



F.D. Attwood & Partners

**Gibraltar Farm, Ham Lane, Hempstead, Gillingham,
Kent**

Environmental Statement: Volume 1, Main Text



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1 INTRODUCTION

1.1 F.D. Attwood & Partners (hereafter known as 'the Applicant') is seeking to obtain planning permission for a Proposed Development at Gibraltar Farm, Ham Lane, Hampstead, Gillingham, Kent. The Site location is identified in Figure 1.1.

1.2 This Environmental Statement (ES) has been prepared to support an Outline Planning Application for the Site comprising up to 450 market and affordable dwellings, with provision of a nursery, access, estate road and residential open space.

1.3 The ES identifies and records the results of assessments of the construction and operational phases of the Proposed Development and considers the potentially significant environmental effects it may create. The ES suggests a range of measures to mitigate the identified effects and, where opportunities exist, to introduce improvement measures.

Figure 1.1: Site Location



LEGISLATIVE FRAMEWORK FOR THE EIA

1.4 This ES has been prepared in accordance with the requirements set out in *The Town and Country Planning (Environmental Impact Assessment) Regulations 2017* (hereafter referred to as the EIA Regulations) (**Ref. 1.1**).

1.5 The EIA Regulations require that, before consent is granted for certain types of development, an EIA must be undertaken. The EIA Regulations set out the types of development which must always be subject to an EIA (Schedule 1 development) and other developments which may require assessment if they give rise to significant environmental impacts (Schedule 2). The reporting of an EIA takes the form of an Environmental Statement (ES).

1.6 Following consultation with relevant statutory bodies and a review of potential environmental impacts, Medway Council (MC) concluded that an EIA is required for the Proposed Development.



STRUCTURE OF THE ENVIRONMENTAL STATEMENT

1.7 The ES has been prepared on behalf of the Applicant, by a team of specialist consultants and also draws on existing studies and information where necessary.

1.8 The ES comprises three parts – the Main Text (Volume 1), the Figures and Technical Appendices (Volume 2) and the Non-Technical Summary (Volume 3). The ES forms part of a suite of reports that will support the planning application for the Proposed Development.

1.9 The ES provides:

- A description of the Site and its surroundings (Chapter 2);
- An overview of the approach and methodology of the EIA (Chapter 3);
- A description of reasonable alternatives considered in terms of design, location, size and scale (Chapter 4);
- A description of the Proposed Development (Chapter 5);
- Identification of the development programme and construction (Chapter 6);
- The results of the analysis of the potentially significant environmental effects of the Proposed Development for the following disciplines: Transport and Access; Air Quality; Noise and Vibration; Landscape and Visual Amenity; Ecology and Biodiversity; Water Quality, Hydrology and Flood Risk; Soils, Geology and Contaminated Land, Archaeology and Cultural Heritage and Socio-economics (Chapters 7-15). Cumulative impacts are assessed within each of the Chapters where relevant; and
- A conclusion based on the findings of the EIA (Chapter 16).

1.10 Each of the technical sections of the ES comprises: an introduction; a methodology of assessment, review of relevant policy context, a description of the baseline (existing) conditions; an assessment of the likely environmental effects of the Proposed Development; a description of mitigation measures; a discussion on residual effects; and a summary. Technical Appendices in relation to these Chapters are provided as **Volume 2**.

1.11 In conclusion, with reference to the EIA Regulations, the ES contains those matters which must be included:

- A description of the development comprising information on the site, design, size and other relevant features of the development;



-
- A description of the likely significant effects of the proposed development on the environment;
 - A description of any features of the proposed development, 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 the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment;
 - A non-technical summary of the above information (**Volume 3**); and
 - Any additional information relevant to the specific characteristics of the development and to the environmental features likely to be significantly affected.

NATURE OF THE PLANNING APPLICATION

1.12 The Proposed Development, which has been assessed by the EIA process, is the subject of an Outline planning application being made to MC comprising up to 450 market and affordable dwellings, with provision of a nursery, access, estate road and residential open space.



REFERENCES

Ref 1.1: Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 2017.



2 THE SITE AND SURROUNDINGS

2.1 The Site lies within the administrative area of Medway Council (MC), between the urban settlement of Hempstead and Lordswood. A small section of the Site lies within the Maidstone administrative area.

2.2 The Site covers an area of approximately 27 ha and is currently in agricultural use.

2.3 The Site's north-western boundaries are formed by Gibraltar Farm and the remaining ancient woodland of Hook Wood. To the south and east, there is also another ancient woodland – Hall Wood.

2.4 To the north-east, the Site is bounded by Elm Court, a light industrial estate on which there are a number of small local businesses, as well as a garden centre and café.

2.5 To the south-east, the Site is largely bounded by open fields and this is the boundary to the proposed development (except part of the cycleway) which lies along the administrative boundary between Medway and Maidstone Districts.

2.6 The topography of the Site can be described in two parts. The eastern side is relatively flat with gentle slopes between 1:25 to 1:45 running from north to south. On the western third of the Site, the gradients are steeper with the land falling to Gibraltar Farm at an average slope of 1:18.

2.7 From review of the Flood Risk Assessment (FRA), the Site lies predominantly in Flood Zone 1 (the zone of lowest flood risk) on the EA Flood Map. Consequently, the Site is at low risk of flooding from fluvial or tidal waters.

2.8 There are no statutory designations within the Site and none nearby that would be materially affected by the proposals. In terms of non-statutory designations, a component of Hook Wood Local Wildlife Site (LWS), known as Hall Wood, is situated within the western Site boundary.

2.9 The Site is not located within or near to an Air Quality Management Area (AQMA).



Planning History of the Site

2.10 By letter dated the 24th January 2014 a screening opinion was sought for a development of up to 500 market and affordable dwellings on a site identical to that the subject of this screening request save for access being proposed from North Dane Way whereas access is now proposed from Ham Lane (see below).

2.11 In a decision dated the 24th February 2014 (Ref. MC/14/0324) it was concluded that an Environmental Impact Assessment (EIA) was not necessary for the following reasons:

“The characteristics of the development, its location and effect on the landscape, after applying the criteria in Schedule 2 and 3 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 having regard to the advice contained in Circular 2/99 is not considered to constitute a development that requires an Environmental Impact Assessment.”

2.12 Attention was drawn to the need for any future application to be accompanied by a suite of documents dealing with a range of issues.

2.13 A planning application for up to 450 dwellings was duly made on the 8th August 2014 (Ref. MC/14/2395) and refused on the 27th January 2015 for the following single reason:

“The development would result in an inappropriate form of development within a locally valued landscape and Capstone, Darland and Elm Court Area of Local Landscape Importance, resulting in harm to the landscape and rural character and appearance of the area contrary to the objectives of Policies S4, BNE25 (1) and BNE 34 of the Medway Local Plan 2003; The Medway Landscape Character Assessment 2011; National Planning Policy Framework, in particular the fifth Core Planning Principle referred to in paragraph 17 and paragraph 109 of the National Planning Policy Framework.”

2.14 The application was appealed (Ref.APP/A2280/W/16/3143600), recovered by the Secretary of State and granted conditional permission (subject to a Section 106 Agreement) on the 6th March 2017. The time limiting condition required the submission of reserved matters within 18 months of the decision. Because of unforeseen delays a further application (Ref. MC/18/0556) for an identical development seeking a time limited permission for a further 18 months, was submitted and granted conditional planning permission (subject to a Section 106 Agreement) on the 26th September 2018.



3 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

3.1 The main objectives of the ES comprise:

- Establishing the existing baseline;
- Determine environmental conditions. This task was divided into two phases:
 - (i) collection and review of existing data relating to the Site, including a review of information held by statutory and non-statutory consultees; and
 - (ii) the enhancement of existing data, where necessary with information collected through site investigation and surveys.
- identifying, predicting and assessing the significance of the environmental impacts including beneficial, adverse, direct, indirect, long term, medium term, short term, temporary, permanent and cumulative impacts which could be expected as a result of the development proposals on those environmental issues that were considered to be potentially significant during the scoping process; and
- determining mitigation and management measures, which would be required in order to prevent, reduce or remedy any significant adverse effects along with consideration of enhancement measures which could be implemented to ensure positive benefits as a result of these proposals.

CONSULTATION

3.2 Pre-application consultation is an essential part of the EIA process and has been used to:

- identify available baseline data and the need for any further field surveys; and
- identify the main environmental issues that need to be assessed in detail.

3.3 Both statutory and non-statutory consultees have been consulted as part of the EIA. In addition, the Applicant has committed to consultation with local interested residents and parties regarding the development proposals.

3.4 As part of the planning promotion process, the Applicant has also undertaken public consultation events with the local communities, full details of which are provided in the Statement of Community Involvement which accompanies this Application.



3.5 Throughout the pre-application process, the Applicant employed a variety of methods and approaches in accordance with best practice. The feedback received during the consultation exercises have informed and shaped the proposals for this application.

SCOPE OF THE EIA

3.6 The purpose on an EIA scoping exercise is to ensure that all relevant environmental issues with respect to the Proposed Development are identified from the outset and to confirm that the EIA process would conform to the requirements of the EIA Regulations. The EIA Regulations require 'a description of the likely significant effects of the development on the environment.'

3.7 An assessment of all environmental effects is not required, only those likely to be significant. By applying relevant guidance and professional judgement it is possible to identify those environmental areas that should be assessed.

3.8 The areas potentially likely to experience a significant effect as a result of the Proposed Development were identified as follows:

- Transport and Access;
- Air Quality;
- Noise and Vibration;
- Landscape and Visual Amenity;
- Ecology and Nature Conservation;
- Water Quality, Hydrology & Flood Risk;
- Soils, Geology, Contaminated Land;
- Archaeology and Cultural Heritage; and
- Socio-economics.

Environmental Topics Scoped out of ES

3.9 Climate change was considered as part of the Flood Risk Assessment and Drainage Strategy which has been referred to and appended to the ES (**Appendix 12.1**). The Proposed Development has been designed to ensure that surface water run-off from the Site discharges at an appropriate rate with an additional allowance for potential climate change. Climate change has therefore been addressed in both the design of the Proposed Development and the EIA process. It is not considered that any other climate change matters are of relevance to the



Development in this instance. Any carbon emissions generated by the Development would be insignificant in the context of global climate change. Further assessment of the impact of the Proposed Development on climate change is therefore not considered further in the assessment.

PROJECT TEAM

3.10 This ES has been completed by a team of specialist consultants as illustrated in Table 3.1 below:

Table 3.1: Consultant Team

Section	Consultant
Chapters 1 to 6	Entran Ltd
Chapter 7: Transport and Access	Charles and Associates Ltd
Chapter 8: Air Quality	Entran Ltd
Chapter 9: Noise and Vibration	Entran Ltd
Chapter 10: Landscape and Visual Impacts	EDP Ltd
Chapter 11: Ecology	EDP Ltd
Chapter 12: Water Quality, Hydrology and Flood Risk	Herrington Consulting Ltd
Chapter 13: Soils, Geology and Contaminated Land	Ground Technology Ltd
Chapter 14: Archaeology and Cultural Heritage	EDP Ltd
Chapter 15: Socio-economics	Greengage Ltd

ASSESSMENT CRITERIA

3.11 A number of criteria have been used to determine whether or not the potential effects of the Proposed Development are significant. Where possible, the effects have been assessed quantitatively.

3.12 The significance of effects have been assessed using one or more of the following criteria:

- international, national and local standards;



-
- relationship with planning policy;
 - sensitivity of receiving environment;
 - reversibility and duration of effect;
 - inter-relationship between effects; and
 - the results of consultations.

3.13 The effects that were considered to be significant prior to mitigation have been identified within the ES. The significance of these effects reflects judgement as to the importance or sensitivity of the affected receptor(s) and the nature and magnitude of the predicted changes. For example, a large adverse impact on a feature or site of low importance will be of lesser significance than the same impact on a feature or site of high importance.

3.14 The following terms have been used to assess the significance of effects where they are predicted to occur:

- Major Beneficial or Adverse effect – where the Proposed Development would cause a significant improvement (or deterioration) to the existing environment;
- Moderate Beneficial or Adverse effect – where the Proposed Development would cause a noticeable improvement (or deterioration) to the existing environment;
- Minor Beneficial or Adverse effect – where the Proposed Development would cause a barely perceptible improvement (or deterioration) to the existing environment; and
- Neutral/ Negligible – no discernible improvement or deterioration to the existing environment.

3.15 Where individual assessment sections deviate from these terms, the alternative terminology has been explained as appropriate within the relevant Chapter.

3.16 A non-technical summary of the ES is provided as **Volume 3**.

CUMULATIVE EFFECTS

3.17 Cumulative impacts from proposed or committed developments in the vicinity of the Proposed Development have been considered within each of the following technical Chapters. The proposed or committed schemes considered are identified in Table 3.2.



Table 3.2: Proposed or Committed Developments

Site Name	Application No.	Distance from the Site	Location	Description
Land East of Gleamingwood Drive Lordswood Kent	15/503359/OUT	Adjacent	578003, 162014	Residential development (approx 89 dwellings) plus open space, biomass plant and access road (plus emergency access)
Land at North Dane Way (East Hill), Chatham, Medway	N/A	120m	577500, 165500	Erection of up to 975 dwellings (C3) including a mix of sizes, types and tenures including affordable housing; A two-form entry primary school; Potential for local community centre; Open space; and Road infrastructure.
Land At Brickfield Darland Farm Pear Tree Lane Hempstead Gillingham ME7 3PP	MC/16/2776	2.3km	578213, 165607	Residential development of up to 44 dwellings with associated garaging, access, landscaping and open space



4 ALTERNATIVES AND DESIGN EVOLUTION

INTRODUCTION

4.1 This Chapter sets out the need for the Proposed Development and the reasonable alternatives considered by the developer. The EIA Regulations (**Ref 1.1**) states that an ES should include:

“a description of the reasonable alternatives studied by the developer, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment.”

4.2 The following sections describe the reasonable alternatives considered by the developer in addition to the Proposed Development. Consideration has been given to and commentary is provided on the following:

- The 'No Development' alternative;
- Alternative Sites; and
- Alternative Designs and Layouts.

'NO DEVELOPMENT' ALTERNATIVE

4.3 The 'No-Development' option refers to leaving the Site in its current state, which comprises an area of undeveloped land. This alternative would not contribute positively to housing delivery in the area, which falls below the rate required to meet objectively-assessed housing need.

4.4 As the Proposed Development can contribute up to 450 dwellings to future housing supply and the Site is under the Applicant's control, the 'No Development' scenario has been dismissed.

ALTERNATIVE SITES AND LAYOUTS

4.5 The application has been prepared because it lies within the applicants control and is available for development. The Site has also previously secured outline planning permission, with the original layout being approved following a Public Inquiry after a “called in” appeal which the Secretary State allowed. This outline permission, which was extended in the summer of 2018, is extant and was considered to be justified balancing the fact that the scheme contributed



to the significant housing needs in Medway and that the environmental impacts could be appropriately mitigated.

4.6 Whilst this extant outline permission exists and the landowner would like to develop the Site, alongside one of the many national housebuilders that are striving to purchase the approved scheme, the approved development site cannot currently be delivered because it relies on a small strip of land at the end of North Dane Way for access, which is within Medway Council's control.

4.7 Despite the applicant offering to acquire this small strip of land at full commercial value given that it was recognised as critical to the achievement of the approved road access scheme serving the approved scheme, Medway Council chose not to dispose of their strip of land. As a result of this decision, in order to bring forward the Site for housing within the approved development area, it was necessary to identify an alternative means of access to the Site.

4.8 Road access from other points off North Dane Way would have involved a greater impact on an Ancient Woodland and this option had been previously rejected in environmental terms. This area of woodland was also similarly within Medway Council's ownership who had made clear of their unwillingness to dispose of the land to facilitate access to the Site.

4.9 As a road connection from North Dane Way was not an option for the above reasons and the Site is bound by agricultural land and woodland on the eastern and western sides, the only other means of access that was possible to "unlock" the Site access issue and deliver the approved housing was by utilising the only other site boundary that fronted a road highway, from Ham Lane.

4.10 As a result of this background, and the approved development framework that was established by the extant permission, the Applicant has looked at the technical highway considerations arising from an access to Ham Lane including an assessment of the wider highway network including the modelling of motorway junctions and offsite improvements to increase capacity and ease traffic flows. As the Site remains the same and the outline framework relates to a proposal for 450 dwellings, the design process has incorporated many of the original agreed development principles for the Site. This framework has also been revised following a presentation to the South East Design Panel and pre-application engagement with Medway officers including feedback from a presentation to council members. The evolution of the submitted design is detailed further in the accompanying Design and Access Statement to the planning submission.



4.11 The above demonstrates the extent to which options and alternatives have been considered, but the origins of the proposal for this site derive from the approved permission that is already in place, which the submission seeks to deliver. As a result it is the past planning history that has effectively set the development area and site boundaries and target quantum of development. On this basis, alternative sites or significantly changed proposals were dismissed.

4.12 The connection of the road to a different road frontage at Ham Lane has resulted in a change to the outline proposals, although a large body of the previous, landscape led , approved development masterplan has been incorporated within this submission. For example, the strategic buffer planting to the perimeter of the Site has remained the same. Alternative designs have been considered as the design of the layout has progressed in line with updated technical inputs from the team, and feedback from members, officers, the South East Design Panel and other consultees as part of the wider stakeholder engagement. It is relevant that the submission is in Outline with only the means of access fixed and this point is relevant to the consideration of the available alternatives which may be tested further at the reserved matters stage.

4.13 The evolution of the Development has therefore responded to a variety of design and environmental issues and the resultant proposals are considered to offer the most advantageous design solution.

4.14 The final layout of the Proposed Development is identified in Chapter 5 and **Appendix 5**.

5 THE PROPOSED DEVELOPMENT

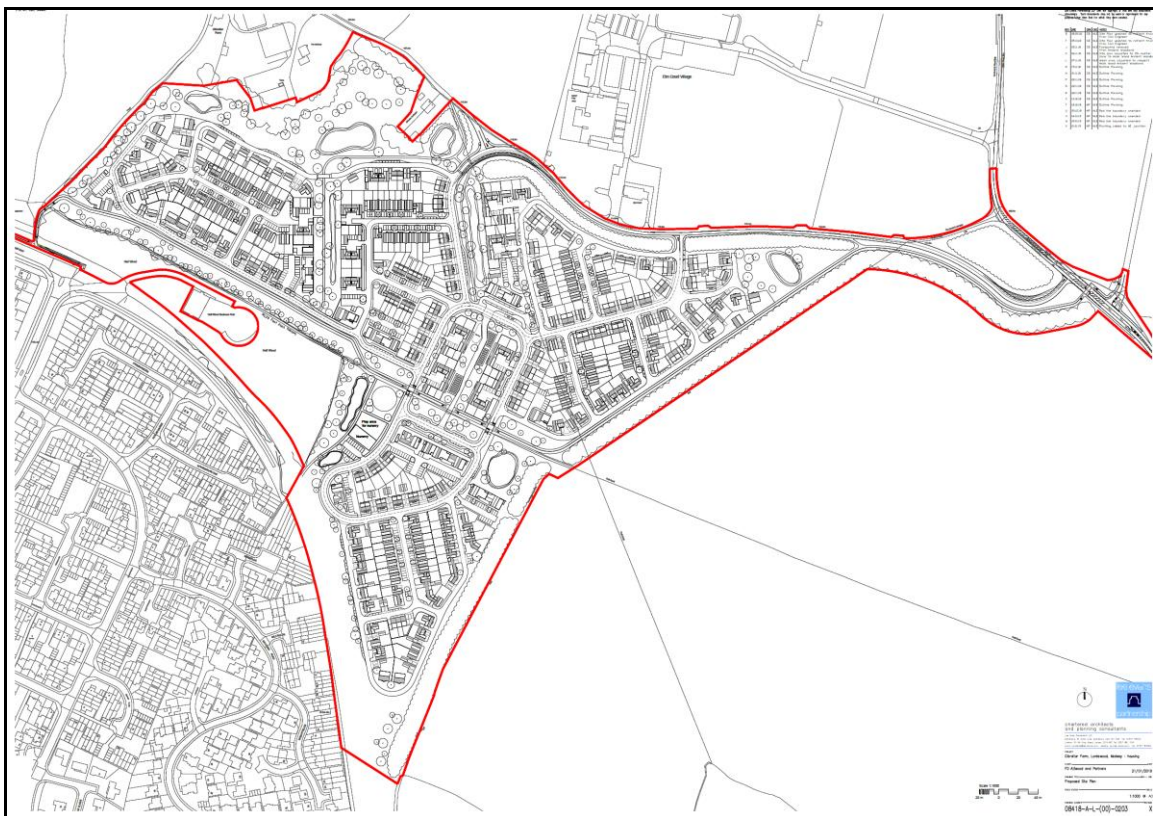
5.1 The Proposed Development covers an area of approximately 27 hectares (ha). It is proposed for a mix of residential, nursery and commercial uses.

5.2 The application is submitted in Outline. The Planning Application seeks planning permission for the following:

- up to 450 dwellings;
- A nursery up to 300m² internally;
- Shops / Cafes / Takeaways: Class A1, A3, A5 with an area of 200 – 240 m²;
- Associated access/roads, pedestrian and cycle paths;
- Fenced community gardens;
- Approximately 6.3ha of public open space including a play area of 400m²; and
- Approximately 3.9ha of new woodland and infrastructure planting.

5.3 A proposed Site layout is presented in Figure 5.1. Further plans are provided in **Appendix 5**.

Figure 5.1: Proposed Site Plan



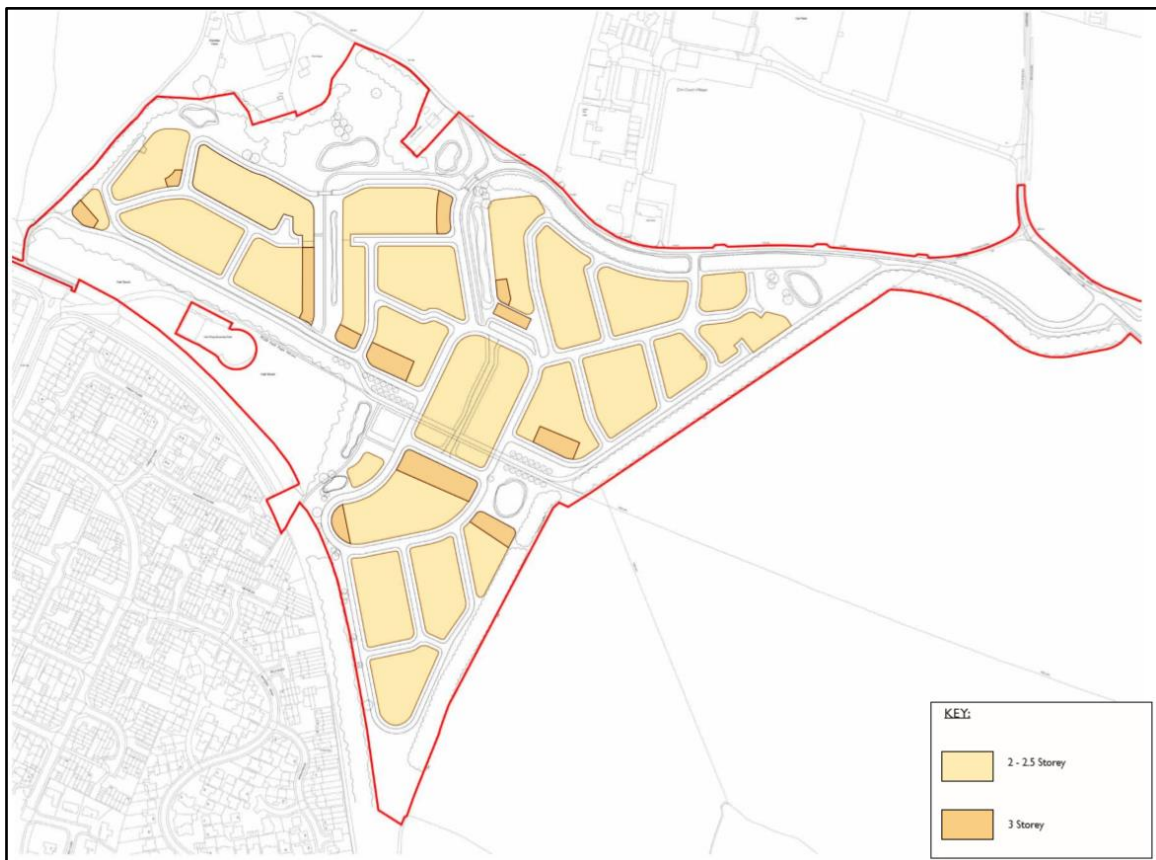
Scale and Massing

5.4 The proposed development will be predominantly two storeys in height. This is in-keeping with the surrounding districts and no building will be above 11m in height. Building heights are presented in Figure 5.2 below.

