 15 years. There are increased cumulative visual impacts for the other 3 views but these are not predicted to be significant.

Table 14-7 Landscape Effects Summary

Landscape receptors RECEPTOR SENSITIVITY	Impact significance - Cumulative	Impact significance - Year Fifteen Rickman's Green Village alone
Extensive ancient semi-natural woodlands	LOW	LOW
Strong network of mature woodland, copses, shaws and hedgerows	LOW	LOW
Rural character of narrow, enclosed lanes and tracks	HIGH	MEDIUM-HIGH
Small-scale, intimate pastoral landscape character	HIGH	MEDIUM-HIGH
Time depth of the landscape	MEDIUM-LOW	MEDIUM-LOW
Landscape setting of the SDNP	NEUTRAL	NEUTRAL

Table 14-8 Visual Effects Summary

Viewpoints	Impact significance – Cumulative	Impact significance - Year Fifteen Rickman's Green Village alone
Representative Viewpoint 4	MEDIUM-HIGH	MEDIUM-HIGH
Representative Viewpoint 6	MEDIUM	MEDIUM-LOW
Representative Viewpoint 7	LOW	NEUTRAL
Representative Viewpoint 8	MEDIUM	MEDIUM-LOW

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