5.5 In these proposals a small proportion of apartments will be three storeys high and up to 11m in the ridge height. These buildings will only be permitted in certain key locations away from the edges of the Site, where their increased mass would benefit the overall streetscapes and give emphasis and interest to the development.

5.6 The three storey units are flats, although there are a number of 2.5 storey (rooms in the roof) housing facing the principal avenues and terminating vistas. The illustrative design allows for all three storey flatted buildings to have lifts to facilitate access.

Figure 5.2: Building Heights





Density

5.7 The residential element of the Proposed Development will have an overall density of approximately 34 dwellings per hectare, but will vary across the site.

Character and Design

5.8 The Avenue is the main route into and around the development. The design of the street will emphasise the residential character of the neighbourhood with a formal arrangement of the houses. Homes will be facing the street and provide a good sense of enclosure. On plot parking will be provided for every home along these type of streets to keep the pavement distinct and clear of obstructions. The street design needs to accommodate the prospect of future bus movements.

5.9 In the Lanes, shared space streets give priority to pedestrians and cyclists. Kerbs are usually omitted to give a clear indication that vehicles should give way to pedestrians. Trees and planters are a feature of these streets. On street parking, perpendicular to the houses, with trees in-between will strengthen the character of these areas together with the linear continuous grouping of the same typology of houses.

5.10 In the Woodlands, shared space streets again give priority to pedestrians and cyclists and kerbs are usually omitted. Trees and wider front gardens are a feature of these streets. On plot parking with greenery and trees in-between will strengthen the character of these areas together with the use of weatherboarding and render in addition to brick.

5.11 Courtyards are placed at strategic locations where dual frontage is required for passive surveillance. They form a distinct edge to green areas and public footpaths. This is an arrangement with strong references to the local vernacular.

5.12 The proposed character areas are illustrated in Figure 5.3 below.

Figure 5.3: Character Areas



Quantum of Development

5.13 Table 5.1 identifies the quantity of the land proposed for the mixed uses to be provided by the Proposed Development.

Table 5.1: Land Budget Summary

Land Budget Summary	
Site Area	27 ha
Development Area	13.2 ha
Open Space	6.3 ha
Residential	
Density	34 dwellings per ha
Total no of dwellings	Up to 450
Public Amenities and Facilities	
Shops / Cafes / Takeaways: Class A1, A3, A5	200 - 240 m ²
Nursery: Class D1	300 m ²
Open Space	
Public Open Space	6 ha
Strategic Woodland	3.9 ha
Play Areas	400 m ²
Community Gardens	0.27 ha



Residential Uses

5.14 The residential component of the Proposed Development forms a significant part of the development proposals and will provide up to 450 new homes.

5.15 The Proposed Development will comprise a full range of housing types, sizes and tenures ranging from one and two bedroom flats to five bedroomed detached houses.

Public Amenities and Facilities

5.16 The proposed scheme will provide the following:

- up to four shops/cafes/takeaways in a central location in the Site, near the proposed bus stop;
- community garden areas to be available to residents, as well as the planting of publicly accessible fruit trees; and
- land for a new nursery close to the heart of the scheme and near Lordswood.

Open Space

5.17 Figure 5.4 illustrates the proposed open spaces included within the proposals.

5.23 As part of the aforementioned junction improvements, a traffic island crossing would be introduced to allow for safe crossing.

Figure 5.5: Vehicular Access

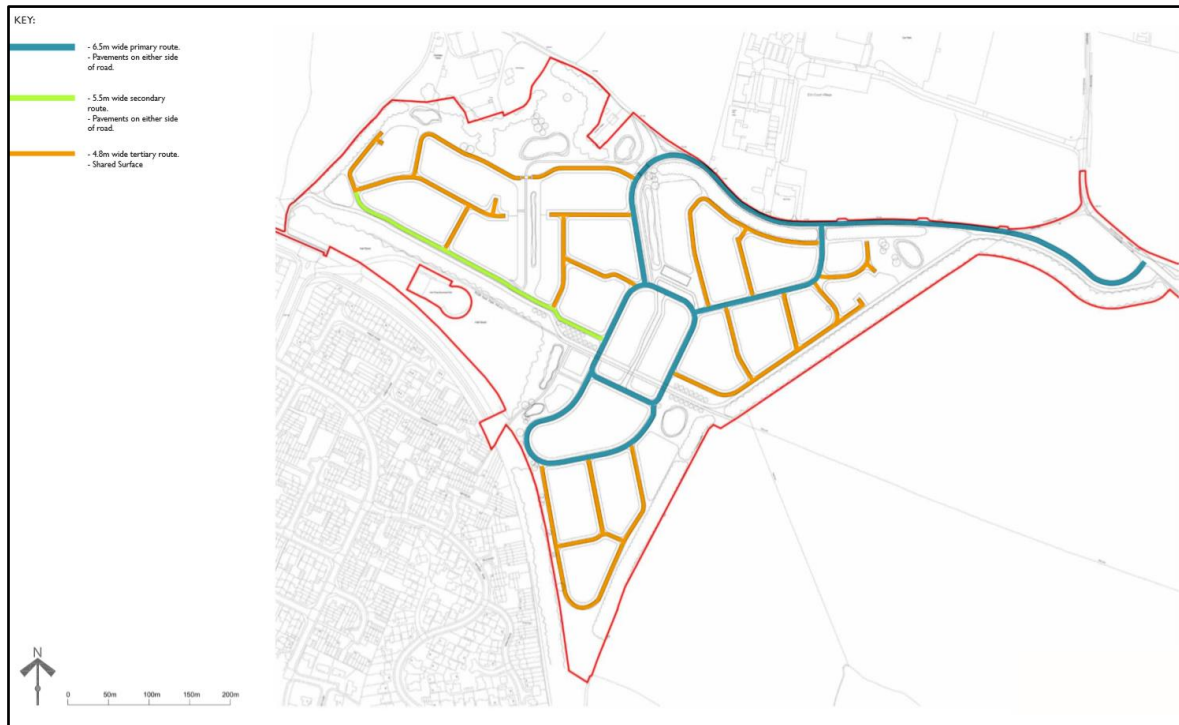


Figure 5.6: Pedestrian and Cyclist Access





6 DEVELOPMENT PROGRAMME AND CONSTRUCTION

INTRODUCTION

6.1 This chapter describes the anticipated programme of development works and the key activities that would be undertaken on the Site during the construction phase of the project. It identifies, in general terms, the potential effects associated with construction activities and outlines proposals for their mitigation. Detailed consideration of construction-related environmental effects upon the various technical topics assessed, together with their associated mitigation measures, are provided in each of the technical assessment chapters of this ES.

6.2 It is proposed that a Construction Environmental Management Plan (CEMP) would be prepared and implemented for the construction phase of the Proposed Development. This would be discussed and agreed with the relevant planning officers at MC prior to the commencement of works at the Site. An outline of the content of the CEMP is provided in this Chapter.

6.3 Planning for construction is necessarily broad at this stage and may be subject to modification. For example, specific construction activities could vary in frequency depending upon the particular stage of works. Consequently, where uncertainty exists, the assessment has assumed a 'worst-case' situation. It is considered, however, that sufficient information is available at this stage to enable the likely significant environmental effects relating to the construction works to be identified and their significance assessed.

PROGRAMME OF WORKS

6.4 The construction period is anticipated to be approximately 7 years to complete the Proposed Development in its entirety.

DESCRIPTION OF THE WORKS

6.5 The proposed construction works can be divided into the following main stages:

- Enabling works;
- Site preparation;
- Construction of the mixed use development; and
- Removal of remaining construction elements.



Enabling Works

6.6 Enabling works will be undertaken prior to the start of the main construction works. The extent of these works would include:

- Establishment of site project offices and construction compound including car designated parking areas for contractors;
- Isolation or diversion of utility services impinging upon excavation areas;
- Provision of temporary electrical supplies and other required services for the duration of the construction works; and
- Erection of site hoardings including provision of a site security system.

Site Preparation

6.7 All existing non-critical infrastructure will be removed. All works will be strictly managed to ensure that vehicle movement and dust are controlled and kept to a minimum. Further details on the management of dust are included in Chapter 8: Air Quality.

6.8 All live utilities and any live drainage would be capped off or diverted before any excavation works commence. A method statement will be produced outlining the process for identifying and disconnecting existing services at the Site.

6.9 Once the temporary works are in place, any groundworks or earthmoving would proceed. All material will be re-used on site where possible, or otherwise transported off-site where reuse is not possible.

Construction of the Proposed Development

6.10 This phase will include the construction of the access roads within the Proposed Development.

6.11 The Site would require new mains water, gas, electricity and IT/telephone connections. Statutory services will be brought into the Site as and when the programme dictates, although the trenching works will be carried out alongside the substructure work.

6.12 The operation of construction vehicles and general construction activities may give rise to the potential for surface runoff to become contaminated with hydrocarbons, silt or other construction materials. This may in turn lead to a contamination event should site drainage be



allowed to enter watercourses. Excavations may require dewatering (of accumulated rainfall or runoff) during construction. In such circumstances, it will be important to ensure that the quality of this water is sufficiently high to allow discharge to an appropriate point. Further details on drainage are provided in Chapter 12: Water Quality, Hydrology and Flood Risk.

Removal of Remaining Construction Elements

6.13 This last phase will be undertaken at the end of the main construction works or where the construction has progressed to a stage where it can be undertaken at an earlier time. The extent of these works would include:

- Removal of site project offices and construction compound;
- Decommissioning of temporary electrical supplies and other required services utilised for the construction works; and
- Removal of site hoardings and site security system.

HOURS OF WORK

6.14 It is proposed that hours of work during the construction phase would be as follows:

- 0700-1900hrs on weekdays;
- 0700-1300hrs on Saturdays; and
- No working on Sundays or bank holidays.

6.15 These proposed hours would be agreed with the Local Authority Planning department prior to commencement of the works. Special working outside these hours, such as heavy plant activities and crane and equipment assembly, would be kept to a minimum and would be subject to prior agreement with reasonable notice by the Local Authority's Environmental Health Officer (EHO).

6.16 It is anticipated that none of the works outlined above will be carried out on Sundays or Bank Holidays without special prior agreement with MC and other relevant parties.



PLANT AND EQUIPMENT

6.17 The following plant and equipment is anticipated to be used during the construction works.

Table 6.1: Indicative Plant used during Construction

Plant and Equipment	Enabling works and Site Preparation	Construction	Services installation	Fit out	Landscaping
Concrete silo and ready-mix lorries		X	X		X
Concrete cutter, saws and splitters	X	X	X		X
Cranes and hoists	X	X			
Cutters, drills and small tools		X	X	X	
Excavators and breakers	X	X	X		X
Floodlights	X	X		X	
Fork lifts trucks		X	X	X	
Hydraulic benders and cutters		X	X	X	
Road Brush Vehicles		X	X	X	
Lorries/vans	X	X	X	X	X
Tarmac laying equipment		X			X
Scaffolding and access platforms		X		X	X
Temporary supports		X		X	
Tipper lorries		X			X
Wheel washers	X	X	X		X
Skips & Skip trucks	X	X		X	X



ENVIRONMENTAL MANAGEMENT AND MITIGATION

Environmental Management Plan

6.18 A principal construction contractor will be responsible for all aspects of construction operations. In line with best practice, the construction contractor will subscribe to the CCS (Considerate Contractors Scheme).

6.19 A CEMP would be prepared by the Principal Contractor which would include details of all relevant environmental management controls necessary for environmental protection during the construction works. This would follow best practice guidelines and would be agreed with the Local Authority Environmental Health Department.

6.20 The CEMP would include:

- Restrictions and targets for specific work activities in order to minimise environmental effects, including disruption and disturbance to local residents (if relevant), workers and the general public;
- Details of the means by which appropriate environmental monitoring, record keeping and reporting would be managed to ensure the above targets are being met;
- Procedure(s) to deal with necessary 'abnormal' works that may result in deviation from the agreed procedures and targets; and
- Provision for a programme of regular environmental audits and reviews at key stages in the construction programme.

6.21 The CEMP would place stringent contractual and procedural performance obligations upon trade contractors. These would be maintained and reinforced by commitments detailed below and, where relevant, within Chapters 7-14 inclusive. Such obligations would be enforced through subsequent detailed agreements with and consents provided by the Local Authority. A clear management structure and description of the responsibilities and authority of a specific Project Environmental Manager (PEM) would be included.

6.22 The PEM would have primary responsibility for liaising with the Planning Authority and other statutory agencies on environmental matters. It is anticipated that regular meetings would take place to review progress and to agree necessary options. Notwithstanding this, it is recognised that positive action and reaction by site operatives at the time of any environmental incident or breach of targets are essential components for effective environmental management.



6.23 The CEMP would address requirements in relation to environmental controls and would allow for, and include, the following:

- The appointment of an experienced PEM responsible for the preparation and implementation of the CEMP;
- Details of the phasing of the works, including information on construction works that may be carried out by trade contractors;
- Procedures for construction activities, highlighting any operations likely to result in adverse environmental effects, with an indication of the mitigation measures to be employed;
- Wheel washing and highway cleaning procedures;
- Reference to and provision of a framework for compliance with all legislation that would be relevant;
- Emergency procedures that would be implemented on the Site;
- Prohibited or restricted operations;
- Control limits of target criteria for environmental issues, where practicable;
- Requirements for monitoring and record-keeping;
- Mechanisms for third parties to register complaints and the procedures for responding to complaints;
- Provisions for reporting, public liaison and prior notification, especially where dispensations would be required;
- Details of construction operations, highlighting the operations most likely to result in disturbance and/or working outside core working hours, together with an indication of the expected duration of each activity;
- Possible departures from target criteria and details of how any adverse effects would be minimised or potential complaints addressed;
- Details of proposed routes for HGVs travelling to and from the Site;
- Provisions for auditing by the PEM, MC and other regulatory authorities, where appropriate;
- Details of plant to be used;
- Details of all construction works involving interference with a public highway, including temporary carriageway/footpath closures, realignments and diversions; and
- Housekeeping procedures and environmental management controls.



Contract Conditions

6.24 Individual trade contracts would incorporate appropriate requirements in respect of environmental control, based largely on the standards of 'good working practice' outlined in the EMP in addition to statutory requirements. Contractors would therefore be required to demonstrate how they would achieve the provisions of the EMP, how targets would be met and how potential adverse environmental effects would be minimised.

Management of Construction Works

6.25 The PEM would deal with queries from the public and other complaints and enquiries. This nominated individual would be named at the Site entrance, with a contact number and would be identified to the Local Authority and community groups, prior to the start of the Site activities and whenever a change of responsibility occurs.

6.26 Any complaints would be logged and reported to the relevant individual within the Local Authority (and *vice versa*) as soon as practicable.

6.27 The CEMP would specify the roles and responsibilities of the PEM and the appropriate Officers within Local Authority in respect of any breaches or complaints from the public. The required actions would be different in each specific case, depending on the operation, equipment or location.

Emergencies and Accidents

6.28 The building contractor would be required to maintain high safety standards on-site and to be fully compliant with current health and safety legislation.

6.29 An Emergency Incident Plan would be put in place to deal with potential spillages and/or pollution incidents. Any pollution incidents would be reported immediately to the regulatory bodies.

Materials Storage and Handling

6.30 Environmental issues would be considered in the procurement of raw materials and manufactured building components and all such materials would be appropriately stored on the Site to minimise damage by vehicles, vandals, weather or theft. Deliveries of hazardous



materials would be supervised and a just-in-time deliveries system would be implemented to minimise storage times and reduce the risk of spillage on-site. Tanks and drums of liquid chemicals and fuels would be stored in bunded compounds. Packaging materials would be returned, where possible.

6.31 Contractors and their sub-contractors would be expected to maintain a tidy site and, where practical, to operate a 'just-in-time' policy for the delivery and supply of materials for the works.

6.32 Where possible, pre-fabricated elements would be lifted directly into position from delivery vehicles. This would assist in reducing on-site storage and labour requirements and construction noise levels to surrounding sensitive receptors.

6.33 Mobile cranes would be used for general unloading and hoisting during the structural and envelope works. Passenger/goods materials hoists, fork lift trucks and other electric or hydraulically operated plant may be used to distribute and transport materials around the Site.

Waste Management and Minimisation

6.34 Waste would be generated during all stages of the construction works. Although specific materials cannot be identified at this stage of the design, potential sources of waste within the construction process are anticipated to comprise:

- Excavated material;
- Packaging – including plastics, wooden pallets, expanded foams;
- Waste materials generated from inaccurate ordering, poor usage, badly stored materials, poor handling, spillage; and
- Dirty water, for example from Site runoff containing silt.

6.35 It is the intention of the project to use all excavated material, wherever possible within the Proposed Development.

6.36 A Site Waste Management Plan (SWMP) would be developed and implemented detailing how waste created during the construction phase would be managed. This would be prepared by the Contractor in accordance with the Site Waste Management Plan Regulations 2008 and non-statutory guidance on preparation of SWMPs. All relevant Contractors would be required to investigate opportunities to minimise waste arisings at source and, where such waste generation is unavoidable, to maximise the recycling and reuse potential of construction



materials. Recycling of materials would take place off-site, where noise and dust are less likely to result in effects to the occupants of surrounding properties. Appropriate waste management and recycling centres close to the Site would be identified prior to the construction works and contracts would be established with registered waste carriers and authorised waste disposers for construction waste.

6.37 All waste would be stored on the Site in accordance with the relevant legislation and no burning of construction waste would be undertaken at the Site.

6.38 The destination of all waste or other materials removed during construction would be notified to the relevant authority by the Contractor/Construction Manager for approval. Loads would only be deposited at authorised waste treatment and disposal sites. Deposition of waste would be in accordance with the requirements of the EA, Environmental Protection Act 1990 (EPA), the Controlled Waste Regulations 1992 as amended, the Hazardous Waste Regulations 2005 (Ref 6.2), the List of Wastes (England) Regulations 2005 (**Ref 6.3**) and the Waste (England and Wales) Regulations 2011.

Traffic and Access Management

6.39 An assessment of the potential effects of the Proposed Development on traffic and the local transportation network is presented in Chapter 7: Transport and Access.

6.40 Specific detail relating to the management of construction traffic will be presented within a dedicated construction transportation plan, which will be submitted for approval by the Local Authority post planning.

6.41 All construction traffic entering and leaving the Site would be closely controlled. Deliveries would be phased and controlled on a 'just-in-time' basis, wherever possible. This would minimise travel time and traffic congestion around the Site.

6.42 The majority of all deliveries would be made by standard HGVs, with no special access / delivery requirements.

6.43 The Traffic Management Plan would detail the management of the above measures as well as the management of car parking on the Site and the Site labour force travel to the Site. No parking on public roads would be allowed and the Contractor/Construction Manager would be responsible for enforcing this requirement. Provision would be made within the Site for



essential on-site parking. Any local traffic management measures for Site access would be agreed with the relevant authorities.

Air Quality and Dust

6.44 Site-specific best practice measures would be implemented by contractors to minimise the disturbance to local residents and other potentially sensitive receptors. These measures would include:

- Damping down surfaces during dry weather;
- Providing appropriate hoarding and/or fencing to reduce dust dispersion and restrict public access;
- Sheeting buildings, chutes, skips and vehicles removing wastes with the potential for dust generation;
- Appropriate handling and storage of materials, especially stockpiled materials;
- Restricting drop heights onto lorries and other equipment;
- Fitting all equipment with dust control measures such as water sprays wherever possible;
- Using a wheel wash, limiting speeds on the Site to 5 mph, avoidance of unnecessary idling of engines and routing of Site vehicles as far from sensitive properties as possible;
- Using gas powered generators rather than diesel, if possible (these are also quieter) and ensuring that all plant and vehicles are well maintained so that exhaust emissions do not breach statutory emission limits;
- Switching off all plant when not in use;
- No fires would be allowed on the Site; and
- Ensuring that a road sweeper is available to clean mud and other debris from hardstanding, roads and footpaths.

6.45 Full assessments of the potential effects of the construction works on air quality are presented in Chapter 8: Air Quality.

Hazardous Materials and Contaminated Land

6.46 Prior to construction, the Contractor would be required to prepare a Method Statement and Risk Assessment demonstrating how the safety of construction workers and the public



would be addressed in terms of potentially harmful substances. Protective measures would include:

- Provision of adequate facilities and procedures for personal washing and changing;
- Provision and use of personal protective equipment (PPE);
- Implementation of dust suppression methods; and
- Implementation measures to avoid surface water ponding and the collection and disposal of the Site runoff.

6.47 Such measures should be carried out in accordance with the Protection of Workers and the General Public during the Development of Contaminated Land document and CIRIA Report 132: A Guide for Safe Working on Contaminated Sites **(Ref 6.4)**.

6.48 Other practical methods of limiting risks from hazardous materials and contaminated land would include:

- The storage of all potentially hazardous materials on hard surfaced areas, with bunding to the satisfaction of the Environment Agency;
- The storage of ground tank oil in accordance with the Control of Pollution (Oil Storage) (England) Regulations, 2001 (Ref 6.5); and
- The treatment of any excess dewatering effluent prior to discharging to the foul sewerage system and only on the achievement of an approved discharge consent from Southern Water.

Site Drainage and Effects on Water Resources

6.49 The assessment of the potential effects of the Development proposals on water resources is presented in Chapter 12: Water Quality, Hydrology and Flood Risk. In summary, a precautionary approach would be adopted to appropriately manage construction-derived surface water run-off. As such, particular care would be taken to prevent any release or mobilisation of pollutants, which could pose a potential risk to receptors such as surface water and groundwater.

6.50 Best practice pollution prevention measures would be put in place to isolate environmentally damaging substances and prevent their release. These measures would be agreed in consultation with the Environment Agency and Southern Water and would include:



-
- Secure, careful siting and bunding of fuel storage facilities and any areas used for the storage of potentially hazardous materials;
 - Use of drip trays when filling smaller containers from tanks or drums to avoid drips and spills;
 - Works involving concrete would be carefully controlled and ready-mix concrete wagons would be washed out in a safe designated area;
 - The avoidance of stockpiling materials wherever possible to prevent spills and, where undertaken, sheeting and covering these stockpiles and haulage vehicles loads;
 - Management of the Site drainage to prevent sediment laden contaminated runoff entering the wider environment;
 - Surface drainage would pass through settlement and oil interceptor facilities where required;
 - Provision for the treatment and safe disposal of wastewaters, including water from dewatering pumping operations should these be undertaken;
 - Appropriate management and transportation of the Site waste including the establishment of dedicated waste storage areas designed to prevent pollution, regular inspections and the implementation of waste minimisation and management plans as described above; and
 - Ensuring that any water which may have come into contact with contaminated material would be disposed of in accordance with the Water Resources Act (1991) and other legislation, to the satisfaction of the Environment Agency.

6.51 Furthermore, any piling systems would be designed to minimise the risk of potential pathways for contamination to reach groundwater resources.

6.52 An Emergency Plan would be implemented, forming part of the CEMP, outlining procedures to follow in the instance of any accidents involving spillages. This would involve the provision of on-site equipment for containing spillages, such as emergency booms and chemicals to soak up spillages. Should an incident occur, the Environment Agency would be contacted immediately.

Protection of Ecological Resources

6.53 An assessment of the potential effects of the Development on ecological resources is presented in Chapter 11: Ecology and Nature Conservation.



6.54 Chapter 11 details the measures that will be taken to mitigate effects from the Proposed Development can be broadly summarised as follows:

- Screening during construction;
- No trenches or excavations to be left open, though if unavoidable, exit ramps will be put in place;
- No night-time working or lighting during construction;
- Adherence to the EA's Pollution Prevention Guidance Notes;
- Careful timing of works; and
- Ecologically-informed lighting strategy for operational phase.

CUMULATIVE EFFECTS

6.55 Any cumulative effects during the construction phase are identified within Chapters 7-15 where relevant.

SUMMARY AND CONCLUSIONS

6.56 The construction effects of the Proposed Development would be managed through the development of a project and site-specific CEMP. The CEMP would be agreed with the Local Authority and other relevant bodies prior to the commencement of works which, as a minimum, would comply with the mitigation measures set out in this ES. The CEMP would outline methods for contractor and general public liaison, hours of work, methods to deal with complaints and outline management practices to control dust, traffic and access, waste, water pollution, ecological and archaeological effects, ensuring a high level of control throughout the construction works.

6.57 The procedures within the CEMP would ensure the delivery of a high level of environmental control throughout the construction phase, thereby minimising the potential for adverse effects. Further detail regarding specific mitigation during construction works for the Proposed Development is presented within Chapters 7 to 15 of this ES.



REFERENCES

Ref 6.1: HMSO (2011) The Waste (England and Wales) Regulations 2011

Ref 6.2: Office of the Deputy Prime Minister (2005) The Hazardous Waste (England and Wales) Regulations, SI 2005 No.894. HMSO, Norwich.

Ref 6.3: HMSO (2005) The List of Wastes (England) Regulations 2005

Ref 6.4: CIRIA (2002) CIRIA Report 132 Good Practice Guidance For The Management of Contaminated Land. Safe Working Practices on Contaminated Sites.

Ref 6.5: HMSO (2001) Control of Pollution (Oil Storage) (England) Regulations.



7 TRANSPORT

INTRODUCTION

7.1 This chapter assesses the likely significant effects of the Proposed Development in terms of transport. It is supported by **Appendix 7.1** (The Transport Assessment (TA))

7.2 The chapter describes: the assessment methodology; the baseline conditions currently existing at the Site and in the surrounding area; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; the likely residual effects after these measures have been employed; and the cumulative effects associated with the Proposed Development.

LEGISLATION, POLICY AND GUIDANCE

7.3 The assessment has been undertaken within the context of relevant planning policies and guidance documents. There is no legislation identified as being relevant to transport.

Planning Policy Context

National Planning Policy

The National Planning Policy Framework (NPPF)

7.4 The National Planning Policy Framework (NPPF) details the national policy for Transport. At the heart of the NPPF is a presumption in favour of sustainable development and is highlighted as *“the basis for every plan, and every decision.”*

7.5 Paragraph 29 states that the *“...transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel. However, the Government recognises that different policies and measures required in different communities and opportunities to maximise sustainable transport solutions will vary from urban to rural areas.”*

7.6 Paragraph 32 of the NPPF gives reference to Transport Assessments and the plans and decisions to be taken from them.



“All developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment. Plans and decisions should take account of whether:

- *the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site to reduce the need for major transport infrastructure;*
- *safe and suitable access to the site can be achieved for all the people; and*
- *improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.”*

7.7 Paragraph 34 states that *“Plans and decisions should ensure developments that generate significant movement are located where the need to travel will be minimised and the use of sustainable transport modes can be maximised...”*

Local Planning Policy

Medway Local Transport Plan 3 (LTP3)

7.8 Kent County Council’s Local Transport Plan provides a framework for transport policy within Kent. Its purpose is to set out the County Council’s current priorities for local transport investment for the period 2016-31.

7.9 MC’s current third Local Transport Plan (LTP3), which covers the period 2011-2026, sets out the key strategic policy for sustainable transport throughout Medway.

7.10 The LTP3 seeks to address wider social, economic and environmental challenges for the area. The ambition of the transport strategy, which is closely aligned to Medway’s Sustainable Communities Strategy, is to deliver transport interventions that contribute to five overarching priorities that focus on:

- “Supporting Medway’s regeneration, economic competitiveness and growth by securing a reliable and efficient local transport network;
- Supporting a healthier natural environment by contributing to tackling climate change and improving air quality;
- Ensuring Medway has good quality transport connections to key markets and major conurbations in Kent and London;



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- Supporting equality of opportunity to employment, education, goods and services for all residents in Medway; and
 - Supporting a safer, healthier and more secure community in Medway by promoting active lifestyles and by reducing the risk of death, injury or ill health or being the victim of crime.”

7.11 Section 3 of the LTP3 details Medway’s framework for delivery, which includes their long-term transport objectives spanning over the period of the plan. Each of these objectives has a specific focus and seeks to deliver improvements towards the plan’s priorities, together with contributing to other agendas of Medway Council and its partner organisations.

7.12 The key transport objectives for Medway and underlying principle of each objective as set out in the plan are provided below:

- Highway maintenance – “To undertake enhanced maintenance of the highway network in the most sustainable way practical.”
- Improving transport infrastructure capacity – “To respond to regeneration by efficiently and safely managing and improving Medway’s road network, including improving road freight movements through Medway.”
- Improving public transport -“To respond to the regeneration of Medway by encouraging travel by public transport including improving the quality, reliability, punctuality and efficiency of services.”
- Encouraging active travel and improving health -“To contribute to improving health by promoting and developing transport corridors that encourage personal movement and by improving air quality.”
- Improving travel safety -“To reduce casualties on Medway’s roads and to encourage changes to travel habits by the implementation of Safer Routes to School projects.”

7.13 Section 5 of LTP3 sets out the actions that are planned to deliver the above objectives and how the success of the plan will be measured. LTP3 states, “*to allow funding for large one-off projects to be effectively targeted during the 15-year period of the strategy, some interventions are prioritised for short, medium and long-term delivery*”. These delivery periods are defined as:

- Short term: April 2011 to March 2016
- Medium term: April 2016 to March 2021
- Long term: April 2021 to March 2026



7.14 The Medway Local plan 2003 was adopted in May 2003, replacing the Medway Towns Local Plan 1992 and Medway Local Plan Deposit Version 1999.

7.15 There are 23 policies related to transport enlisted as T1 to T23 which are contained within Chapter 8 of the Medway Local Plan 2003. The policies which are considered relevant to the site are outlined below.

7.16 Policy T1: Impact of Development; this policy states that development proposals will be permitted provided that;

- The highway network has adequate capacity to cater for the traffic generated from the development;
- The development will not significantly increase the risk of road traffic accidents;
- The development will not generate significant HGV movements on residential roads; and
- The development will not result in traffic movements at unsociable hours in residential roads.

7.17 Policy T2: Access to the Highway; this policy states that development proposals requiring formation of a new access, or an intensification in the use of an existing access will only be permitted where:

- The access is not detrimental to the safety of vehicle occupants, cyclists and pedestrians;
- or
- Can, alternatively, be improved to a standard acceptable to the council as Highway Authority.

7.18 Policy T3: Provision for Pedestrians; this policy states that development proposals shall provide attractive and safe pedestrian access which are accessible by people with disabilities, as well as, maintain or improve pedestrian routes related to the site.

7.19 Policy T4: Cycle Facilities; this policy states that development proposals should include cycle facilities related to the site.

7.20 Policy T6: Provision for Public Transport; this policy states, where of sufficient scale, new developments will be expected to make provision for access by public transport.



7.21 Policy T11: Development Funded Transport Improvements; this policy states legal agreements with development would be sought to secure off-site improvements to transport infrastructure, public transport services and improved accessibility by all modes of transport.

7.22 Policy T12: Traffic Management; this policy states road layouts within new developments will need to be designed with appropriate traffic management measures to help limit vehicle speeds and improve safety for all road users.

7.23 Policy T13: Vehicle Parking Standards; this policy states that development proposals will be expected to make vehicle parking provision in accordance with the adopted standard.

7.24 Policy T22: Provision for people with disabilities; this policy states that facilities to be used by public included within the development proposals should be suitable for people with disabilities.

Future Medway Local Plan

7.25 Medway's emerging Local Plan covering the period up to 2035 is currently being prepared and once finalised, will replace the 2003 Medway Local Plan. Further consultation on spatial options the outcome of which is dependant on a HIF bid is expected in summer 2019.

Guidance Documents

7.26 In producing this ES chapter, reference has been made to the following guidance documents:

- "Guidelines for the Environmental Assessment of Road Traffic" (Institute of Environmental Assessment (IEA), 1993); and
- "Assessment and Management of Environmental Effects" (Design Manual for Roads and Bridges, HA205/08 Volume 11, Section 2, Part 5, 2008)

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

7.27 Table 2.1 of the IEA guidelines sets out a checklist of "*environmental effects*" to be considered. Some of the items listed (namely, noise, vibration, visual impact, air pollution, dust and dirt, and ecological impacts) are covered in Chapters 9, 10, 8 and 11 respectively of the ES, and



so will not be included in this transport chapter. The following topic areas to be considered in this chapter include:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian amenity;
- Accidents and safety; and
- Hazardous loads.

7.28 It is not anticipated that the Cumulative Development requires transportation of dangerous or hazardous loads. Therefore, this topic has been scoped out.

7.29 Information to inform this chapter has been taken from the TA in **Appendix 7.1** which considers:

- The Cumulative Development in the context of current transport policy;
- Existing transport conditions in the vicinity of the Cumulative Development's Application Sites;
- The form of the Cumulative Development including all proposed access arrangements;
- The accessibility of the Cumulative Development by sustainable modes of travel and the identification of new, and any improvements to existing, sustainable facilities and services; and
- The traffic generation and impact upon the local highway network and the identification of mitigation measures.

Study Area

7.30 The extent of the study area reflects the scale of the Proposed Development and the occurrence of significant effects on the network. The IEA guidelines suggest that "*highway links where traffic flows will increase by more than 30%*" and "*any other specifically sensitive areas where traffic flows have increased by 10% or more*" should be included. Therefore, the study area covers the following junctions and links:

- Ham Lane/Lidsing Road
 - Lidsing Road/Hempstead Road
 - Hempstead Road/Chapel Lane;
-



-
- Chapel Lane/Hempstead Valley Drive
 - Hempstead Valley Drive/Sharsted Way
 - Sharsted Way/Hoath Way
 - Hoath Way/M2J4
 - Lidsing Road
 - Westfield Sole Road
 - Shawstead Road
 - Capstone Road

Methodology

7.31 For details of the full methodology of the assessment, reference should be made to the TA in **Appendix 7.1**. To summarise, the assessment adopted industry standard method of forecasting the trip generation and distribution of development generated trips. Many of the assumptions underpinning this assessment have been based on those used and accepted for the consented development, with updates where appropriate.

7.32 The assessment has been undertaken for the following scenarios:

- AM and PM Peak Hour, 2018 Base;
- AM and PM Peak Hour, 2023 Do-Minimum;
- AM and PM Peak Hour, 2023 With-Development.

Forecast Assumptions

7.33 It was agreed that a future year scenario of 2023 should be tested to allow for future growth in the area.

7.34 The assessment included the following committed development assumptions:



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- Outline planning permission (LPA Ref MC/14/2395) was granted in March 2017 for this same site, Land at Gibraltar Farm, for the construction of up to 450 dwellings following a Public Inquiry. Following a further application approved by Medway Council an extant permission exists for the development with access from North Dane Way. As access from this road connection cannot be achieved the current application with access from Ham Lane has been prepared proposes to replace the previously granted scheme. Therefore, although a committed development, given it is being replaced, the approved development has not been considered for the purpose of this TA.
 - An additional consented development has been considered within this TA at the Hempstead Valley Shopping Centre. Planning consent (LPA Ref MC/17/3484) was granted in April 2018 for the *'redevelopment of existing surface level car parks to provide for retail or retail and leisure development, construction of a car park deck, amendments to access routes, servicing and internal pedestrian and vehicular routes, public realm works and landscaping'*.
 - Due to the retail focus of the consented proposals, and following a review of the accompanying TA, the main traffic impacts of this scheme will likely occur during the weekend and therefore would not impact upon the assessments undertaken within this TA. The consented development would, however, result in some traffic impacts in the PM peak period and therefore the relevant development flows have been taken from the TA and incorporated into the forecast PM peak traffic impact assessment for the Gibraltar Farm proposals.

Limitations and Assumptions

7.35 The traffic flow assessment is based on the underlying assumptions which include:

- Trip generation calculations based on empirical evidence of sites in similar locations;
- Distribution of traffic based on journey to work data assuming the likely routes; and
- The extent of the modelled area, which only allows local and not wider, strategic reassignment.

Traffic Data Used Throughout the Environmental Assessment



7.36 The basis for all traffic data used in this ES, including noise and vibration assessment and air quality (Chapters 9 and 8), has been based on the same traffic data sets as the TA, albeit with appropriate factoring to the requirement parameters for the particular disciplines.

Impact Assessment and Significance Criteria

7.37 To arrive at a judgement on the significance of effects on transport, the assessment considers the relative importance of the receptors and how these are likely to be affected as described below. The impact assessment for the Proposed Development considers a comparison between the AM and PM Peak Hour, 2023 With-Development and the AM and PM Peak Hour, 2023 Do-Minimum scenarios. Both scenarios include growth and cumulative development assumptions (detailed later and in the TA – **Appendix 7.1**) – accordingly all assessment considered here is cumulative in nature and there is no separate cumulative impact section.

Ranking of Sensitivity/Value

7.38 The sensitivity of a receptor is based on the relative importance of the receptor or resource. The assessment has been carried out in accordance with the IEA guidance which highlights that it is useful to identify particular groups of people or locations which may be sensitive to change in traffic conditions. The guidance sets out the groups of people and special interests to be considered (described as receptors), which are included in Table 7.1.

Table 7.1: Receptor Classifications of Sensitivity

Value (sensitivity)	Receptors
Very High	Sensitive groups including children, elderly and disabled; sensitive locations e.g. hospitals, churches, schools and historical buildings
High	Locations where large groups of people gather such as shopping areas or tourist/visitor attraction
Medium	People walking; people cycling; sites of ecological/nature conservation value; people driving
Low	Open spaces; recreational sites; shopping areas
Negligible	No receptors

Assessment of Impact Magnitude



7.39 The magnitude of an impact is described as major, moderate, minor, negligible or no change. Impacts are either beneficial or adverse in nature. Such terms are relative to the receptor affected by the impact (i.e. a particular impact can result in a beneficial effect on one receptor and an adverse effect on another), and the criteria associated with them are summarised in Table 7.2.

Table 7.2: Magnitude of Impact and Typical Descriptors

Magnitude of Impact	Typical Criteria Descriptors
Major	<ul style="list-style-type: none">• Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).• Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).
Moderate	<ul style="list-style-type: none">• Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).• Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).
Minor	<ul style="list-style-type: none">• Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).• Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).
Negligible	<ul style="list-style-type: none">• Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).• Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).
No Change	<ul style="list-style-type: none">• No loss or alteration of characteristics, features or elements; no observable impact in either direction.

7.40 The assessment of impact magnitude is also in accordance with the IEA guidelines and considers the following topics.

Severance

7.41 Severance is used to describe “...a complex series of factors that separate people from places and other people”. This can occur due to difficulty crossing a heavily trafficked road or relate to minor traffic flows if they impede pedestrian access to essential facilities. Factors which have been considered in the assessment include road width, traffic flow and composition, traffic speeds, availability of crossing facilities and the number of movements that are likely to cross the affected route.

7.42 In accordance with the IEA guidelines the assessment uses a range of indicators including changes in traffic flows of 30%, 60% and 90% which are regarded as “slight”, “moderate” and



“substantial” changes in severance, respectively. Furthermore, consideration has been given to the local conditions such as whether crossing facilities are available and traffic signal settings.

Driver Delay

7.43 Traffic delays have been determined using the individual junction models prepared to assess the local highway network in the AM and PM Peak Hour, 2023 Do-Minimum and AM and PM Peak Hour, 2023 With-Development scenarios to give an estimate of increased vehicle delays (see **Appendix 7.1** for further details).

Pedestrian Delay

7.44 The assessment on pedestrian delay has been carried out using professional judgement in accordance with the IEA guidelines. The volume, composition or speed of traffic have the potential to affect the ability of people to cross roads. Increases in traffic levels are likely to lead to greater increases in delay; and the extent of the delay will be dependent on the level of pedestrian activity, visibility and general physical conditions of the Site.

Pedestrian Amenity

7.45 Pedestrian amenity is defined as “*the relative pleasantness of a journey*” and is affected by traffic flow, traffic composition, footway width and the pedestrian separation from traffic. The assessment of the impact magnitude relating to pedestrian amenity has been carried out in accordance with the IEA guidance which states that there would be an improvement to pedestrian amenity when traffic flow (or lorry component) is halved and detrimental effect if doubled.

Fear and Intimidation

7.46 Pedestrians’ fear and intimidation as a result of traffic is dependent on the volumes of traffic, the HGV composition, the proximity to people or the lack of protection (such as narrow footway widths). The assessment has taken into account the IEA guideline thresholds summarised in Table 7.3.

Table 7.3: Thresholds for Fear and Intimidation



Degree of hazard	Av 18 hour traffic flow (veh/hour)	Total 18 hour HGV flow	Av speed over 18 hr day (mph)
Extreme	1800+	3000+	20+
Great	1200-1800	2000-3000	15-20
Moderate	600-1200	1000-2000	10-15

Accidents and Safety

7.47 The assessment of impact magnitude relating to accidents and safety is based on consideration of the accident data acquired from Kent County Council/Medway Council which is contained in Appendix B of **Appendix 7.1**.

Assessment of Significance of Effect

7.48 The relative significance of an effect is largely a product of the value and sensitivity of the identified receptor and the magnitude and duration of the impact, but the assessment is moderated by professional judgement and takes into account the considerations described above. The significance of effect matrix is provided in Table 7.4. It is assumed for the purposes of this assessment that any effects of moderate significance or greater will be significant in EIA terms.

Table 7.4: Significance of Effect Matrix

		Magnitude of Impact (Degree of Change)				
		No Change	Negligible	Minor	Moderate	Major
Value Environmental (Sensitivity)	Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight



7.49 In the context of the Proposed Development, short to medium term (temporary) effects are generally considered to be those associated with the construction phase, and long term (permanent) effects are generally those associated with the operational phase.



BASELINE CONDITIONS

Local Highway Network

7.50 The following section describes the local highway network which is illustrated on Figure 3.1 in **Appendix 7.1**.

7.51 Whilst there have been no significant changes to the surrounding highway network since the previous planning application, the focus of this TA is the proposed relocation of the development site's access arrangements. The following section of the report will provide details of the local highway network in relation to the proposed site access. The local highway network is shown in Figure 3.2 of **Appendix 7.1**.

Ham Lane

7.52 Ham Lane is a lightly trafficked road which runs east to west along the northern boundary of the development site. The road connects to Lidsing Road/Capstone Road junction in the form of a simple priority junction to the east and continues to the north west as Shawstead Road eventually leading to North Dane Way.

7.53 The road is rural in character with hedgerows on the northern edge and grass verge to the southern edge along the majority of its length. There is no footway or street lighting provision.

Lidsing Road

7.54 Lidsing Road runs north-south to the east of the Site and has a varying carriageway width of approximately 5.5 – 6m. Similar to the majority of the roads in the area, there is no footway and street lighting provision.

7.55 To the south, the road continues approximately 7km to Maidstone through the village of Boxley. To the north, the road continues as Capstone Road towards Chatham town centre.

Hempstead Road

7.56 To the north eastern corner of the Site, Hempstead Road forms a staggered junction with Ham Lane and Lidsing Road.



7.57 Hempstead Road is approximately 6m wide and leads to Hempstead to the north. Approximately 500m north of the junction with Lidsing Road the road enters the residential area of Hempstead, providing access to a number of dwellings with private driveways, as well as a number of side roads, street lighting, and footways are present on both sides of the road.

North Dane Way

7.58 North Dane Way is a single carriageway road (i.e. one lane in each direction) which originates at the junction with Albermarle Road to the north western corner of the Site. It serves as a distributor road connecting Lordswood with Chatham (to the north). In the vicinity of the Site, North Dane Way is approximately 10m wide. It has grass verges on both sides.

7.59 The road is subject to the national speed limit of 60mph within the vicinity of the Site. Travelling approximately 1km to the north, the speed limit changes to 40mph.

7.60 North Dane Way continues past the junction with Albemarle Road as a cul-de-sac running along the western boundary of the Site. However, this section is closed to traffic at this junction. Therefore, all through traffic is required to turn right from North Dane Way into Albemarle Road (or left from Albemarle Road into North Dane Way).

Hoath Way (A278)

7.61 Hoath Way is a two-lane dual carriageway which connects the A2 to the north at Bowaters Roundabout and M2 Junction 4 to the south. This road is subject to a 50mph limit.

7.62 Hoath Way along its eastern edge has provision of shared footway and cycleway to the north starting at Sharsted Way / Hoath Way roundabout and segregated footway and cycleway north of Hoath Way roundabout leading to A2.

Strategic Highway Network

7.63 The M2 is a strategic trunk road, managed by Highways England (HE), which runs east-west to the south of the Site and across Kent connecting the A2 at either ends. The M2/A2 corridor leads to London to the west, and Dover to the east.



7.64 The development site can access the M2 using junction 4 to the east via Lidsing Road, Hempstead Road and Hoath Way. The Site can also access the M2 junction 3 to the west via Lidsing Road, Westfield Sole Road and Walderslade Woods (A2045).

Surveys

7.65 Manual junction turning counts and queue surveys were undertaken on 2nd October 2018 at the following junctions:

- Ham Lane/Capstone Road;
- Lidsing Rd/Hempstead Road;
- Hempstead Road/Chapel Lane; and
- Hempstead Valley Drive/Chapel Lane;
- Hempstead Valley Drive/Sharsted Way roundabout/The Rise

7.66 The traffic surveys recorded vehicle flows, turning movements and queue lengths in both the morning and evening peak periods.

7.67 In addition to the surveyed data above, traffic data from surveys in 2016 was obtained from MC which were used to inform a strategic transport model for the area. Output traffic flow data from the model was provided for the following:

- Hoath Way/Sharsted Way/Wigmore Road roundabout; and
- M2 Junction 4.

7.68 Figure 3.5 of **Appendix 7.1** illustrates the location of the surveyed junctions in relation to the Site.

Accident Analysis

7.69 An accident analysis of the study area has been undertaken, the details of which are provided in the TA in **Appendix 7.1**.



Existing Local and Wider Accessibility

Walking and Cycling

7.70 Walking and cycling have the potential to substitute short car trips, particularly those less than 1.6km (walk) and 5km (cycle) respectively and to form a part of a longer journey on public transport. As such, facilities catering for these are crucial to encourage shorter journeys to be undertaken by sustainable modes rather than the private car.

7.71 The Site is situated to the east of the residential settlement in Lordswood and to the south east of the residential settlement in Hempstead Valley. The majority of the residential roads in both of the settlements have well established pedestrian networks with footway provision along with street lighting on both sides of the carriageway, thereby, providing useful routes for pedestrians.

7.72 Figure 3.3 of **Appendix 7.1** illustrates the Public Rights of Ways (PROWs) available within the vicinity of the Site. As shown on the plan, there are two footpaths (RC27 and RC28) within the Site. Additionally, byway RC29 runs approximately east to west across the development site. This byway continues north to south along the western border of the Site. Footpath RC28 and byway RC29 continue beyond the KCC boundary where they are referred as KH34 and KH41 respectively.

7.73 In terms of cycling, there is off-road cycle routes provision within the vicinity of the Site. To the west, off-road cycle routes are available along all of North Dane Way and Albemarle Road and the majority of Lords Wood Lane as well as just off the north western boundary of the Site. Further to the east, off-road cycle routes are available to the north along Hoath Way from its junction with Sharsted Way and further north. These serve as useful cycle routes for commuters as they lead to Lordswood Industrial Estate to the south west and Gillingham Business Park to the north east.

Bus Services

7.74 The nearest bus stops to the development site are located in Albemarle Road and Clandon Road within approximately 400m from the western edge of the Site. The location of these bus stops relative to the Site are shown in Figure 3.4 of **Appendix 7.1**.

7.75 Bus services B150, 166 and 716/717 can be accessed using these bus stops. The frequency of these services is summarised in Table 7.5 below.



Table 7.5: Existing bus services and frequency

Route		Monday to Friday	Saturday	Sunday
B150	Princes Park –Walderslade Bluebell Hill – Maidstone	6 per day	6 per day	N/A
166	Lordswood – Walderslade – Chatham	Up to 7 per hour	Up to 5 per hour	Up to 2 per hour
716 /717	Darland – Luton – Lordswood – Walderslade – Bridgewood – London	3 services in both AM and PM	N/A	N/A
658	Lordswood – Walderslade – Rochester Grammar Schools	School service 1 in AM and PM	N/A	N/A
113	Wigmore – Chatham	8 per day	8 per day	N/A
116	Hempstead Valley – Gillingham - Chatham	2 per hour	2 per hour	N/A

Local Facilities

7.76 Planning guidance emphasises the integration of land use, transport and planning decisions. To ensure developments are sustainable, they should be accessible to local facilities, employment opportunities and public transport services.

7.77 Therefore, consideration has given to various local facilities including shops, education, employment and public transport that are available within easy walking and cycling distance from the Proposed Development site. Table 7.6 below provides a list of these facilities.

Table 7.6: List of facilities within the vicinity of the development site

	Facilities
Schools	Swingate Nursery and Infant School
	Swingate Primary School
	St Benedict's Primary School
	Lordswood School
	Kingfisher Primary School
	Maudene School
Health	Hempstead Medical Centre
	Lordswood Community Healthy Living Centre
Employment	Lordswood Industrial Estate
	Elm Court Industrial Estate
	Gillingham Business Park
Leisure	Lordswood Leisure Centre



	Lordswood Bowling Centre
	Lordswood Library
	Capstone Farm Country Park
	Chatham Snowsports Centre
Shopping	Kestrel Shopping Centre
	Morrisons Foodstore
	Hempstead Valley Shopping Centre
Public Transport	Nearest bus stops

7.78 In summary, as described in detail above, it is considered that the Site is within range of a wide variety of facilities within both walking and cycling distance. It is therefore conveniently located to encourage sustainable and active forms of travel; as well as providing access to public transport for longer journeys.

Summary of Sensitivity

7.79 The links and junctions within the study area have been considered as to which receptors may be present and if so the corresponding sensitivity. The sensitivity of the receptors are summarised in Table 7.7.

Table 7.7: Summary of Receptors Sensitivity

Resource/Receptor	Sensitivity
People walking along the adjacent carriageways and footways of Hempstead Road, Chapel Lane, Hempstead Valley Drive, Sharsted Way, Hoath Way.	Medium
People driving on Ham Lane, Shawstead Lane, Lidsing Road, Capstone Road, Hempstead Road, Chapel Lane, Hempstead Valley Drive Sharsted Way, Hoath Way, Westfield Sole Road.	Medium
People waiting at bus stops North Dane Way, Hempstead Road	Medium

Future Baseline

7.80 In the absence of the Proposed Development, the land uses within the Site could be developed in accordance with the consented scheme. However, for core purposes of this assessment it is assumed the Site would retained as existing and the highway network will continue to operate on a similar basis as the existing situation; albeit subjected to demand associated with forecast growth. The future baseline of 2023 (AM and PM Peak Hour, 2023Do-Minimum) has been used in the assessment of effects to provide a realistic assessment.



ASSESSMENT OF EFFECTS

7.81 The potential impacts and the significance of the effects on transport, are characterised in the absence of mitigation measures, beyond those identified and described previously as embedded into the Proposed Development, for the construction and operational phases of the Proposed Development. The following embedded mitigation measures are considered in this chapter:

- Implementation of the Construction Environmental Management Plan (CEMP) during construction (**Appendix 7.1**).

7.82 Impacts may be direct or indirect. The effects during construction are anticipated to be short to medium term duration (temporary) while effects during operation are anticipated to be of long term duration (permanent) unless otherwise stated.

7.83 Impacts are only considered in detail when there is a reasonable likelihood of an effect on a receptor of importance.

7.84 Further details on the Proposed Development and construction activities are provided in Chapter 6 and are therefore not reproduced in detail in this chapter.

Construction

7.85 During construction, vehicles accessing the Site will be a mixture of: specialist construction vehicles including cranes and bulldozers; HGV vehicles delivering or picking up materials to the Site (including excavated materials); and cars/LGVs associated with the workers at the Site. It is anticipated that the larger vehicles will be arriving/departing throughout the day and are unlikely to be during the peak hours. Traffic flows associated with the workers at the Site are likely to be concentrated at either end of the day (i.e. 08:00-18:00).

Severance

7.86 There will be no change to severance experienced by pedestrians during construction as the change in traffic flow on the road network within the study area will be minimal. Whilst there will be an increase in HGVs during the construction period, the numbers will be spread throughout the day and so the change in traffic composition is likely to result in a negligible magnitude of impact resulting in a temporary neutral or slight adverse cumulative effect.



Pedestrian Delay and Pedestrian Amenity

7.87 There will be a minimal number of extra vehicles and changes to traffic composition on the roads surrounding the Site during construction compared to the baseline. Therefore, the magnitude of impact associated with pedestrian delay and pedestrian amenity for people walking along the footways adjacent to the local roads and people waiting at bus stops will be negligible resulting in a temporary neutral or slight adverse cumulative effect.

Driver Delay

7.88 Additional traffic flows associated with the construction period are likely to be minimal. However, the area suffers from congestion and so even slight increases in traffic flow could have an adverse effect on driver delay in the congested times on the road network which is when the site workers may be arriving/departing. The HGV deliveries/collections are likely to be outside of the congested periods. Therefore, the magnitude of impact will be moderate resulting in a temporary moderate adverse cumulative effect for people driving on the local roads.

Fear and Intimidation

7.89 During construction, people walking along the footways or waiting at bus stops immediately adjacent to the Site access will experience a “great” hazard threshold for fear and intimidation. In addition, the people walking along the footways will experience a “great” hazard threshold for fear and intimidation. The hazard thresholds are the same as those in the AM and PM Peak Hour, 2031 Do-Minimum as the change in traffic flow on the road network within the study area will be minimal.

7.90 Therefore, the magnitude of impact will be no change resulting in a temporary neutral cumulative effect.

Accidents and Safety

7.91 During construction, there will be no change to accident safety risks on the external highway network as the change in traffic flow on the road network within the study area will be minimal. The magnitude of impact will be no change resulting in a temporary neutral cumulative effect.



Operational

Severance

7.92 During operation there will be an increase in traffic flows on road within the study area compared to the baseline “AM and PM Peak Hour, 2031 Do-Minimum” scenario. On this basis, the magnitude of impact for severance experienced by pedestrians crossing these roads will be moderate resulting in a permanent moderate adverse cumulative effect.

Pedestrian Delay

7.93 Given the increase in traffic flows across the network, there would be a resulting moderate impact and therefore a permanent moderate adverse cumulative effect for pedestrians or people waiting at bus stops adjacent to these roads.

Pedestrian Amenity

7.94 The increase in traffic flows on Ham Lane will exceed the “traffic flows doubling” threshold resulting in a detrimental effect to pedestrian amenity. This will result in an impact magnitude of moderate and therefore a permanent moderate adverse cumulative effect for people walking along the adjacent footways or waiting at bus stops on these roads. Elsewhere the increase is less than the scale necessary to impact on pedestrian amenity.

Driver Delay

7.95 This relates to the increase of traffic flows during the peak period during operation of the Proposed Development. On this basis, the magnitude of impact will be moderate resulting in a permanent moderate adverse cumulative effect for people driving on these roads.

Fear and Intimidation

7.96 During operation, there will be no change to the degree of hazard threshold when considering the average 18-hour traffic flow (vehicles/hour) across the network. Therefore, there will be no change to the impact magnitude experienced by people walking along the adjacent footways or waiting at bus stops on these roads resulting in a permanent neutral cumulative effect.



Accidents and Safety

7.97 The accident data considered for the highway network illustrates that there is no common causation factor attributed to the crashes that occurred and no accident blackspots identified. Therefore, the magnitude of impact will be no change resulting in a permanent neutral cumulative effect.

MITIGATION MEASURES

7.98 Through the mechanism of the Transport Assessment, a range of measures have been developed to mitigate the impact of the development. These are details in the TA and are summarised here.

Mitigation of Operational Severance, Pedestrian Delay and Amenity

7.99 The Proposed Development will deliver the following mitigation measures with respect to pedestrians:

- Enhanced ped/cycle facilities at the junction of North Dane Way and Albermale Road to improve crossing and links to the leisure centre; linking to:
- An enhanced footpath connection to the Site from North Dane Way; linking to:
- A new traffic free footpath/cycleway link across the development site, with priority crossing points; linking to:
- A new footway/cycleway like alongside Ham Lane to the east; linking to:
- A new crossing facility of Lidsing Road, with enhanced facilities on both sides of Lidsing Road;
- Improvements to the pedestrian facilities at the Chapel Lane, Hempstead Valley Drive junction.

7.100 These measures will result in the following changes to impact:

- Severance – Major Beneficial;



-
- Pedestrian Delay – Major Beneficial;
 - Pedestrian Amenity – Moderate Beneficial.

Mitigation of Operational Driver Delay

7.101 The proposed development includes the following mitigation measures directed to addressing impact on the traffic operation:

- Enhancement and realignment of Ham Lane;
- A new junction arrangement for the Ham Lane, Lidsing Road, Hempstead Road junction;
- Modifications to Chapel Lane, Hempstead Valley Drive;
- Mitigation to the Sharsted Way, Hoath Way junction;
- Enhancements to the Hoath Way, M2J4;
- Changes to the arrangement and enhancement of the Lidsing Road, Forge Lane junction.

7.102 These mitigation measures mitigate the impact of the development and lead to a permanent, moderate beneficial impact in driver delay when compared to the do-minimum scenario in 2023.

Residual Effects

7.103 Table 7.8 provides a summary of the residual effects resulting from the Proposed Development after effective implementation of the embedded mitigation measures proposed above.



Table 7.8: Residual Transport Effects

Development Phase	Receptor Affected	Residual Effects
Construction	Severance: All links for pedestrians crossing	Neutral or Slight Adverse
	Pedestrian Delay and Amenity: All links for people walking or waiting at bus stops	Neutral or Slight Adverse
	Driver Delay: people driving on all links	Moderate Adverse
	Fear and Intimidation: All links for people walking or waiting at bus stops	Neutral
	Accidents and Safety: All links for people walking or waiting at bus stops, and people driving	Neutral
Operation	Severance: pedestrians crossing.	Major Beneficial
	Pedestrian Delay: people walking along the footways adjacent network.	Major Beneficial
	Pedestrian Amenity: people walking along the footways or waiting at bus stops.	Moderate Beneficial
	Driver Delay: people driving on network	Moderate Beneficial
	Fear and Intimidation: people walking or waiting at bus stops	Neutral
	Accidents and Safety: All links for people walking, or waiting at bus stops, and people driving	Neutral



SUMMARY

7.104 The Site is well connected to the local and national highway network with access onto Hoath Way and thereafter the M2 via J4.

7.105 During construction of the Proposed Development there will be a temporary moderate adverse cumulative effect relating to driver delay for all receptors on all roads while there will be neutral to slight adverse cumulative effect to severance, pedestrian delay, and pedestrian amenity for all pedestrian receptors on all roads. There will also be a neutral cumulative effect on fear and intimidation for pedestrians crossing all roads, and accidents and safety for all receptors on all roads.

7.106 During operation of the Proposed Development there will be permanent moderate adverse cumulative effects and permanent moderate beneficial cumulative effects (for pedestrians crossing relating to severance; all pedestrian receptors relating to pedestrian delay and amenity; and people driving relating to driver delay. There will also be moderate to major beneficial cumulative effects (depending on the road considered), and neutral cumulative effects for all receptors in relation to accidents and safety.

7.107 Table 7.9 summarises the transport effects resulting from the Proposed Development.



Table 7.9: Summary of Transport Effects

Receptor/ Affected Group	Significance (value) of Receptor	Effect	Embedded Mitigation Measures	Magnitude/Spati al Extent/Duration/ Likelihood of Occurrence	Significance of Effect	Additional Mitigation	Residual Magnitud e of Impact	Significanc e of Residual Effect
Cumulative Effects - Construction								
Severance (all links) for people crossing; pedestrian delay and pedestrian amenity (all links) for people walking or people waiting at bus stops	Medium	Minimal increase in traffic flows and negligible increase in HGVs along local road network	Implementation of the CEMP	Negligible	Neutral or Slight Adverse	None	No change	Neutral or Slight Adverse
				Local				
				Temporary				
				Definitely				
Fear and Intimidation (all links) for people walking or people waiting at bus stops	Medium	Minimal increase in traffic flows and negligible increase in HGVs along local road network	Implementation of the CEMP	Negligible	Neutral	None	No change	Neutral
				Local				
				Temporary				
				Definitely				
Accidents and Safety (all links) for people walking or people waiting at bus stops, and people driving	Medium	No change	Implementation of the CEMP	No change	Neutral	None	No change	Neutral
				Local				
				Temporary				
				Definitely				
Driver Delay: people driving on all links	Medium	Minimal increase in traffic flows	Implementation of the CEMP	Moderate	Moderate Adverse	None	No change	Moderate Adverse
				Local				
				Temporary				



Receptor/ Affected Group	Significance (value) of Receptor	Effect	Embedded Mitigation Measures	Magnitude/Spati al Extent/Duration/ Likelihood of Occurrence	Significance of Effect	Additional Mitigation	Residual Magnitud e of Impact	Significanc e of Residual Effect
				Definitely				
Cumulative Effects – Operation								
Severance: people crossing local roads	Medium	Increase in traffic flows	Sustainable travel strategy	Moderate	Moderate Adverse	Improved pedestrian links	No change	Major Beneficial
				Local				
				Permanent				
				Likely				
Pedestrian Delay and Pedestrian Amenity: people walking or waiting at bus stops.	Medium	Increase in traffic flows	Sustainable travel strategy	Moderate	Moderate Adverse	Improved pedestrian links	No change	Major Beneficial
				Local				
				Permanent				
				Likely				
Driver Delay: people driving on local road network.	Medium	Increase in traffic flows	Sustainable travel strategy. Access strategy	Moderate	Moderate Adverse	Junction Improvement s	No change	Moderate Beneficial
				Local				
				Permanent				
				Likely				



Receptor/ Affected Group	Significance (value) of Receptor	Effect	Embedded Mitigation Measures	Magnitude/Spati al Extent/Duration/ Likelihood of Occurrence	Significance of Effect	Additional Mitigation	Residual Magnitud e of Impact	Significanc e of Residual Effect
Fear and Intimidation: people walking or waiting at bus stops	Medium	No change in 18 hour flow category range	Sustainable transport strategy	No change	Neutral	None	No change	Neutral
				Local				
				Permanent				
				Likely				
				Likely				
Accidents and Safety: All links for people walking or waiting at bus stops, and people driving	Medium	No change	Sustainable transport strategy	No change	Neutral	None	No change	Neutral



8 AIR QUALITY

INTRODUCTION

8.1 This chapter presents the findings of an assessment of local air quality effects associated with the Proposed Development.

8.2 The Proposed Development may introduce the following air quality effects;

- During the construction phase, suspended and re-suspended fugitive dust emissions from demolition / construction activities and vehicular emissions from construction traffic, including re-suspended dust from HGV movements.
- During the operational phase, vehicular emissions (primarily nitrogen dioxide (NO₂) and particulate matter (PM₁₀ and PM_{2.5}) from increased traffic movements associated with the Proposed Development.

8.3 The potential effects of the Proposed Development on local air quality during both construction and operational phases have been assessed. For both phases, the type, source and significance of potential effects are identified and the measures that should be employed to minimise these effects are described.

8.4 A glossary of common air quality terminology is provided in **Appendix 8.1**.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Scope of Assessment

8.5 The scope of the assessment has been determined in the following way:

- Review of air quality data for the area surrounding the Proposed Development and background pollutant maps; and
- Review of the traffic flow data, which has been used as an input to the air quality modelling assessment.



8.6 There is the potential for impacts on local air quality during both the construction and operational phases of the Proposed Development. During the construction phase, there is the potential for impacts to occur as a result of dust and PM₁₀ emissions. Guidance provided by the Institute of Air Quality Management (IAQM) (**Ref. 8.1**) includes the following criteria for assessing the effects of construction dust:

- A sensitive 'human receptor' within 350m of the Proposed Development site boundary or within 50m of the route used by construction vehicles on public highways up to 500m from the Site entrance; and /or
- A sensitive 'ecological receptor' within 50m of the Proposed Development site boundary or within 50m of the route used by construction vehicles on the public highway, up to 500m from the Site entrance.

8.7 There are several residential properties surrounding the Proposed Development. An assessment of construction phase impacts of dust and particulate matter has therefore been included in this assessment. There are no sensitive ecological receptors within 50m of the Site boundary or within 50m of the route used by construction vehicles up to 500m from the Site entrance, an assessment of the impact of the construction phase on sensitive ecological habitats has therefore not been considered further.

8.8 During the operation of the Proposed Development there is the potential for impacts on local air quality to occur as a result of emissions from road vehicle trips generated by the operation of the Proposed Development. Based on the Department for Transport (DfT) thresholds for transport assessments as set out in Appendix 2 of the Kent and Medway Air Quality Planning Guidance (**Ref. 8.2**) the Proposed Development is classed as a 'major' development (i.e. >50 residential units). Following a review of the Proposed Development against checklist 1 and checklist 2 set out within the Guidance it is concluded that an air quality assessment is required.

8.9 Guidance provided by the IAQM & Environmental Protection UK (EPUK) (**Ref. 8.3**) provides threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required. At locations outside an AQMA, a change in light duty vehicles (LDV) of more than 500 per day and / or a change in heavy duty vehicles (HDV) of more than 100 per day is considered to result in potentially significant impacts on air quality. At locations within or adjacent to an AQMA, a change in LDVs of more than 100 per day and / or a change in HDVs of more than 25 per day is considered potentially significant.



8.10 The Site does not fall within or near to an AQMA. Data provided by the transport consultants indicates that the proposed development will result in an increase in LDVs in excess of the threshold values for locations outside an AQMA on a number of road links in the vicinity. An assessment of impacts arising from vehicle emissions using the local roads has therefore been included in the assessment. Consideration has also been given to the suitability of the Site for its proposed use.

8.11 Traffic generated by the Development may result in an increase in local air pollution impacting air quality at nearby sensitive ecological receptors located adjacent to the local road network. The North Downs Woodlands SAC is located within 3km of the Site and within 200m of roads likely to have an increase in traffic as a result of the Proposed Development. However, since these roads are a considerable distance from the Site, it is concluded that the North Downs Woodlands SAC will not be affected by air quality issues associated with traffic movements from the Proposed Development. An assessment of the operational impacts of the Proposed Development on ecologically sensitive receptors has therefore been excluded from this Chapter. Potential impacts associated with ecology are assessed in Chapter 11.0 of this ES.

8.12 Details of the assessment methodology and the specific issues considered are provided below.

Construction Phase Methodology

Introduction

8.13 To assess the potential impacts associated with dust and PM₁₀ releases during the construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the Institute of Air Quality Management has been undertaken.

8.14 This approach divides construction activities into the following dust emission sources:

- demolition;
- earthworks;
- construction; and
- trackout.

8.15 The risk of dust effects (low, medium or high) is determined by the scale (magnitude) and nature of the works and the proximity of sensitive human and ecological receptors.

8.16 The IAQM guidance recommends that an assessment be undertaken where there are sensitive human receptors:



-
- within 350 m of the Proposed Development site boundary; or
 - within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Proposed Development site entrance(s).

8.17 An assessment should also be carried out where there are dust-sensitive ecological receptors:

- within 50 m of the Proposed Development site boundary;
- or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the entrance(s).

8.18 The significance of dust effects is based on professional judgement, taking into account the sensitivity of receptors and existing air quality.

Dust Emission Magnitude

8.19 The magnitude of the dust impacts for each source is classified as Small, Medium or Large depending on the scale of the proposed works. Table 8.1 summarises the IAQM criteria that may be used to determine the magnitude of the dust emission. These criteria are used in combination with site specific information and professional judgement.



Table 8.1: Dust Emission Magnitude Criteria

Source	Large	Medium	Small
Demolition	<ul style="list-style-type: none"> Total building volume >50,000m³ Potentially dusty material (e.g. concrete) Onsite crushing and screening Demolition activities >20m above ground level. 	<ul style="list-style-type: none"> Total building volume 20,000 - 50,000m³ Potentially dusty material Demolition activities 10 - 20m above ground level. 	<ul style="list-style-type: none"> Total building volume <20,000m³ Construction material with low potential for dust release Demolition activities <10m above ground level Demolition during wetter months
Earthworks	<ul style="list-style-type: none"> Total site area >10,000m² Potentially dusty soil type (e.g. clay) >10 heavy earth moving vehicles active at any one time Formation of bunds >8m in height Total material moved >100,000 tonnes 	<ul style="list-style-type: none"> Total site area 2,500 - 10,000m² Moderately dusty soil type (e.g. silt) 5 - 10 heavy earth moving vehicles active at any one time Formation of bunds 4 - 8m in height Total material moved 20,000 - 100,000 tonnes 	<ul style="list-style-type: none"> Total site area <2,500m² Soil type with large grain size (e.g. sand) <5 heavy earth moving vehicles active at any one time Formation of bunds <4m in height Total material moved <20,000 tonnes Earthworks during wetter months
Construction	<ul style="list-style-type: none"> Total building volume >100,000m³ On site concrete batching Sandblasting 	<ul style="list-style-type: none"> Total building volume 25,000 - 100,000m³ Potentially dusty construction material (e.g. concrete) On site concrete batching 	<ul style="list-style-type: none"> Total building volume <25,000m³ Material with low potential for dust release (e.g. metal cladding or timber)
Trackout	<ul style="list-style-type: none"> >50 HGV movements in any one day (a) Potentially dusty surface material (e.g. high clay content) Unpaved road length >100m 	<ul style="list-style-type: none"> 10 - 50 HGV movements in any one day (a) Moderately dusty surface material (e.g. silt) Unpaved road length 50 - 100m 	<ul style="list-style-type: none"> <10 HGV movements in any one day (a) Surface material with low potential for dust release Unpaved road length <50m
(a) HGV movements refer to outward trips (leaving the Site) by vehicles of over 3.5 tonnes.			

Receptor Sensitivity

8.20 Factors defining the sensitivity of a receptor are presented in Table 8.2.



Table 8.2: Factors Defining the Sensitivity of a Receptor

Sensitivity	Human (health)	Human (dust soiling)	Ecological
High	<ul style="list-style-type: none"> • Locations where members of the public are exposed over a time period relevant to the air quality objectives for PM₁₀ (a) • Examples include residential dwellings, hospitals, schools and residential care homes. 	<ul style="list-style-type: none"> • Regular exposure • High level of amenity expected. • Appearance, aesthetics or value of the property would be affected by dust soiling. • Examples include residential dwellings, museums, medium and long-term car parks and car showrooms. 	<ul style="list-style-type: none"> • Nationally or Internationally designated site with dust sensitive features (b) • Locations with vascular species (c)
Medium	<ul style="list-style-type: none"> • Locations where workers are exposed over a time period relevant to the air quality objectives for PM₁₀ (a) • Examples include office and shop workers (d) 	<ul style="list-style-type: none"> • Short-term exposure • Moderate level of amenity expected • Possible diminished appearance or aesthetics of property due to dust soiling • Examples include parks and places of work 	<ul style="list-style-type: none"> • Nationally designated site with dust sensitive features (b) • Nationally designated site with a particularly important plant species where dust sensitivity is unknown
Low	<ul style="list-style-type: none"> • Transient human exposure • Examples include public footpaths, playing fields, parks and shopping streets 	<ul style="list-style-type: none"> • Transient exposure • Enjoyment of amenity not expected. • Appearance and aesthetics of property unaffected • Examples include playing fields, farmland (e), footpaths, short-term car parks and roads 	<ul style="list-style-type: none"> • Locally designated site with dust sensitive features (b)
<p>(a) In the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day.</p> <p>(b) Ecosystems that are particularly sensitive to dust deposition include lichens and acid heathland (for alkaline dust, such as concrete).</p> <p>(c) Cheffing C. M. & Farrell L. (Editors) (2005), The Vascular Plant. Red Data List for Great Britain, Joint Nature Conservation Committee.</p> <p>(d) Does not include workers exposure to PM₁₀ as protection is covered by Health and Safety at Work legislation.</p> <p>(e) Except commercially sensitive horticulture.</p>			

8.21 The sensitivity of a receptor will also depend on a number of additional factors including any history of dust generating activities in the area, likely cumulative dust impacts from nearby construction sites, any pre-existing screening such as trees or buildings and the likely duration of the



impacts. In addition, the influence of the prevailing wind direction and local topography may be of relevance when determining the sensitivity of a receptor.

Area Sensitivity

8.22 The sensitivity of the *area* to dust soiling and health impacts is dependent on the number of receptors within each sensitivity class and their distance from the source. In addition, human health impacts are dependent on the existing PM₁₀ concentrations in the area. Tables 8.3, 8.4 and 8.5 summarise the criteria for determining the overall sensitivity of the area to dust soiling, health impacts and ecological impacts respectively.

Table 8.3: Sensitivity of the Area to Dust Soiling Effects on People and Property

Receptor Sensitivity	Number of Receptors	Distance from the source (a)			
		<20m	<50m	<100m	<350m
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.



Table 8.4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ (µg/m ³)	Number of Receptors	Distance from the source (a)				
			<20m	<50m	<100m	<200m	<350m
High	> 32	> 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32	> 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28	> 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	< 24	> 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	>32	> 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28-32	> 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	<28	-	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.



Table 8.5: Sensitivity of Area to Ecological Impacts

Sensitivity of Area	Distance from the Source	
	<20m	<50m
High	High Risk	Medium Risk
Medium	Medium Risk	Low Risk
Low	Low Risk	Low Risk

8.23 For each dust emission source (demolition, construction, earthworks and trackout), the worst-case area sensitivity is used in combination with the dust emission magnitude to determine the risk of dust impacts.

Risk of Dust Impacts

8.24 The risk of dust impacts prior to mitigation for each emission source is presented in Tables 8.6, 8.7 and 8.8.

Table 8.6: Risk of Dust Impacts – Demolition

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table 8.7: Risk of Dust Impacts – Earthworks and Construction

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible



Table 8.8: Risk of Dust Impacts - Trackout

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Mitigation and Significance

8.25 The IAQM guidance provides a range of mitigation measures which are dependent on the level of dust risk attributed to the Proposed Development. Site specific mitigation measures are also included where appropriate.

8.26 The IAQM assessment methodology recommends that significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity following the application of appropriate mitigation measures. For almost all construction activities, the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effects will normally be negligible.

Construction Traffic

8.27 Construction traffic will contribute to existing traffic levels on the surrounding road network. The greatest potential for impacts on air quality from traffic associated with this phase of the Proposed Development will be in the areas immediately adjacent to the principal means of access for construction traffic.

8.28 The number of vehicles associated with construction of the Proposed Development is not predicted to be significant.

Operational Phase Methodology

8.29 Air quality at the Proposed Development has been predicted using the ADMS Roads dispersion model (Version 4.1.1.0, January 2018). This is a commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

8.30 The ADMS Roads model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations



selected by the user. Meteorological data from Gravesend for the year 2017 has been used for the assessment.

8.31 The model has been used to predict road specific concentrations of oxides of nitrogen (NO_x) and Particulate Matter (PM₁₀ and PM_{2.5}) at selected receptors. The predicted concentrations of NO_x have been converted to NO₂ using the NO_x to NO₂ calculator available on the Defra air quality website (**Ref. 8.4**).

8.32 Traffic data for road links adjacent to the Proposed Development have been provided by the Transport Consultants for the project (Charles & Associates).

8.33 A summary of the traffic data used in the assessment can be found in **Appendix 8.2**. The data includes details of annual average daily traffic flows (AADT), vehicle speeds and percentage Heavy Duty Vehicles (HDV) for the assessment years considered. Low traffic speeds have been assigned to appropriate road links to account for congestion and queuing vehicles.

8.34 The following scenarios have been included in the assessment:

- 2017 – baseline traffic (for verification purposes);
- 2023 – baseline traffic, with committed developments (hereafter referred to as ‘without development’ scenario); and
- 2023 – baseline and development traffic (hereafter referred to as ‘with development’ scenario).

8.35 The emission factors released by Defra in November 2017, provided in the emissions factor toolkit EFT2017_8.0.1 have been used to predict traffic related emissions in 2017 and 2023 (the proposed opening year of the Proposed Development).

8.36 To predict local air quality, traffic emissions predicted by the model must be added to local background concentrations. Background concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5} have been taken from the 2015 Defra background maps (issued November 2017). The maps provide an estimate of background concentrations between 2015 and 2030. The data used for the modelling assessment are set out in Table 8.3.

8.37 Background concentrations for 2017 have been used to predict concentrations in 2023 assuming no change in future years. Again, this is considered to represent a worst-case prediction of future concentrations.



8.38 To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process aims to minimise modelling uncertainty and systematic error by correcting the modelled results by an adjustment factor to gain greater confidence in the final results. This process was undertaken using the methodology outlined in Chapter 7, Section 4 of LAQM.TG(16).

8.39 Traffic data for the model verification study was sourced from the Department for Transport traffic counts (**Ref. 8.5**). A verification factor of 3.07 was determined which indicates that the model is under-predicting in this area. This factor was applied to the modelled road-NO_x concentrations prior to conversion to annual mean NO₂ concentrations using the NO_x to NO₂ calculator. Further details of the determination of the verification factor are provided in **Appendix 8.3**.

8.40 Local roadside monitoring data was not available for concentrations of PM₁₀ and PM_{2.5}, the modelled pollutant road-contributions for PM₁₀ and PM_{2.5} were therefore adjusted using the verification factor obtained for NO_x as recommended in the guidance provided in LAQM.TG(16).

8.41 LAQM.TG(16) does not provide a method for the conversion of annual mean NO₂ concentrations to 1-hour mean NO₂ concentrations. However, research (**Ref. 8.6**) has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m³. Care has been taken to ensure that locations where the 1-hour mean objective is relevant are included in the assessment.

8.42 A quantitative assessment of air quality in the vicinity of the Proposed Development has been completed against the Air Quality Strategy objectives set out in **Appendix 8.4** for NO₂, PM₁₀ and PM_{2.5}.

Sensitive Receptors

8.43 LAQM.TG(16) describes in detail typical locations where consideration should be given to pollutants defined in the Regulations. Generally, the guidance suggests that all locations '*where members of the public are regularly present*' should be considered. At such locations, members of the public will be exposed to pollution over the time that they are present, and the most suitable averaging period of the pollutant needs to be used for assessment purposes.

8.44 For instance, on a footpath, where exposure will be transient (for the duration of passage along that path) comparison with short-term standard (i.e. 15-minute mean or 1-hour mean) may be relevant. For private dwellings, however; where exposure may be for longer periods, comparison with long-term (such as 24-hour mean or annual mean) standards may be most appropriate. In



general terms, concentrations associated with long-term standards are lower than short-term standards owing to the chronic health effects associated with exposure to low level pollution for longer periods of time.

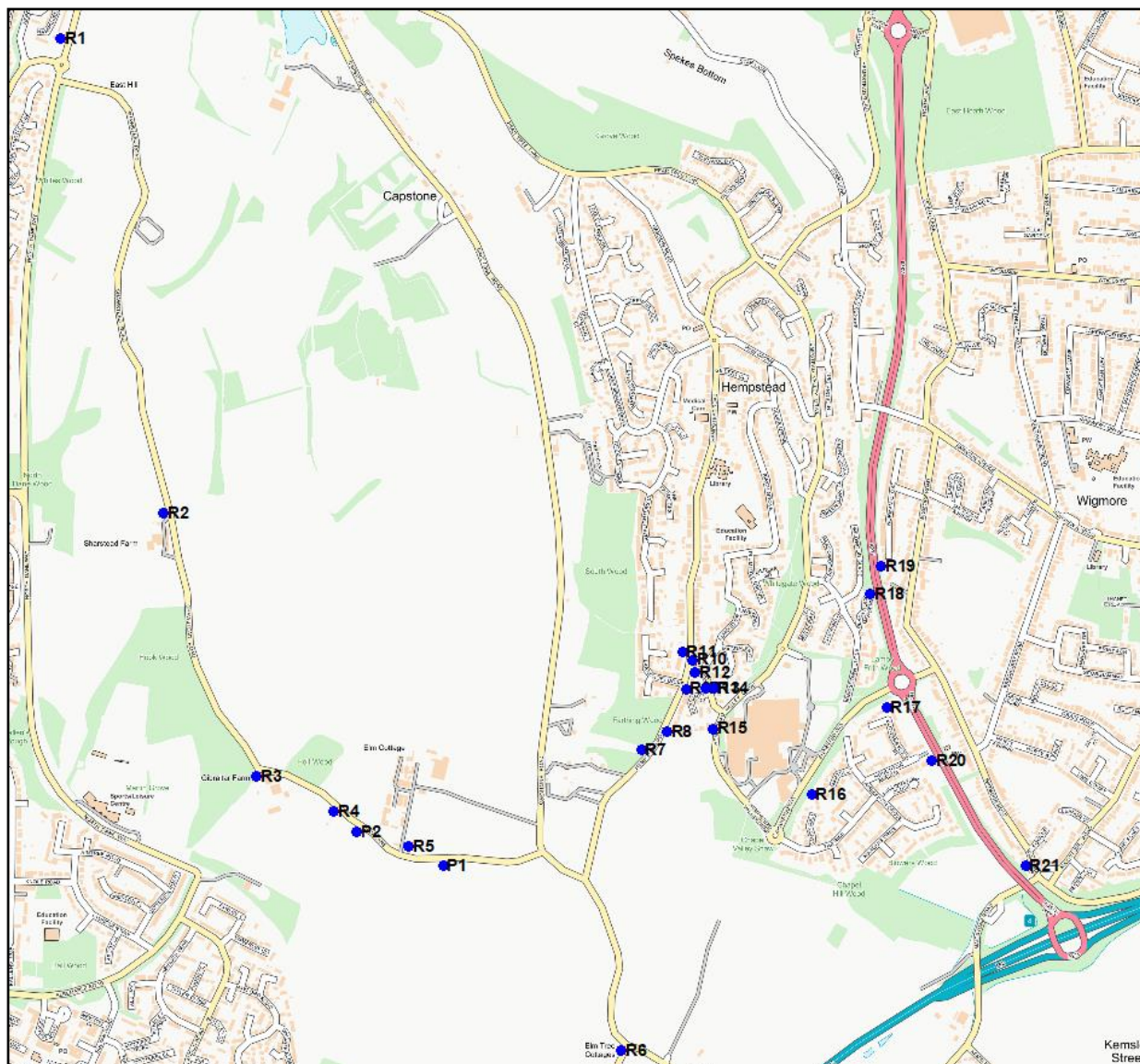
8.45 To assess the impact of traffic generated by the Proposed Development pollutant concentrations have been predicted at 21 existing sensitive residential receptors close to the roads affected by traffic generated by the Proposed Development. There are no sensitive ecological habitats within the vicinity of the Proposed Development or the roads likely to be affected by the Proposed Development. The modelling assessment also predicted concentrations at two at the facades of the Proposed Development. Details of these sensitive receptors are presented in Table 8.9 and the locations are illustrated in Figure 8.1.



Table 8.9: Location of Sensitive Receptors

ID	Receptor	Type	Easting	Northing
R1	Hampshire Close	Residential	577313.1	165355.5
R2	Shawstead Road	Residential	577599.2	164031.8
R3	Shawstead Road	Residential	577860.0	163295.0
R4	Ham Lane	Residential	578076.0	163196.7
R5	Elms Court	Residential	578283.8	163101.1
R6	Lidsing Road	Residential	578877.3	162529.5
R7	Hempstead Road	Residential	578933.1	163370.5
R8	Hempstead Road	Residential	579004.8	163420.1
R9	Hempstead Road	Residential	579058.5	163540.2
R10	Hempstead Road	Residential	579076.7	163621.0
R11	Hempstead Road	Residential	579048.6	163643.2
R12	Chapel Lane	Residential	579084.4	163585.4
R13	Clermont Close	Residential	579112.4	163542.7
R14	Chapel Lane	Residential	579136.1	163541.3
R15	Clermont Close	Residential	579133.1	163428.8
R16	Sandy Dell	Residential	579408.9	163243.9
R17	Blowers Wood Grove	Residential	579618.5	163488.7
R18	Black Rock Gardens	Residential	579571.8	163804.5
R19	Norman Close	Residential	579603.3	163883.6
R20	Houghton Avenue	Residential	579743.9	163340.0
R21	Wigmore Road	Residential	580006.4	163046.8
P1	Façade of the Proposed Development	Proposed	579390.0	163046.9
P2	Façade of the Proposed Development	Proposed	578137.8	163139.4

Figure 8.1: Location of Receptors Considered within ADMS Model



Significance Criteria

8.46 The significance of the predicted impacts has been determined using the guidance set out within the Kent and Medway Air Quality Planning Guidance. In the first instance the change in pollutant concentrations as a result of the development is calculated as a percentage of the relevant objective limit. The impact is then classified according to the criteria set out in Table 8.10 below.

8.47 Following classification of the impacts the guidance recommends the actions set out in Table 8.11 based on the identified impact.



Table 8.10: Classification of impacts due to changes in pollutant concentrations

Classification of Impact	Concentration change due to development	Or if development contribution causes
Very High	Increase >10%	Breach of air quality objective
High	Increase 5-10%	Exposure to be within 5% of Objective
Medium	Increase 1-5%	Exposure to be within 10% of Objective
Low/Imperceptible	Increase <1%	-

Table 8.11: Recommended Planning Requirements

Magnitude of change in air quality	Likely requirements	Likely Outcomes
Very High	Require mitigation to remove very high air quality impacts. If impact of development on air quality is still very high – strong presumption for recommendation of refusal on air quality grounds	Recommend Refusal
High	Recommend refusal unless appropriate on-site mitigation measures implemented to the satisfaction of the planning authority. Mitigations to include reducing exposure through various measures, emissions reduction technologies and/or development redesign	Refusal, unless recommended mitigation is implemented.
Medium	Seek mitigation to reduce air quality impacts. Mitigations to include reducing exposure through various measures, emissions reduction technologies and/or development redesign	Ensure on-site mitigation options are implemented.
Low/Imperceptible	Recommend the minimum mitigation for development scheme type	Recommend minimum mitigation

8.48 The EPUK & IAQM planning guidance also provides criteria for determining the significance of a development. These criteria are provided below for comparison.

8.49 The EPUK & IAQM guidance recommends that the impact at individual receptors is described by expressing the magnitude of incremental change in pollution concentration as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion as summarised in Table 8.12.



Table 8.12: Impact Descriptors for Individual Receptors.

Long Term Average Concentration at Receptor in Assessment Year	% Change in concentration relative to AQAL (a)			
	1	2-5	5-10	>10
75% or less of AQAL	Negligible	Negligible	Slight adverse	Moderate adverse
76-94% of AQAL	Negligible	Slight adverse	Moderate adverse	Moderate adverse
95-102% of AQAL	Slight adverse	Moderate adverse	Moderate adverse	Substantial adverse
103-109% of AQAL	Moderate adverse	Moderate adverse	Substantial adverse	Substantial adverse
110% or more of AQAL	Moderate adverse	Substantial adverse	Substantial adverse	Substantial adverse
(a) A change in concentration of less than 0.5% of the AQAL is considered insignificant, however changes between 0.5% and 1% are rounded up to 1%.				

8.50 The EPUK/IAQM guidance notes that the criteria in Table 8.12 should be used to describe impacts at individual receptors and should be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The EPUK/IAQM guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- The existing and future air quality in the absence of the Proposed Development;
- 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.



LEGISLATION, PLANNING POLICY AND GUIDANCE

Air Quality Strategy for England, Scotland, Wales & Northern Ireland

8.51 The Government's policy on air quality within the UK is set out in the Air Quality Strategy (AQS) for England, Scotland, Wales and Northern Ireland (AQS) published in July 2007 (**Ref. 8.7**), pursuant to the requirements of Part IV of the Environment Act 1995. The AQS sets out a framework for reducing hazards to health from air pollution and ensuring that international commitments are met in the UK. The AQS is designed to be an evolving process that is monitored and regularly reviewed.

8.52 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are benzene (C₆H₆), 1,3-butadiene (C₄H₆), carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), particulate matter (PM₁₀, PM_{2.5}), sulphur dioxide (SO₂), ozone (O₃) and polycyclic aromatic hydrocarbons (PAHs).

8.53 The air quality standards are long-term benchmarks for ambient pollutant concentrations which represent negligible or zero risk to health, based on medical and scientific evidence reviewed by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). These are general concentration limits, above which sensitive members of the public (e.g. children, the elderly and the unwell) might experience adverse health effects.

8.54 The air quality objectives are medium-term policy-based targets set by the Government which take into account economic efficiency, practicability, technical feasibility and timescale. Some objectives are equal to the EPAQS recommended standards or WHO guideline limits, whereas others involve a margin of tolerance, i.e. a limited number of permitted exceedances of the standard over a given period.

8.55 For some pollutants, there is both a long-term (annual mean) standard and a short-term standard. In the case of nitrogen dioxide (NO₂), the short-term standard is for a 1-hour averaging period, whereas for fine particulates (PM₁₀) it is for a 24-hour averaging period. These periods reflect the varying impacts on health of differing exposures to pollutants (e.g. temporary exposure on the pavement adjacent to a busy road, compared with the exposure of residential properties adjacent to a road).

8.56 The AQS also contains a framework for considering the effects of a finer group of particles known as 'PM_{2.5}'. Local Authorities are required to work towards reducing emissions / concentrations of PM_{2.5}, but there is currently no statutory objective incorporated into UK law at this time.



8.57 The AQS objective levels relevant to this assessment are set presented in **Appendix 8.4**.

Local Air Quality Management (LAQM)

8.58 Part IV of the Environment Act 1995 also requires local authorities to periodically Review and Assess the quality of air within their administrative area. The Reviews have to consider the present and future air quality and whether any air quality objectives prescribed in Regulations are being achieved or are likely to be achieved in the future.

8.59 Where any of the prescribed air quality objectives are not likely to be achieved the authority concerned must designate that part an Air Quality Management Area (AQMA).

8.60 For each AQMA, the local authority has a duty to draw up an Air Quality Action Plan (AQAP) setting out the measures the authority intends to introduce to deliver improvements in local air quality in pursuit of the air quality objectives. Local authorities are not statutorily obliged to meet the objectives, but they must show that they are working towards them.

8.61 The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work (**Ref. 8.8**). This guidance, referred to in this chapter as LAQM.TG(16), has been used where appropriate in the assessment.

National Planning Policy Framework

8.62 The National Planning Policy Framework (NPPF) (**Ref. 8.9**) sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the NPPF with the objective of contributing to the achievement of sustainable development.

8.63 The NPPF states that the planning system has three overarching objectives in achieving sustainable development including a requirement to *'contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.'*

8.64 Under Section 15: Conserving and Enhancing the Natural Environment, the NPPF (paragraph 170) requires that *'planning policies and decisions should contribute to and enhance the natural 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 or land instability. Development should, wherever possible help to improve local environmental conditions such as air and water quality.'

8.65 In dealing specifically with air quality the NPPF (paragraph 181) states 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. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan.'*

8.66 Paragraph 183 states that *'the focus of planning policies and decisions should be on 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 assume that these regimes will operate effectively.'*

Medway Local Plan

8.67 The Medway Local Plan (**Ref. 8.10**) was adopted in May 2003. The following policy relevant to air pollution and the Proposed Development are contained within this document:

Policy BNE2 – Air Quality, which states

'Development likely to result in airborne emissions should provide a full and detailed assessment of the likely impact of these emissions. Development will not be permitted when it is considered that unacceptable effects will be imposed on the health, amenity or natural environment of the surrounding area, taking into account the cumulative effects of other proposed or existing sources of air pollution in the vicinity..'

Control of Dust and Particulates associated with Construction

8.68 Section 79 of the *Environmental Protection Act (1990)* provides the following definitions of statutory nuisance relevant to dust and particles:



-
- 'Any dust or other effluvia arising on industrial, trade or business premises and being prejudicial to health or a nuisance', and
 - 'any accumulation or deposit which is prejudicial to health or a nuisance'.

8.69 Following this, Section 80 states that where a statutory nuisance is shown to exist, the local authority must serve an abatement notice. Failure to comply with an abatement notice is an offence and if necessary, the local authority may abate the nuisance and recover expenses.

8.70 In the context of the Proposed Development, the main potential for nuisance of this nature will arise during the construction phase – potential sources being the clearance, earthworks, construction and landscaping processes.

8.71 There are no statutory limit values for dust deposition above which 'nuisance' is deemed to exist – 'nuisance' is a subjective concept and its perception is highly dependent upon the existing conditions and the change which has occurred. However, research has been undertaken by a number of parties to determine community responses to such impacts and correlate these to dust deposition rates.

EPUK & IAQM Land Use Planning and Development Control

8.72 Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) published the Land Use Planning and Development Control Air Quality guidance in January 2017 (**Ref. 8.11**) to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

8.73 The main focus of the guidance is to ensure all developments apply good practice principles to ensure emissions and exposure are kept to a minimum. It also sets out criteria for identifying when a more detailed assessment of operational impacts is required, guidance on undertaking detailed assessments and criteria for assigning the significance of any identified impacts.

8.74 This guidance has been used within this assessment.

Assessment of Dust from Demolition and Construction

8.75 The IAQM published guidance in 2014 on the assessment of emissions from demolition and construction activities. The guidance sets out an approach to identifying the risk of impacts occurring at nearby sensitive receptors from dust generated during the construction process and sets out recommended mitigation measures based on the identified risk.



8.76 This guidance has been used within this assessment.

Kent & Medway Air Quality Partnership Planning Guidance

8.77 The Kent & Medway Partnership Planning Guidance provides a methodology for assessing the air quality impacts of proposed developments in the Kent and Medway area. This guidance has been used within this assessment.



BASELINE CONDITIONS

Medway Council Review and Assessment of Air Quality

8.78 MC has carried out detailed assessments of air quality in the area and as a result has declared four AQMAs within the Medway area. All four are due to potential exceedences of the AQS objectives for annual mean NO₂ concentrations. The Site is not located within or near an AQMA. The closest AQMA to the Proposed Development is Central Medway AQMA which is declared for a number of roads in the Central Medway area and is located approximately 3.2km to the northwest of the Site.

Automatic Local Monitoring Data

8.79 MC operates two automatic monitoring sites, the closest is a roadside site located approximately 3.8km to the northwest of the Proposed Development. The other automatic monitor is a rural background site located 14km to the northeast of the Proposed Development. Bias adjusted data obtained from both monitoring stations is presented in Tables 8.13 and 8.14.

Table 8.13: NO₂ Concentrations recorded at the nearest Continuous Automatic Monitors

Monitoring Site	Statistic	2013	2014	2015	2016	2017
Chatham	Annual Mean (µg/m ³)	25.0	24.8	23.5	25.7	25.4
	Number of 1-hour means > 200 µg/m ³	0	0	0	0	0
Rochester Stoke	Annual Mean (µg/m ³)	14.0	14.1	13.0	13.3	14.7
	Number of 1-hour means > 200 µg/m ³	0	0	0	0	0

Data obtained from MC Air Quality Annual Status Report for 2018

8.80 Exceedences of the AQS objective for annual mean NO₂ concentrations have not been experienced at the Chatham monitor throughout the five-year period presented, despite being located at a roadside location within an AQMA. No exceedences were recorded at the background site.

8.81 Exceedences of the hourly objective have not been recorded during the five years of the monitoring presented, therefore the objective was met in all five monitoring years.

8.82 Based on the data recorded at these sites, NO₂ concentrations are expected to meet the annual mean and hourly mean objectives at the Proposed Development.



Table 8.14: PM₁₀ Concentrations recorded at the nearest Continuous Automatic Monitors

Monitoring Site	Statistic	2013	2014	2015	2016	2017
Chatham	Annual Mean (µg/m ³)	23.0	21.4	18.5	19.1	21.6
	Number of 24-hour means > 50 µg/m ³	10	15	4	3	7
Rochester Stoke	Annual Mean (µg/m ³)	18.0	17.6	14.6	15.8	16.6
	Number of 24-hour means > 50 µg/m ³	3	8	2	4	4
Data obtained from MC Air Quality Annual Status Report for 2018						

8.83 Annual mean PM₁₀ concentrations recorded have been consistently below the 40 µg/m³ objective since 2013.

8.84 Exceedences of the 24-hour objective have been recorded at both monitoring stations during the five years of the monitoring presented, however the objective allows for 35 exceedences of the 50 µg/m³ limit in any given year therefore the objective was met in all five monitoring years.

8.85 Based on the data recorded at these sites, PM₁₀ concentrations are expected to meet the annual mean and 24-hour objectives at the Proposed Development.

Non-Automatic Monitoring

8.86 NO₂ diffusion tube monitoring is also carried out at 34 locations in the Medway area. However, none of these tubes are located in the vicinity of the Proposed Development. However, Maidstone Borough Council (MBC) undertakes diffusion tube monitoring relatively close the Proposed Development. Data from these monitoring sites are presented in Table 8.15 below.

Table 8.15: NO₂ Concentrations recorded at the nearest Diffusion Tube Monitors

Monitoring Site	Type	Distance to Kerb	2016	2017
Maid99 – Forge Lane	Roadside	1	52.8	-
Maid100 – Harp Farm Road	Roadside	1	56.9	-
Maid105 – Near Harp Farm Rd, Westfield Sole, Maidstone	Roadside	19	32.9	30.9
Maid114 – Speed sign on West side of road bridge over M2 (at Blind Lane end)	Roadside	15	-	29.7

8.87 Limited data is available from these monitoring sites. At Maid105 and Maid114 diffusion tube sites, the AQS objective for annual mean NO₂ concentrations has been met. At Maid99 and Maid100,



which are located in close proximity to the M2, concentrations are exceeding of the objective level in 2016.

Defra Background Maps

8.88 Additional information on background concentrations in the vicinity of the Proposed Development have been obtained from the Defra background pollutant maps. The average pollutant concentrations from the grid squares representing the assessment area have been extracted from the maps which include the modelled receptors and road links included in the modelling assessment.

8.89 The Proposed Development site lies within the following grid squares: 577500, 163500; 578500, 162500; 578500, 163500.

8.90 Separate background concentrations have been obtained for the grid squares representing the monitoring sites used in the verification of the modelling.

8.91 The 2015 Defra background maps, which provide estimated background concentrations between 2015 and 2030, have been used to obtain concentrations for 2017. The data is set out in Table 8.16.

Table 8.16: Estimated Annual Mean Background Concentrations from Defra Maps ($\mu\text{g}/\text{m}^3$)

Grid Square	Receptor	NO ₂	PM ₁₀	PM _{2.5}
577500, 165500	R1	13.5	14.5	10.0
577500, 164500	R2	12.7	14.3	9.8
577500, 163500	R3	13.0	14.5	9.9
578500, 163500	R4, R5, R6, R7	12.7	14.7	10.0
579500, 163500	R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20	14.9	14.6	10.0
580500, 163500	R21	16.2	15.6	10.5
577500, 161500	Maid105	19.3	16.5	11.1

8.92 The background concentrations obtained from the Defra background maps for NO₂ and PM₁₀ shows reasonable correlation with the concentrations measured at the background monitoring site.



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Construction Phase

Area Sensitivity

8.93 The application site is currently occupied by open fields, therefore there are no buildings requiring demolition at the Site. An assessment of dust effects associated with demolition have not therefore been included within this assessment.

8.94 The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the Proposed Development site boundary. A summary of the receptor and area sensitivity to health and dust soiling impacts is presented in Table 8.17.

Table 8.17: Sensitivity of Receptors and the Local Area to Dust and PM₁₀ Impacts

Receptor	Distance from Site Boundary (m)	Approx. Number of Receptors	Sensitivity to Health Impacts (a)		Sensitivity to Dust Soiling Impacts	
			Receptor	Area	Receptor	Area
Residential Properties	<20 m	1-10	High	Low	High	Medium
	<50 m	10-100	High	Low	High	Medium
Overall Sensitivity of the Area			Low		High	
(a) Estimated background PM ₁₀ concentration is 14.7 µg/m ³ .						

8.95 The route of the construction traffic is assumed to be Ham Lane. As the Proposed Development site is large in size, the sensitivity of the area to impacts arising from track-out is considered within a distance of 500m from the Proposed Development site entrance. There are relatively few sensitive receptors along the roads within this distance, therefore the sensitivity of the area to impacts from trackout is considered to be medium for dust impacts and low for human health impacts.

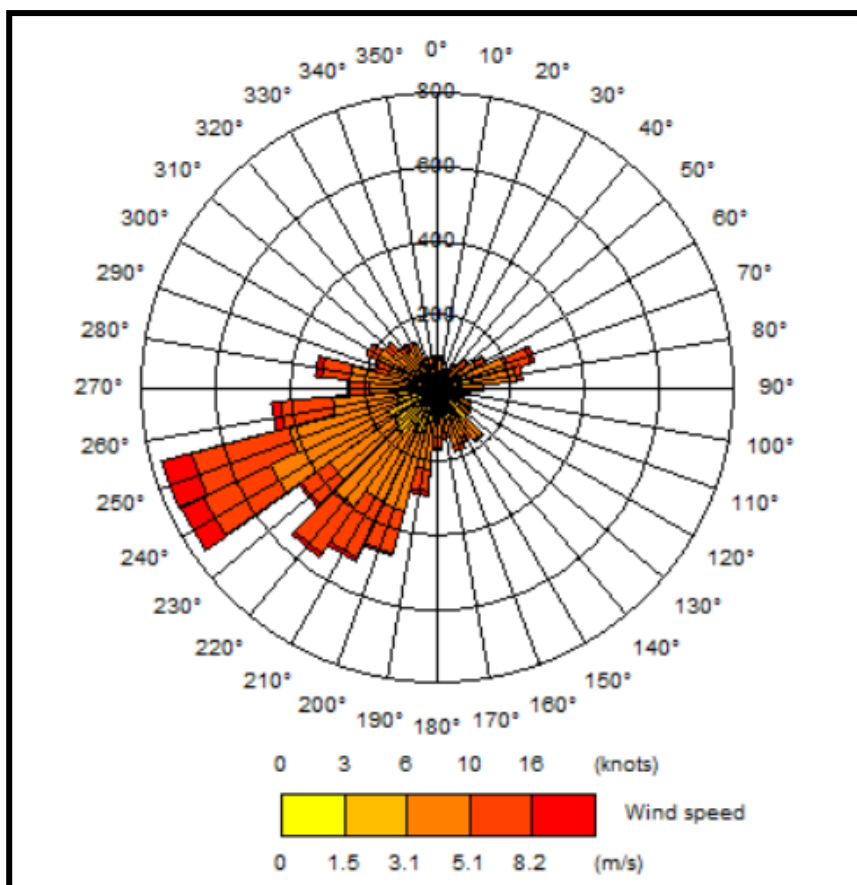
8.96 There are no dust-sensitive habitat sites within 500m of the Proposed Development nor within 50m of the route used by construction vehicles, therefore the impact of dust and particulate matter emissions on ecologically sensitive receptors has not been considered further in this assessment.

8.97 The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited will depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may

intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

8.98 A wind rose from Gravesend is provided in Figure 8.2, which shows that the prevailing wind is from the southwest, therefore receptors to the northeast of the Proposed Development are the most likely to experience dust impacts from the Proposed Development. There are two sensitive residential receptors to the northeast of the Proposed Development.

Figure 8.2: Wind Rose for Gravesend Meteorological Station (2017)



Dust Emission Magnitude

8.99 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling of the Site and landscaping. Given the size of the Site, the magnitude of the dust emission for the earthworks phase is considered to be *large*.

8.100 Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of build. Based on the overall size of the Proposed Development and the construction materials, the dust emission magnitude is considered to be *large*.



8.101 Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration. Construction traffic will likely access the Proposed Development site via Ham Lane. Based on the likely movements per day, dust emission magnitude due to trackout is considered to be *medium*.

Dust Risk Effects

8.102 A summary of the potential risk of dust impacts, based on the low overall sensitivity of the area to human health impacts and medium overall sensitivity to dust soiling impacts, is presented in Table 8.18.

Table 8.18: Risk of Dust Impacts Prior to Mitigation

Source	Impact Magnitude	Human Health Risk	Dust Soiling Risk
Earthworks	Large	Low	Medium
Construction	Large	Low	Medium
Trackout	Medium	Low	Low

Operational Phase

NO₂ Concentrations

8.103 Annual mean NO₂ concentrations predicted at the selected receptor locations are set out in Table 8.18. The concentrations include the estimated 2017 background NO₂ concentrations as indicated in Table 8.16.

Table 8.19: Predicted Annual Mean Nitrogen Dioxide Concentrations at Selected Receptors (µg/m³)

Receptor Number	2023 Without Development	2023 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R1	18.7	18.7	0.1	Low / Imperceptible
R2	13.0	13.1	0.1	Low / Imperceptible
R3	13.2	13.2	0.1	Low / Imperceptible
R4	13.0	13.1	0.2	Low / Imperceptible
R5	13.0	13.7	1.5	Medium
R6	16.9	17.1	0.5	Low / Imperceptible
R7	14.7	15.0	0.9	Low / Imperceptible
R8	18.6	19.2	1.6	Medium
R9	19.4	20.1	1.9	Medium



Receptor Number	2023 Without Development	2023 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R10	19.5	20.0	1.3	Medium
R11	16.7	16.9	0.5	Low / Imperceptible
R12	19.0	19.6	1.6	Medium
R13	18.1	18.5	1.2	Medium
R14	19.0	19.6	1.6	Medium
R15	18.1	18.5	1.0	Medium
R16	17.3	17.5	0.4	Low / Imperceptible
R17	19.0	19.2	0.4	Low / Imperceptible
R18	18.9	19.0	0.1	Low / Imperceptible
R19	23.5	23.6	0.1	Low / Imperceptible
R20	21.3	21.5	0.4	Low / Imperceptible
R21	25.1	25.3	0.5	Low / Imperceptible
P1	-	13.4	-	-
P2	-	13.2	-	-

8.104 The results of the modelling indicate that in the opening year of 2023, the AQS objective level for annual mean NO₂ concentrations will be met at all of the receptor locations included within the assessment.

8.105 The greatest increase as a result of emissions from the traffic generated by the Proposed Development is 0.7 µg/m³ which equates to 1.9% of the AQAL. According to the Kent and Medway Air Quality Partnership Air Quality Planning Guidance criteria set out in Table 8.10, the impact of the Proposed Development on local air quality with regard to annual mean NO₂ concentrations is considered to be *medium* at eight of the selected receptors and *low / imperceptible* at the remaining receptors.

8.106 The EPUK & IAQM guidance also provides guidance for determining the significance of an impact to air quality. These are set out in Table 8.12. In accordance with the EPUK & IAQM significance criteria, the impact of the operation of the Proposed Development on annual mean NO₂ concentrations is *negligible*.

8.107 The predicted annual mean NO₂ concentrations are all below 60µg/m³, therefore it is considered likely that the AQS objective level for hourly mean NO₂ concentrations will also be met. Therefore, the impact of the Proposed Development with regard to hourly mean NO₂ concentrations is also considered to be *low / imperceptible*.



8.108 Within the Site itself (receptors P1 and P2) annual mean NO₂ concentrations are predicted to fall well below (less than 75%) the relevant AQAL. It is also expected that the hourly mean objective level within the Site will be met. The impact with regards to new exposure is therefore also considered to be *low / imperceptible*.

PM₁₀ Concentrations

8.109 Predicted annual mean PM₁₀ concentrations at the selected receptors locations are presented in Table 8.20. The concentrations include the estimated 2017 background PM₁₀ concentrations as indicated in Table 8.16.

Table 8.20: Predicted Annual Mean PM₁₀ Concentrations at Selected Receptors (µg/m³)

Receptor Number	2023 Without Development	2023 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R1	16.0	16.0	0.0	Low / Imperceptible
R2	14.4	14.4	0.0	Low / Imperceptible
R3	14.6	14.6	0.0	Low / Imperceptible
R4	14.8	14.8	0.1	Low / Imperceptible
R5	14.8	15.0	0.4	Low / Imperceptible
R6	15.8	15.9	0.1	Low / Imperceptible
R7	15.2	15.3	0.2	Low / Imperceptible
R8	15.6	15.7	0.4	Low / Imperceptible
R9	15.8	16.0	0.5	Low / Imperceptible
R10	15.8	15.9	0.4	Low / Imperceptible
R11	15.1	15.1	0.1	Low / Imperceptible
R12	15.7	15.8	0.4	Low / Imperceptible
R13	15.4	15.5	0.3	Low / Imperceptible
R14	15.7	15.8	0.4	Low / Imperceptible
R15	15.4	15.5	0.3	Low / Imperceptible
R16	15.2	15.3	0.1	Low / Imperceptible
R17	15.7	15.7	0.1	Low / Imperceptible
R18	15.7	15.7	0.0	Low / Imperceptible
R19	17.1	17.1	0.0	Low / Imperceptible
R20	16.5	16.5	0.1	Low / Imperceptible
R21	18.2	18.3	0.2	Low / Imperceptible
P1	-	14.9	-	-
P2	-	14.8	-	-



8.110 The results of the modelling indicate that predicted annual mean PM₁₀ concentrations are well below (less than 75%) the AQS objective level of 40 µg/m³ at all the selected receptors both with and without the Proposed Development operational.

8.111 Traffic associated with the Proposed Development is predicted to result in a maximum increase in the annual mean PM₁₀ concentration of 0.2 µg/m³ which equates to 0.5% of the AQAL. In accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance criteria as set out in Table 8.10, the impact on local air quality with regards to this pollutant is considered to be *low / imperceptible*.

8.112 In accordance with the EPUK & IAQM significance criteria set out in Table 8.12, the significance of the impact of the operation of the Proposed Development on annual mean PM₁₀ concentrations is *negligible*.

8.113 LAQM.TG(16) provides a relationship between predicted annual mean concentrations and the likely number of exceedances of the short-term (24-hour mean) PM₁₀ objective of 50 µg/m³ (N), where:

$$N = -18.5 + 0.00145 \times \text{annual mean}^3 + (206/\text{annual mean}).$$

8.114 The objective allows 35 exceedances per year, which is equivalent to an annual mean of 32 µg/m³.

8.115 Based on the above approach, the maximum number of days where PM₁₀ concentrations are predicted to exceed 50µg/m³ is 2 days with a change of less than one day as a result of the operation of the Proposed Development. The impact on 24 hour PM₁₀ concentrations is therefore also considered to be *low / imperceptible*.

8.116 Within the Site itself, annual mean and 24-hour mean PM₁₀ concentrations are predicted to fall well below the relevant AQALs. The effect with regards to new exposure is therefore also considered to be *low / imperceptible*.

PM_{2.5} Concentrations

8.117 Predicted annual mean PM_{2.5} concentrations at the selected receptor locations are presented in Table 8.21. The concentrations include the estimated 2017 background PM_{2.5} concentrations as indicated in Table 8.16.



Table 8.21: Predicted Annual Mean PM_{2.5} Concentrations at Selected Receptors (µg/m³)

Receptor Number	2023 Without Development	2023 With Development	Change as a result of Development (as % of the AQAL)	Significance of Impact
R1	10.8	10.8	0.0	Low / Imperceptible
R2	9.9	9.9	0.0	Low / Imperceptible
R3	10.0	10.0	0.0	Low / Imperceptible
R4	10.1	10.1	0.1	Low / Imperceptible
R5	10.1	10.2	0.4	Low / Imperceptible
R6	10.6	10.7	0.1	Low / Imperceptible
R7	10.3	10.3	0.2	Low / Imperceptible
R8	10.5	10.6	0.4	Low / Imperceptible
R9	10.6	10.8	0.5	Low / Imperceptible
R10	10.6	10.7	0.3	Low / Imperceptible
R11	10.2	10.3	0.1	Low / Imperceptible
R12	10.6	10.7	0.4	Low / Imperceptible
R13	10.4	10.5	0.3	Low / Imperceptible
R14	10.6	10.7	0.4	Low / Imperceptible
R15	10.4	10.5	0.2	Low / Imperceptible
R16	10.3	10.4	0.1	Low / Imperceptible
R17	10.6	10.6	0.1	Low / Imperceptible
R18	10.6	10.6	0.0	Low / Imperceptible
R19	11.4	11.4	0.0	Low / Imperceptible
R20	11.0	11.0	0.1	Low / Imperceptible
R21	11.9	11.9	0.1	Low / Imperceptible
P1	-	10.1	-	-
P2	-	10.1	-	-

8.118 The results of the modelling assessment indicate that predicted annual mean PM_{2.5} concentrations are well below (less than 75%) of the AQAL as the selected receptor locations both with and without the Proposed Development.

8.119 The Proposed Development is predicted to increase PM_{2.5} concentrations by a maximum of 0.1µm³ which equates to 0.5% of the AQAL. In accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance criteria as set out in Table 8.10, the impact on local air quality with regards to this pollutant is considered to be *low / imperceptible*.



8.120 In accordance with the EPUK & IAQM significance criteria set out in Table 8.12, the significance of the impact of the operation of the Proposed Development on annual mean PM_{2.5} concentrations is *negligible*.

8.121 Within the Site itself, annual mean PM_{2.5} concentrations are predicted to fall well (less than 75%) below the relevant AQAL. The effect with regards to new exposure is therefore also considered to be *low / imperceptible*

ASSESSMENT OF CUMULATIVE EFFECTS

8.122 Cumulative effects can potentially be experienced during both the construction and operational phases. During the construction phase, cumulative effects of dust and particulate matter generated from on-site activities may be experienced in locations in close proximity to two or more development sites and the timing of the construction phases overlap. There may also be an effect due to the increased construction traffic on local roads if construction vehicles are to use the same routes to access the sites. During the operational phase, cumulative effects may be experienced due to the additional road vehicles generated by one or more schemes if the traffic is likely to affect the same local roads.

8.123 A number of nearby committed developments have been considered cumulatively within this assessment, these are outlined in Chapter 3.

Construction Phase Effects

8.124 Guidance provided by the IAQM suggests that effects of dust and particulate matter generated from a construction site may be experienced up to 350m from the Site. There are two development sites within 350m of the Site: Land East of Gleamingwood Drive (15/503359/OUT) and Land at North Dane Way.

8.125 The majority of construction phase activities for the Land East of Gleamingwood Drive are expected to occur at least 1.2km further north of the Site. Additionally, since there are relatively few sensitive receptors in the vicinity, there should be no significant cumulative effects if construction occurs at the same time.

8.126 It is unknown when construction will begin for the Land at North Dane Way, as a planning application has not been submitted at the time of writing. However, with the implementation of the mitigation measures listed in **Appendix 8.5**, there should be no significant cumulative effects if construction occurs at the same time.



Operational Phase Effects

8.127 The traffic flows used for the assessment include a contribution from the committed developments in the area. The assessment of the impact of the Proposed Development has therefore taken into account the cumulative effect of the Site and the committed development on predicted future pollutant concentrations.

EMISSIONS MITIGATION CALCULATION

8.128 The Proposed Development is predicted to result in a medium impact on local air quality in some locations. Therefore, in accordance with the advice provided in the Kent and Medway Air Quality Partnership Air Quality Planning Guidance which is reproduced in Table 8.11, mitigation measures will be implemented to reduce operational emissions.

8.129 In order to assist in determining the value of emissions mitigation required an Emissions Mitigation Assessment was completed including an emissions mitigation calculation in accordance with the advice provided in the Kent and Medway Air Quality Planning Guidance.

Table 8.22: Emissions Mitigation Calculation

	NOx	PM10
Proposed Development Trips (as AADT)⁽¹⁾	2,679 (1.3% HGV)	
Average Trip Length (km)⁽²⁾	13.8	
Emissions (kg/yr)⁽³⁾	3,402.12	317.15
Emissions (tonnes/yr)	3.40	0.32
Damage Cost (per tonne)⁽⁴⁾	£4,191	£46,938.39
Cost of 5 Year Exposure	£71,291.40	£74,432.60
Total	£145,724.00	
(1) Provided by Transport Consultants		
(2) Obtained from National Travel Survey 2017 (Av miles travelled per car per person in a year /av no of trips made per car per person in a year) (5104/594 = 8.6 miles (13.8km))		
(3) Value obtained from EFT spreadsheet (assuming average speed of 48kph)		
(4) IGCB Air Quality Damage Costs per tonne (2017 prices) (Central Estimate for Transport Rural)		

8.130 The Emissions Mitigation Calculation presented above suggests a damage cost of £145,724.00. A range of costs is provided, the above damage cost is based on the Central Estimate. Overall the range of costs is from £24,268.22 to £487,091.09.



ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Construction Phase

8.131 The control of dust emissions from construction site activities relies upon management provision and mitigation techniques to reduce emissions of dust and limit dispersion. Where dust emission controls have been used effectively, construction operations have been successfully undertaken without impacts to nearby properties.

8.132 Overall the Proposed Development is considered to be a medium risk of dust impacts, and low risk to human health from particulate matter concentrations at nearby receptors during the construction phase. Appropriate mitigation measures for the Proposed Development have been identified following the IAQM guidance and based on the risk effects presented in Table 8.17. It is recommended that the 'highly recommended' measures set out in **Appendix 8.5** are incorporated into a Dust Management Plan (DMP) and approved by MC prior to commencement of any work on the Proposed Development site.

8.133 In addition to the 'recommended' measures, the IAQM guidance also sets out a number of 'desirable' measures which should also be considered. These are also set out in **Appendix 8.5**.

8.134 Following implementation of the 'highly recommended' measures outlined in the IAQM guidance and reproduced in **Appendix 8.5**, the impact of emissions during construction of the Proposed Development would be negligible.

Operational Phase

8.135 The detailed dispersion modelling indicates that the impact of the operation of the Proposed Development on local pollutant concentrations is negligible and that the concentrations of relevant pollutants (NO₂, PM₁₀ and PM_{2.5}) within the Proposed Development and at nearby sensitive receptors will meet the relevant air quality objectives in the opening year.

8.136 The Kent and Medway Air Quality Partnership Air Quality Planning Guidance recommends the following mitigation measures for residential developments:



-
- All gas fired boilers to meet a standard of <math><40\text{mgNO}_x/\text{kWh}</math>;
 - 1 Electric Vehicle charging point per dwelling with dedicated parking or 1 charging point per 10 spaces (unallocated parking);
 - Travel plan (where required) including mechanisms for discouraging high emission vehicle use and encouraging the uptake of low emission fuels and technologies;
 - A Welcome Pack available to all new residents online and as a booklet, containing information and incentives to encourage the use of sustainable transport modes from new occupiers;
 - EV recharging infrastructure within the Proposed Development (wall mounted or free standing in-garage or off-street points);
 - Car club provision within the Proposed Development or support given to local car club/eV car clubs;
 - Designation of parking spaces for low emission vehicles;
 - Improved cycle paths to link cycle network;
 - Adequate provision of secure cycle storage; and
 - Using green infrastructure, in particular trees to absorb dust and other pollutants.

8.137 The cost of implementing the above mitigation measures will exceed the Damage Cost figure calculated in Table 8.21 by a significant margin. The implementation of the above mitigation measures should further reduce the impact of emissions during operation of the Proposed Development.

Residual Effects

Construction Phase

8.138 Following implementation of the measures recommended for inclusion within the DMP the impact of emissions during construction of the Proposed Development would be *negligible*.

Operational Phase

8.139 The Proposed Development is predicted to have a medium to low/imperceptible adverse impact on local air quality prior to the implementation of appropriate mitigation. Following the implementation of the traffic mitigation measures as described above, the impact of the operational traffic would be reduced to low / imperceptible.



SUMMARY

8.140 An air quality impact assessment has been carried out to assess both construction and operational impacts of the Proposed Development.

8.141 An assessment of the potential impacts during the construction phase has been carried out in accordance with the latest Institute of Air Quality Management Guidance. This has shown that for the Proposed Development, limited releases of dust and particulate matter are likely to be generated from on-site activities. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and particulate matter releases may be effectively mitigated and the resultant impacts are considered to be negligible.

8.142 ADMS Roads dispersion modelling has been carried out to assess both the impact of the operation of the Proposed Development on local pollutant concentrations and the suitability of the Proposed Development site for its proposed end use with regards to local air quality. The results indicate that predicted concentrations of relevant pollutants (NO₂, PM₁₀ and PM_{2.5}) concentrations are below the relevant objectives within the Proposed Development and at nearby sensitive receptors.

8.143 Emissions arising from traffic generated by the operation of the Proposed Development would result in a negligible impact on local pollutant concentrations, predicted concentrations remain below the objective levels at all the selected receptors. In accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance, the impact of the emissions arising from traffic associated with the operation of the Proposed Development is considered to be *medium to low / imperceptible*.

8.144 It should be noted that in accordance with the EPUK & IAQM significance criteria, the impact of the operation of the Proposed Development on NO₂, PM₁₀ and PM_{2.5} concentrations is considered to be negligible.

8.145 Future occupants of the Proposed Development would not be exposed to pollutant concentrations above the relevant objective levels, therefore the impact of the Proposed Development with regards new exposure to air quality is considered to be negligible.

8.146 It is concluded that air quality does not pose a constraint to the Proposed Development, either during construction or once operational.



Table 8.23: Air Quality Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Dust and particulate matter generated during the construction phase	Temporary	-	The adoption of best practice and measures outlined in the IAQM guidance	Negligible
Effects on Local Air Quality from emissions from construction traffic	Temporary	Negligible	None	Negligible
Effects on Local Air Quality from emissions from road traffic generated by the operation of the Proposed Development	Permanent	Medium to Low / Imperceptible	Transport related measures such as Travel Plan.	Medium to Low / Imperceptible



REFERENCES

Ref 8.1: Institute of Air Quality Management (2014); 'Guidance on the assessment of dust from demolition and construction version 1.1'

Ref 8.2: Kent and Medway Air Quality Partnership Air Quality Planning Guidance (Mitigation Option B)

Ref 8.3: EPUK & IAQM. Land-use Planning and Development Control: Planning for Air Quality, January 2017

Ref 8.4: <http://uk-air.defra.gov.uk>

Ref 8.5: <https://www.dft.gov.uk/traffic-counts/cp.php?la=Kent#36010>

Ref 8.6: D. Laxen and B Marner (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites

Ref 8.7: The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)

Ref 8.8: Department for Environment, Food and Rural Affairs (Defra), (2009): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(16)

Ref 8.9: Ministry of Housing, Communities and Local Government: *National Planning Policy Framework* (July 2018)

Ref 8.10: Medway Council. (2003). Medway Local Plan.



9 NOISE AND VIBRATION

INTRODUCTION

9.1 This chapter of the Environmental Statement (ES) assesses the likely environmental significant effects, with respect to noise and vibration, at the proposed residential development at Gibraltar Farm, Medway. The extant and proposed road traffic noise levels are assessed in order to demonstrate site suitability and to allow consideration of potential effects at existing noise sensitive receptors in the surrounding area.

9.2 In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources such as road traffic, rail or construction works that interfere with normal activities, including conversation, sleep or recreation. Vibration is defined as the transmission of energy through the medium of ground or air resulting in small movements of the transmitting medium, such as a building, which can cause discomfort or even damage to structures if the movements are large enough.

9.3 In summary, the chapter addresses:

- The potential constraints from existing sources of noise on the internal and external noise environments at the Proposed Development and where necessary, the types of measures that might be adopted to overcome these constraints;
- The impact of noise and vibration on existing sensitive receptors during the demolition and construction phase;
- The potential effect of road traffic noise from the Proposed Development on surrounding sensitive receptors following completion and habitation of the Proposed Development: and
- The effect of the existing noise and vibration climate on the Development

9.4 A glossary of common noise terminology is provided in **Appendix 9.1**

9.5 The assessment has considered the noise and vibration effects from the development as shown on the Site Layout Plan in **Appendix 9.2**.



ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

9.6 Planning Policy Guidance, PPG24 (**Ref 9.1**) been superseded by The National Planning Policy Framework (NPPF) (July 2018) (**Ref 9.2**). The NPPF sets out the Government's economic, environmental and social planning policies for England. It attempts to summarise in a single document all previous national planning policy advice. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

Construction Phase Methodology

9.7 The impact of noise and vibration during construction of the Proposed Development requires prediction and assessment in accordance with the guidance presented in BS 5228 1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise' (**Ref 9.3**).

Changes in Road Traffic Noise

9.8 The impact of changes in noise level resulting from changes in traffic flow and composition on existing roads as a result of the operational development requires assessment in accordance with the guidance presented in the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 Part 7 – HD 213/11 Noise and Vibration, 2011 (**Ref 9.4**).

Noise at Proposed Residential Properties

9.9 The ambient noise at residential dwellings is assessed against the guidance provided by BS 8233:2014 'Sound Insulation and Noise Reduction for Buildings' for both the day and night-time periods (**Ref 9.5**).

9.10 Night time maximum noise levels are assessed against the guideline noise level for the onset of sleep disturbance provided by the WHO Guidelines for Community Noise (**Ref 9.6**).



ASSESSMENT CRITERIA

9.11 The measurement, prediction and assessment of noise and vibration levels associated with the Proposed Development and the significance of their potential impacts have been assessed in accordance with national guidance and recognised codes of practice. A three-stage process has been adopted. First, the sensitivity of the noise and vibration receptors is assessed. This is followed by an assessment of the magnitude of the noise and vibration impacts and finally the significance of impacts. These are discussed below and have been specifically applied to the following conceptual significance impact matrix as appropriate.

Sensitivity

9.12 The criteria set out in Table 9.1 below have been applied to identify noise/vibration sensitive receptors either on or adjacent to the Site. The receptors are termed 'local' (within 600m of the Site).

Table 9.1 – Noise and Vibration Receptors

Sensitivity	Description	Receptor
High	Receptors that are especially susceptible to noise/vibration	Residential dwellings, Schools, Hospitals, Care Homes
Moderate	Receptors where a reasonable degree of noise disturbance is acceptable	Offices
Low	Receptors where noise is tolerable	Retail shops, restaurants
Negligible	Receptors where noise is not likely to be a factor	Sports Grounds, commercial and industrial environments

Effect Magnitude: Construction Phase

9.13 Noise levels generated by construction activities have the potential to impact upon nearby noise-sensitive receptors. However, the magnitude of the potential impact will depend upon a number of variables, such as:

- the noise generated by plant or equipment used on site;
- the period of time that construction plant is operational;
- the distance between the noise source and the receptor; and
- the level of likely attenuation due to ground absorption and barrier effects.



9.14 BS 5228 sets out a methodology for predicting, assessing and controlling noise levels arising from a wide variety of construction and related activities. As such, it can be used to predict noise levels arising from the operations at proposed construction sites. BS 5228 also sets out tables of sound power levels generated by a wide variety of construction plant to facilitate such predictions.

9.15 The prediction procedure essentially involves taking the source noise level of each item of plant and correcting it for (i) distance effects between source and receiver (ii) percentage operating time of the plant; (iii) barrier attenuation effects; (iv) ground absorption; and (v) facade corrections. The latter correction involves a 3dB noise increase due to the reflection effects for a receiving point location 1m in front of a building facade.

9.16 Noise levels generated by the proposed site operations and experienced at local receptors will depend upon a number of variables, for example:

- the amount of noise generated by plant and equipment being used at the development site generally expressed as a sound power level;
- the periods of operation of the plant at the development site, known as the 'on-time';
- the distance between the noise source and the receptor, known as the 'stand-off';
- the attenuation due to potential barrier effects; and
- the reflection of noise due to the presence of hard vertical faces such as walls.

9.17 BS 5228 gives several examples of acceptable limits for construction or demolition noise. The most simplistic being based upon the exceedance of fixed noise limits and states in paragraph E.2:

“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.”

“Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed: 70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise or 75 decibels (dBA) in urban areas near main roads in heavy industrial areas. These limits are for daytime working outside living rooms and offices.”

9.18 The construction noise impact considers the noise magnitude and adverse effect levels as provided in the Noise Policy Statement for England, 2010 (**Ref 9.7**) and the Planning Policy



Guidance (PPG) provided in March 2014 by the Department for Communities & Local Government in its on-line planning guidance to assist with interpretation of the NPPF as shown in Table 9.2.

Table 9.2 - Construction Noise Magnitude

Day	Time (hours)	Averaging Period T	LOAEL L_{pAeq,T} (dB)	SOAEL L_{pAeq,T} (dB)*
Mondays to Fridays	0700 - 0800	1 hour	60	70
	0800 - 1800	10 hours	65	75
	1800 - 1900	1 hour	60	70
	1900 - 2200	1 hour	55	65
Saturdays	0700 - 0800	1 hour	60	70
	0800 - 1300	5 hours	65	75
	1300 - 1400	1 hour	60	70
	1400 - 2200	1 hour	55	65
Sundays & Public Holidays	0700 - 2200	1 hour	55	65
Any night	2200 - 0700	1 hour	45	55

* The measured levels should be monitored in order to ensure that the levels presented in the table are not exceeded for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months.

9.19 It is worth noting that the purpose of the target construction noise criteria is to control the impact of construction noise insofar as is reasonably practicable, whilst recognising that it is unrealistic for developments of this nature to be constructed without causing some degree of disturbance in the locality. Hence, even if the criteria adopted for this assessment is achieved, noise from construction activities is likely to be readily noticeable. It is further noted that the local authority may restrict the hours of construction and construction related traffic on the Site.

Construction Vibration

9.20 Vibration may be impulsive, such as that due to hammer-driven piling; transient, such as that due to vehicle movements along a railway; or continuous, such as that due to vibratory driven piling. The primary cause of community concern generally relates to building damage from both construction and operational sources of vibration, although, the human body can perceive vibration at levels which are substantially lower than those required to cause building damage.



9.21 Damage to buildings associated solely with ground-borne vibration is not common and although vibration may be noticeable, there is little evidence to suggest that they produce cosmetic damage such as a crack in plaster unless the magnitude of the vibration is excessively high. The most likely impact, where elevated levels of vibration do occur during the construction phase, is associated with perceptibility.

9.22 BS 5228 indicates that the threshold of human perception to vibration is around 0.15mm/s, although it is generally accepted that for the majority of people vibration levels in excess of between 0.15 and 0.3 mm/s peak particle velocity (PPV) are just perceptible.

9.23 There are currently no British Standards that provide a methodology to predict levels of vibration from construction activities, other than that contained within BS 5228 which relates to percussive or vibratory piling only. Therefore, it is not possible to accurately predict levels of vibration during the site preparation and construction phases of the development. As such, to control the impact of vibration during the site preparation and construction of the Proposed Development, limits relating to the perceptibility of vibration have been set.

9.24 Accordingly 1 mm/s ppv has been selected as the target criteria to control the impact of construction vibration, with the criteria for assessing the magnitude of vibration impacts according to the margin by which this target criterion is achieved or exceeded presented in Table 9.3 below. This target criterion is based on the guidance contained within BS 5228, experience from previous sites and accepted vibration policy criteria across a range of enforcing authorities elsewhere in the UK. The limits are presented in terms of peak particle velocity (PPV) as it is the simplest indicator for both perceptibility and building damage.

Table 9.3 - Ground- vibration effect levels for permanent residential buildings

Vibration		
Lowest Observed Adverse Effect Level	PPV mm/s	1
Significant Observed Adverse Effect Level	PPV mm/s	10

9.25 Again, it is worth noting that the purpose of the target construction vibration criteria is to control the impact of construction vibration insofar as is reasonably practicable and is entirely based on the likelihood of the vibration being perceptible, rather than causing damage to property. Hence, although vibration levels in excess of 1 mm/s ppv would be considered a Major Adverse impact in respect of the likelihood of perceptibility, they would not be considered significant in terms



of the potential for building damage, which would require levels of at least 15 mm/s ppv to result in minor cosmetic damage in light / unreinforced buildings.

Effect Magnitude: Completed Development

9.26 The aim of noise policy within the UK is to protect individuals from excessive noise levels both in the workplace and within their homes. It has been recognised that severe annoyance to individuals due to noise can lead to sleep disturbance and adverse health effects.

9.27 The NPPF does not give a set of criteria for external noise assessment and therefore guidance within contemporary British Standards and other internationally published documents has been considered.

9.28 For the purposes of this assessment, external noise levels for residential use have been applied to the residential accommodation and derived on the basis of internal noise criteria outlined in British Standard 8233 and World Health Organisation (WHO) guidance. These derived noise levels have sub-divided into four noise exposure groups (NEGs) for assessment purposes and are presented in Table 9.4. Details of the derivation of each sub-group is shown in Table 9.5.



Table 9.4 - External Noise Levels Criteria for Assessment Purposes, $L_{Aeq,T}$ dB (free-field)

Noise Source		Noise Exposure Groups			
		A	B	C	D
Mixed Sources	07.00-23.00	<55	55-63	63-72	>72
	23.00-07.00	<45	45-57	57-66	>66

Table 9.5 - Sub-class Derivation

NEG	Derivation Source
A	WHO guidance states ' <i>general daytime outdoor noise levels of less than 55 dB(A) are desirable to prevent any significant community annoyance</i> '. Night-time levels are based upon WHO's 30 dB criterion. (see below). Noise levels in this band are unlikely to be a determining factor for planning considerations
B	Based upon a partially open window attenuation of 10-15 dB(A), a maximum figure of 45 dB(A) at the façade will meet with both WHO and the 'good' standard of BS8233 during both the day and night-time. (see below) Subject to appropriate mitigation, noise levels in this band are unlikely to be a determining factor for planning considerations
C	These levels are based upon the trigger levels of Noise Insulation Regulations (NIR) during the day and WHO's 30 dB criterion at night. Subject to appropriate mitigation in the form of both external and façade treatments, noise levels in this band should be a material consideration for planning purposes
D	This band is based upon the outcome of noise survey undertaken by the Building Research Establishment on noise levels higher than that prescribed in the NIR. Residential development in this band should normally be avoided unless special mitigation measures allow suitable internal levels to be achieved

9.29 BS 8233 makes recommendations for the control of noise in and around buildings. It suggests appropriate criteria for different situations, and is primarily intended to guide the design of new or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate. The guidance provides desirable indoor ambient noise levels for dwellings which are summarised in Table 9.6 below.



Table 9.6 - Noise Criteria for Residential Use Buildings

Activity	Location	0700 to 2300	2300 to 0700
Resting	Living room	35 dB $L_{Aeq,16\text{ hour}}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16\text{ hour}}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16\text{ hour}}$	35 dB $L_{Aeq,8\text{ hour}}$

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.

9.30 BS8233:2014 states that 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.

9.31 The internal noise levels recommended in BS 8233 are almost identical to those presented in WHO guidelines for community noise (internal to buildings). Internally, the WHO guidance is that in order to avoid sleep disturbance the period noise level ($L_{Aeq,T}$) should not exceed 30 dB and individual noise events should not exceed 45 dB L_{Amax} . Section 3.4 of the WHO Guidelines states that for good sleep, indoor noise levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times a night. On the basis of the WHO's 15 dB façade insulation for windows partly open; this equates to external L_{Amax} of 60 dB that should not be exceeded more than 10-15 times per night.

9.32 Externally, the WHO guidance is now based upon thresholds of night noise exposure indicated by $L_{night,outside}$ as defined in the Environmental Noise Directive (2002/49/EC, 2002) (Ref 9.8). The $L_{night,outside}$ is the A-weighted long-term average sound level determined over all nights of the year, where the night is the 8-hour period between 2300-0700 hours.), the latest WHO guidance recommends an $L_{night,outside}$ of 40 dB as a target for the night noise guideline (NNG) to protect the public, including the most vulnerable groups such as children, the chronically ill and the elderly.



9.33 An external L_{night} value of 55 dB is recommended as an interim target for countries where the NNG cannot be achieved in the short term for various reasons, and where policy-makers choose to adopt a stepwise approach.

LOAEL and SOAEL for transportation airborne noise affecting indoor residential levels.

9.34 Incident façade levels should not be considered in isolation of the sound reduction provided by the external building fabric. The guidance within Planning Policy Guidance states that "consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases a suitable alternative means of ventilation is likely to be necessary. Further information on ventilation can be found in the Building Regulations."

9.35 Based on the advice within BS:8233:2014 an indoor noise level of 35 dB $L_{\text{Aeq},16\text{hr}}$ during the daytime and 30 dB $L_{\text{Aeq},8\text{hr}}$ during the night-time may be considered as the LOAEL for transportation noise.

9.36 Similarly, an indoor noise level 50 dB $L_{\text{Aeq},16\text{hr}}$ and 45 dB $L_{\text{Aeq},8\text{hr}}$ during the night-time may be considered as the SOAEL for transportation noise.

9.37 The WHO Guidelines for Community Noise also identify 60 dB $L_{\text{Amax},F}$ outside as the guideline value for sleep disturbance with windows open. For this reason, a sound level of 60 dB $L_{\text{Amax},F}$ at the façade is considered the LOAEL.

9.38 Table 9.7 summarises LOAEL and SOAEL inside the different areas of permanent residential buildings.



Table 9.7 - Internal and External Noise Criteria for habitable rooms due to Transportation Noise

Level	Proposed LOAEL and SOAEL levels for transportation noise affecting new residential premises	
	Daytime (07:00 hours to 23:00 hours)	Night-time (23:00 hours to 07:00 hours)
Internal Noise Levels		
LOAEL	35 $L_{Aeq,16h}$ (dB)	30 $L_{Aeq,8h}$ (dB)
SOAEL	50 $L_{Aeq,16h}$ (dB)	45 $L_{Aeq,8h}$ (dB)
LOAEL	Not applicable	45 dB $L_{Amax,F}$ if more than 15 events
	Not applicable	50 dB $L_{Amax,F}$ if less than 15 events
SOAEL	Not applicable	65 dB $L_{Amax,F}$ if more than 15 events
	Not applicable	70 dB $L_{Amax,F}$ if less than 15 events
External Amenity Areas (free field levels)		
LOAEL	50 $L_{Aeq,16hr}$ (dB)	40 $L_{Aeq,8hr}$ (dB)
SOAEL	65 $L_{Aeq,16hr}$ (dB)	55 $L_{Aeq,8hr}$ (dB)

Vibration

9.39 The assessment of potential vibration impacts has considered British Standard 6472:2008 (BS6472) (**Ref 9.9**), which provides guidance over the frequency range 0.5 Hz to 80 Hz.

9.40 BS 6472 describes how to determine the vibration dose value, VDV, from frequency-weighted vibration measurements. The vibration dose value is used to estimate the probability of adverse comment, which might be expected from human beings experiencing vibration in buildings.

9.41 Consideration is given to the time of day and use made of occupied space in buildings, whether residential, office or workshop. BS 6472 states that in homes, adverse comment about building vibrations is likely when the vibration levels to which occupants are exposed are only slightly above thresholds of perception.



9.42 BS 6472 contains a methodology for assessing the human response to vibration in terms of either the VDV, or in terms of the acceleration or the peak velocity of the vibration, which is also referred to as peak particle velocity.

9.43 The recommendations and guidance presented in BS 6472 have been used to derive criteria for assessing the impact of development generated vibration on nearby residential dwellings, as set out in Table 9.8.

Table 9.8 - Residential Use Buildings, Vibration Magnitude Description

Night-time Vibration Level VDV	Daytime Vibration Level VDV	Description
>0.51	>1.6	Major Negative
0.26 - 0.51	0.80 - 1.6	Moderate Negative
0.13 - 0.25	0.20 - 0.79	Minor Negative
<0.13	<0.20	Negligible

Road Traffic Noise

9.44 The impact of any changes in road traffic noise levels has been considered against the principles and guidance presented within the Design Manual for Roads and Bridges (DMRB) Part 7 HD213/11 Noise and Vibration, 2011. DMRB presents an impact significance matrix for assessing the magnitude of changes in noise level for the short and long term and can be used as criteria for assessing the impact of any changes in road traffic noise levels, as shown in Tables 9.9 and 9.10.

9.45 The DMRB states that:

'The impact of a proposed development at any location can be reported in terms of changes in absolute noise level. In the UK the standard index used for traffic noise is the $L_{A10,18hr}$ level, which is quoted in decibels'

9.46 In order to determine whether changes in traffic noise levels are likely to occur as a result of the Proposed Development, noise levels have been predicted in accordance with the methodology contained within the Calculation of Road Traffic Noise (CRTN) (Ref 9.10), based on traffic flow data for the local road network with and without the Proposed Development.



Table 9.9 - Semantic Descriptors for Traffic Noise in the Short Term

Change in Noise Level L_{A10,18 hr} dB	Magnitude of Impact
0	No Change
0.1 to 0.9	Negligible
1 to 2.9	Minor
3 to 4.9	Moderate
5+	Major

Table 9.10 - Semantic Descriptors for Traffic Noise in the Long Term

Change in Noise Level L_{A10,18 hr} dB	Magnitude of Impact
0	No Change
0.1 to 2.9	Negligible
3 to 4.9	Minor
5 to 9.9	Moderate
10+	Major

LEGISLATION, PLANNING POLICY AND GUIDANCE

National Policy: National Planning Policy Framework

9.47 The National Planning Policy Framework (NPPF) (July 2018) sets out the Government's economic, environmental and social planning policies for England. It attempts to summarise in a single document all previous national planning policy advice. Taken together, these policies articulate the Government's vision of sustainable development, which should be interpreted and applied locally to meet local aspirations.

9.48 Under Section 15; Conserving and enhancing the natural environment, the following is stated in paragraph 170:

“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 or land instability”

9.49 The NPPF goes on to state in paragraph 180 that:

“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 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”*

Noise Policy Statement for England, 2010 (NPSE)

9.50 The NPSE seeks to clarify the underlying principles and aims in existing policy documents, legislation and guidance that relate to noise. It also sets out the long term vision of Government noise policy:

9.51 “To promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development”.

9.52 The NPSE clarifies that noise should not be considered in isolation of the wider benefits of a scheme or development, and that the intention is to minimise noise and noise effects as far as is reasonably practicable having regard to the underlying principles of sustainable development.

9.53 The first two aims of the NPSE follow established concepts from toxicology that are applied to noise impacts, for example, by the World Health Organisation. They are:



- NOEL – No Observed Effect Level - the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise; and
- LOAEL – Lowest Observed Adverse Effect Level - the level above which adverse effects on health and quality of life can be detected.

9.54 The NPSE extends these to the concept of a significant observed adverse effect level.

- SOAEL – Significant Observed Adverse Effect Level - The level above which significant adverse effects on health and quality of life occur.

9.55 The NPSE notes:

"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. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times".

Planning Practice Guidance (PPG) – Noise

9.56 The Government's PPG on noise provides guidance on the effects of noise exposure, relating these to people's perception of noise, and linking them to the NOEL and, as exposure increases, the LOAEL and SOAEL.

9.57 As exposure increases above the LOAEL, the noise begins to have an adverse effect and consideration needs to be given to mitigating and minimising those effects, taking account of the economic and social benefits being derived from the activity causing the noise. As the noise exposure increases, it will then at some point cross the SOAEL boundary.

9.58 The LOAEL is described in PPG as the level above which "noise starts to cause small changes in behaviour and / or attitude e.g. turning up the volume of the television, speaking more loudly, or, where there is no alternative ventilation, having to close 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 perceived change in the quality of life."



9.59 PPG identifies the SOAEL as the level above which "noise causes a material change in behaviour and/or attitude, e.g. 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."

BASELINE CONDITIONS

9.60 The baseline conditions across the Site have been determined by environmental noise measurements and subjective observations at the Site. The existing noise conditions at the Site commenced on 9 January 2019 and were completed by 11 January 2018.

9.61 The primary purpose of the noise survey was to gather acoustic information on the baseline noise levels at the Site during daytime and night-time periods. This data is used to assess the suitability of the Site for a residential development, to allow appropriate noise limits to be set for any proposed building services plant and enable an assessment of commercial noise at existing residential properties.

9.62 Site observation indicated that the dominant noise sources were the local road traffic network, predominantly on North Dane Way, and distant traffic on the M2. Noise measurements were taken at Site 1 to represent the noise levels to the north of the Site, measurements at Site 2 represent the southern portion of the Site. The dominant noise source at both sites was observed to be road traffic on the local and surrounding road networks.

Measurement Survey

Noise

9.63 The noise measurements were undertaken at 2 locations with the microphone at a height of 1.5 metres above local ground level and under free-field conditions. The microphones were fitted with protective windshields for the measurements.

9.64 All measurement equipment used during the noise surveys conformed to relevant Type 1 specifications. A full inventory of this equipment is presented in Table 9.11.



Table 9.11 – Inventory of Acoustic Measurement Equipment

Item	Make & Model	Serial Numbers
Sound Level Meter	Svantek 977	34815
Sound Level Meter	Svantek 957	21890
Calibrator	SV31	32530

9.65 All noise measurements were undertaken by consultants competent in environmental noise monitoring, and, in accordance with the principles of BS 7445: 2003 (**Ref 9.11**). The broadband noise parameters of $L_{Aeq,T}$, $L_{A10,T}$, $L_{A90,T}$, and $L_{Amax,F}$ were recorded at each location.

9.66 A summary of the noise measurement at sites 1 and 2 are presented in Table 9.12. The full set of graphical results is shown in **Appendix 9.3 and 9.4**. The noise measurement locations are shown in **Appendix 9.2**.

Table 9.12 – Summary of Measured Noise Levels, January 2019

Monitoring Position	Date	Measured Sound Pressure Level, dB re. 2×10^{-5} Pa.					
		Day Time (07:00 - 23:00)			Night-time (23:00 - 07:00)		
		$L_{Amax,F}$	$L_{Aeq,T}$	$L_{A90,T}$	$L_{Amax,F}$	$L_{Aeq,T}$	$L_{A90,T}$
S1	09/01/2019	87.2	49.1	43.7	60.3	38.7	33.7
	10/01/2019	84.3	46.9	41.5	64.9	41.7	33.9
	11/01/2019	84.4	48.0	41.9	-	-	-
S2	09/01/2019	76.3	48.2	44.7	64.2	41.5	36.6
	10/01/2019	91.9	49.2	44.4	66.8	45.6	37.5
	11/01/2019	77.3	48.4	44.8	-	-	-

9.67 The weather conditions at the start of the survey on 9 January 2019 were sunny and dry with wind speeds below 5 ms^{-1} and a daytime temperature of 5°C . The weather conditions on the 11th January were similar, with similar wind speeds and an average temperature of 7°C .

Vibration

9.68 The vibration levels on the Site were assessed subjectively during the noise survey and no vibration was observed to be imperceptible. It is therefore considered that a vibration survey is not required for the purpose of this assessment.



IDENTIFICATION AND EVALUATION OF POTENTIALLY SIGNIFICANT EFFECTS

9.69 This section considers the potential effects associated with the noise egress during the construction and operation of the Proposed Development.

9.70 Potential noise impacts arising from the completed development include the consideration of access roads and building services noise. The potential noise and vibration effects on the Proposed Development from existing road and rail sources have also been considered.

During Construction

9.71 The operation of equipment associated with site preparation and construction of the Proposed Development has the potential to result in noise effects at existing noise sensitive receptors in the vicinity.

9.72 Specific detail on the type of plant is not available at this stage, therefore construction noise levels are based on the likely plant together with generic plant detail contained within BS5228-1:2009+A1:2014. The type of piling is not yet known. As such, for the purposes of the assessment Continuous Flight Auger (CFA) piling is assumed.

9.73 Calculations were carried out in accordance with the methodology prescribed within BS 5228. Calculations representing a worst-case scenario over a one-hour period with plant operating at the closest point to the nearest Noise Sensitive Receptor and in the absence of mitigation are presented. In practice, noise levels would tend to be lower owing to greater separation distances and screening effects.

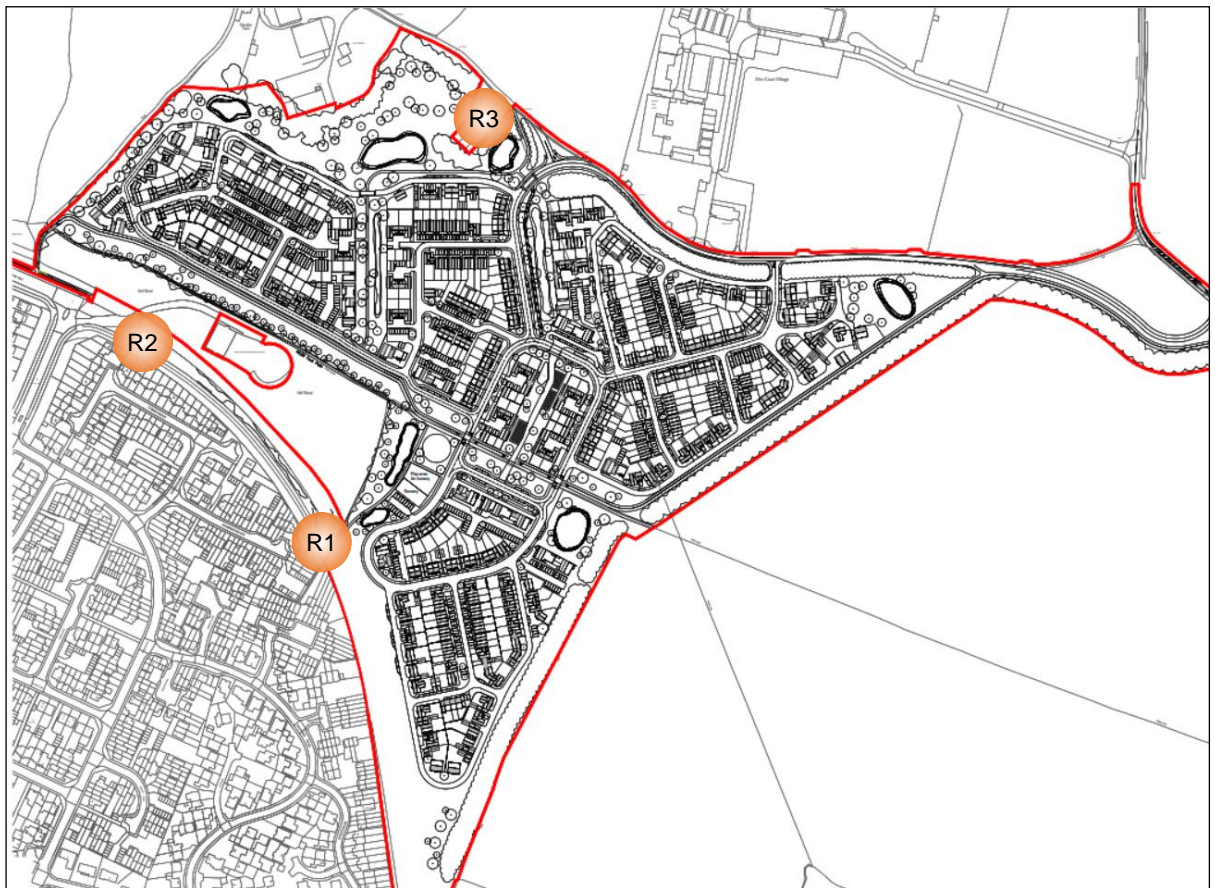
9.74 The construction noise predictions have been undertaken for the noisiest construction phases to provide assessment levels at the nearest noise sensitive receptors. The highest noise levels are from plant usually associated with earthworks, piling, concreting, road pavement and general construction site activities and the facade noise levels used for the assessment are as follows:

- Enabling works 84 dB(A) at 10m
- CFA Piling 85 dB(A) at 10m
- Sub Structure 80 dB(A) at 10m
- Road pavement 81 dB(A) at 10m
- Super Structure 85 dB(A) at 10m

9.75 With regard to barrier attenuation effects, acoustic screening would be provided by permanent structures on the intervening land between the proposed construction areas and receptor locations, in addition to the natural screening may be created by the topography of the area. To provide a robust assessment however, the construction noise predictions assume no attenuation from site hoardings at receptor locations.

9.76 Construction noise levels have been predicted at the closest existing representative noise sensitive receptor locations (R1, R2 and R3) to the Proposed Development. Receptors R1 and R2 are representative of the likely highest construction noise levels at the nearby residential development, R3 is representative of the nearest residential property at the north of the development. These locations are shown in Figure 9.1.

Figure 9.1: Construction Noise Calculation Locations



9.77 The predicted noise levels are 'worse case', assuming the shortest distance between the source of construction noise and the receptor in order to calculate a worse likely noise level at the calculation location. The noise levels predicted at the closest façade of each construction assessment position during each phase and sub-phase of the works are shown in Table 9.13.



Table 9.13 – Worst-case Façade Construction Noise Levels $L_{Aeq,T}$ dB

Receptor	Noise Level, dB, During Construction Phase (rounded to 0 dp)				
	Enabling Works	Piling	Sub-structure	Roads	Super-structure
R1	70	71	66	67	71
R2	63	64	59	60	64
R3	72	73	68	69	73

9.78 The comparison of the results presented in Table 9.13 above with the target noise criterion of 75 dB $L_{Aeq,T}$ identifies that façade noise levels for the nearest existing noise sensitive locations are predicted to be below the target criteria for all construction related operations due to the intervening distances. It should be noted that all construction plant will not be operating simultaneously nor will it be operated at the closest distance to the residential areas for all of the time as assumed for the purposes of a worse-case scenario assessment.

9.79 Comparison of these results with the criteria presented in Table 9.2 identifies that for all phases, at the residential receptors, construction noise effects would be classified as below SOAEL. Due to the high sensitivity of the receptors, the significance is classed as 'Moderate' prior to mitigation.

9.80 In addition to construction plant operating on the Site, there would be movement of materials to and from the Site by road. Construction traffic would be managed to minimise the temporary and intermittent adverse effects that construction traffic can cause. Noise level changes arising from construction traffic has been undertaken using the calculation methodology detailed within the CRTN.

9.81 Mitigation measures are considered later in this chapter. These measures will be adhered to in order to ensure low likelihood of adverse impacts.

Construction Vibration

9.82 Table 9.14 below details the distances at which certain construction activities could give rise to a just perceptible level of vibration. These figures are based on historical field measurements.



Table 9.14 – Distances at which vibration may be just perceptible

Construction Activity	Distance (m)
Excavation	10-15
Heavy Vehicles (e.g. dump trucks)	5-10
Hydraulic Breakers	15-20
Large Rotary Piling Rig	20-30
Driven Piling Rig (if required)	10-20

9.83 On the basis of the distances at which vibration from various construction activities is likely to be perceptible, nearby residential properties are unlikely to be affected. However, mitigation measures to control the impact of construction vibration are presented in the following section.

Operational Phase

Site Suitability – Existing Noise Climate

9.84 The future suitability of the application site for residential accommodation has been determined by comparing the results of the environmental noise survey with the guidance adopted for this chapter.

9.85 The measured ambient noise levels have been averaged to obtain representative day and night time noise levels. Internal ambient noise levels have been calculated assuming a 15 dB and 33 dB reduction for partially open windows and for windows closed, respectively.

9.86 The outline plan indicates the likely layout for the Proposed Development. Measurements at S1 have been adopted to represent the northern portion of the Site. Location S2 is considered representative of the southern portion of the Site. Should further calculations be required, these can be undertaken following finalisation of the Site layout. The daytime and night time noise levels are presented in Table 9.15.

Table 9.15 – External and Internal Ambient Noise Levels

Monitoring Position	Period	Sound Pressure Level, dB re. 2×10^{-5} Pa.		
		External	Internal (Windows Partially Open)	Internal (Windows Closed)
S1	Day	48.1	33.1	15.1
	Night	40.5	25.5	7.5
S2	Day	48.6	33.6	15.6
	Night	44.0	29.0	11.0



9.87 The ambient noise levels summarised in Table 9.15 identify that during the day and night-time the ambient noise levels are 48.6 dB $L_{Aeq,16\text{ hr}}$ and 44 dB $L_{Aeq,8\text{hr}}$ respectively. When assessed against the derivations in Table 9.5 the noise falls within NEG A during both the daytime at night-time periods.

9.88 The highest measured maximum noise level at night is 66.8 dB $L_{Amax,F}$. The noise target for night-time maximum noise levels is 60 dB and mitigation is therefore required in order to ensure appropriate internal maximum noise levels at night.

9.89 BS8233:2014 provides guideline values for external amenity areas and internal rooms during the day and night. Assessment of the external and internal noise levels is presented in Table 9.16.

Table 9.16 – Assessment of Ambient Noise Levels

Monitoring Position	BS 8233 Criteria Achieved (Y/N)			
	Outdoor Amenity (daytime)	Internal (Windows Partially Open/Windows Closed)		
		Living Rooms & Bedrooms (daytime)	Dining Areas	Bedrooms (night time)
S1	Y	Y/Y	Y/Y	Y/Y
S2	Y	Y/Y	Y/Y	Y/Y

9.90 The assessment indicates that the existing ambient noise levels are below the BS 8233 threshold criteria for external and internal areas.

9.91 The noise effects on the proposed residential area of the development when assessed against the guidance in Table 9.7 provide between LOAEL and SOAEL and provides a minor noise effect.

9.92 The WHO Guidelines for Community Noise provides a guideline internal maximum noise level of 45 dB $L_{Amax,F}$ to ensure there are no negative health effects related to sleep disturbance.

9.93 Assuming the same façade sound reduction from typical design as used in the 8233 assessment, the highest maximum noise level of 66.8 results in internal noise levels of 55.8 and 33.8 dB $L_{Amax,F}$ with windows partially open and windows closes, respectively.



9.94 The maximum noise level meets the WHO criteria with windows closed. Sufficient ventilation should be considered when relying on closed windows to achieve the criterion. Examples of mitigation measures for ventilation include trickle ventilators and acoustic air bricks.

Road Traffic Noise

9.95 The traffic flow data provided from the Transport Assessment has been used as the basis for the road traffic noise assessment. The 24-hour Annual Average Weekday Total (AAWT) flows and the 18-hour daytime flows (0600-0000 hrs) were provided for the local road network surrounding the Proposed Development for the year 2021 and 2031 both with and without development. These traffic flows are shown in **Appendix 9.5**.

9.96 Traffic noise predictions have been made using the CRTN prediction methodology. The methodology has been used to predict the magnitude of any change in noise level resulting from the development proposals at the roadside of the local network.

9.97 The predicted changes in noise level, identified with respect to the road traffic noise impact assessment criteria, are presented in Table 9.17 for the day and night-time periods.



Table 9.17 – Change in Noise Level on Local Road Network in, 2023

Link ID	Road Link	Change in AADT Traffic Flow Between 'Do Something' and 'Do Minimum' Scenarios, 2023	
		Increase in Flow	Noise Change, dB
1	N Dane Way (N)	253	0.0
2	N Dane Way (S)	0	0.0
3	Princess Ave	0	0.0
4	Shawstead Rd	253	0.8
5	Ham Lane	2426	5.2
6	Capstone Rd	384	0.4
7	Lidsing Rd (W)	2042	1.5
8	Lidsing Rd (E)	2042	1.5
9	Lidsing Rd (S)	515	0.2
10	Hempstead Rd (S)	1527	0.8
11	Hempstead Rd (N)	1527	0.7
12	Hempstead Rd (N)	455	0.3
13	Chapel Ln (W)	1071	0.7
14	Chapel Ln (E)	1071	0.7
15	Hempstead Valley Dr (N)	0	0.0
16	Hempstead Valley Dr (S)	1071	0.5
17	Hempstead Valley Dr (SE)	1071	0.4
18	The Rise	0	0.0
19	Sharstead Way (S)	1071	0.3
20	Sharstead Way (N)	1071	0.3
21	Wigmore Rd	0	0.0
22	Hoath Way (N)	84	0.0
23	Hoath Way	988	0.1
24	Hoath Way (S)	1117	0.1
25	Harp Farm Rd	0	0.0
26	Westfield Sole Rd	292	0.2
27	Lords Wood Ln	0	0.0
28	Boxley Rd	44	0.0
29	Walderslade Woods	247	0.1
30	M2 (E) off-slip	135	0.0
31	M2 (W) off-slip	982	0.2

9.98 Table 9.17 identifies that the majority of the existing noise-sensitive receptors adjacent to the road network will to experience increases in noise level of less than 1 dB. DMRB states that this is likely to result in a negligible impact in both the short term and the long term.



9.99 The noise change at Ham Lane and Lidsing Road is calculated to be 5.2 dB and 1.5 dB, respectively. There are no noise sensitive properties on these links and the change in noise levels is not likely to affect the nearest existing residential properties to the development site.

9.100 The proposed site is situated to the south of Ham lane and west of Lidsing Road. The generic mitigation measures for closed windows would be sufficient that any increase in existing ambient noise levels as a result of the introduction of the development would not affect the assessment.

ASSESSMENT OF CUMULATIVE EFFECTS

9.101 Identified nearby developments that may potentially give rise to cumulative effects include:

- Land East of Gleamingwood Drive Lordswood Kent;
- Land at North Dane Way (East Hill), Chatham, Medway; and
- Land At Brickfield Darland Farm Pear Tree Lane Hempstead Gillingham ME7 3PP.

9.102 The Land East of Gleamingwood Drive site is approximately 200 m south of the Gibraltar Farm site at the closest point. The proposed development at North Dane Way is approximately 1.6 km north of the Gibraltar Farm site, with the development at Brickfield Darland Farm situated further beyond.

9.103 The assessment of the proposed construction and traffic movements at Gibraltar farm indicates that there are no likely significant effects from the proposed development. Notwithstanding this, the potential for cumulative effects has been considered based on the proximity of the developments and estimation of any cumulative noise levels.

9.104 Considering the distance and likely access routes of the North Dane Way and Brickfield Darland Farm sites there are unlikely to be cumulative impact from construction activities or from the increased traffic movements.

9.105 The close proximity to the site East of Gleamingwood Drive may give rise to increased noise levels during construction activities. The calculated noise levels at the nearest residential receptors indicate that there is low likelihood of noise levels exceeding the target noise criterion.



9.106 On the basis that the construction activities at the Land East of Gleamingwood Drive would be similar to those at Gibraltar Farm, estimated combined construction noise levels would remain below 74 dB $L_{Aeq,T}$ and would not exceed the criterion noise level of 75 dB $L_{Aeq,T}$.

9.107 With consideration to the above, the potential cumulative effects from the Gibraltar Farm development and identified nearby developments are likely to be negligible.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Construction Phase

9.108 To control the impact of noise during construction of the Proposed Development, contractors will ensure that works are carried out in accordance with best practicable means (BPM) as described in BS 5228 comprising of the following:

- Where possible, 'silenced' plant and equipment will be used;
- Where vehicles are standing for a significant period of time, engines will be switched off;
- Acoustic enclosures will be fitted where possible to suppress noisy equipment;
- Plant will operate at low speeds, where possible, and incorporate automatic low speed idling;
- Where possible, electrically driven equipment will be selected in preference to internal combustion powered, hydraulic power in preference to pneumatic and wheeled in lieu of tracked plant;
- All plant will be properly maintained (greased, blown silencers replaced, saws kept sharpened. Teeth set and blades flat, worn bearings replaced etc);
- Consideration will be given to temporary screening or enclosures for static noisy plant to reduce noise emissions and plant should be certified to meet any relevant EC Directives;
- All contractors will be made familiar with the guidance in BS 5228 (Parts 1 & 2) which will form a pre-requisite of their appointment; and
- Early and good public relations with the adjacent tenants and occupants of buildings will also reduce the likelihood of complaints.

9.109 These general measures to control construction noise will be incorporated within the Construction Environmental Management Plan (CEMP) and/or detailed in construction method statements. By adopting the recommended best practicable means, construction noise levels can typically be reduced by 10 dB(A).



9.110 The CEMP will present procedures to control the potential impact of noise at any proposed residential units that are occupied prior to the completion of the construction activities at the Site. Essentially, where construction activities associated with any phase are identified to be within the critical distances, consideration will be given to the use of quieter techniques or targeted and specific noise mitigation measures (such as reduced duration of operation, enclosure of equipment etc.) to ensure continued compliance with the criterion limit.

9.111 The existing residential properties are located at a distance greater than 40 m and therefore further mitigation measures to reduce the vibration effects are not required.

Residential Façade Insulation

9.112 The glazing and ventilation elements are typically the weakest acoustic link in the construction of a building façade. Therefore, in order to assess the acoustic performance of the residential accommodation units of the Proposed Development, it is appropriate in the first instance to explore the level of protection that will be afforded by the performance of the glazing and ventilation elements in combination.

9.113 In order to achieve the target daytime and night-time internal noise levels, it is necessary to determine the minimum acoustic performance requirements of both the glazing and ventilation system. It is assumed that the default choice of glazing for the habitable rooms of the Proposed Development will be double glazing and the default choice for ventilation will be a window slot or through-wall ventilator.

9.114 Using the façade reduction and assessment method detailed in BS 8233 the internal and external ambient noise levels are calculated to meet the criteria for all room times during both day and night-time periods.

9.115 Section 3.4 of the WHO Guidelines states that for good sleep, indoor noise levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times/night. With the assumed façade reduction the maximum indoor noise level during the night time would remain below 45 dB $L_{Amax,F}$.

9.116 When relying on closed windows to meet noise criterion, acoustically treated ventilation should be provided to habitable rooms. The windows should be openable such that the choice of meeting the internal noise levels is with the occupants.



9.117 It should be noted that the sound reduction performances detailed above apply to habitable rooms, such as living rooms and bedrooms, only. For non-habitable rooms, such as kitchens, bathrooms, stairways, halls, landings etc, lower acoustic performance glazing configurations are permissible.

9.118 For those façades where windows need to be closed to meet the internal noise targets, an additional means of ventilation will be necessary to ensure compliance with Approved Document F of the current Building Regulations.

RESIDUAL EFFECTS

Construction Phase

9.119 Calculated construction noise levels indicate that noise levels are likely to remain below the 75 dB $L_{Aeq,T}$ criterion noise level. With the implementation of the mitigation measures outlined above, at least a 10dB(A) reduction in general construction noise is anticipated. On this basis, residual construction noise levels would be significantly below the specified criteria

9.120 With the appropriate mitigation measures, the residual construction noise effects at all receptors would be LOAEL, when compared with the significance criteria adopted for this assessment and provides a minor to negligible noise effect.

Operational Phase

Site Suitability

9.121 The residential area is predicted to experience noise levels within NEG A. To ensure compliance with the adopted criterion appropriate noise mitigation measures have been provided. The residual noise effect is considered to be negligible.

Road Traffic Noise

9.122 The assessment has shown that the Proposed Development will have no significant impact on the levels of road traffic generated noise in the area and the residual effect is negligible at the nearest existing noise sensitive receptor locations.



SUMMARY

9.123 This chapter has considered the likely effects of the Proposed Development with respect to noise and vibration. These include the effects of existing conditions on the Proposed Development and the effects of noise and vibration generated by the Proposed Development on surrounding properties, during both construction and operational phases.

9.124 The assessment has been based on a series of environmental noise measurements undertaken at the application site and noise predictions.

9.125 The impact of noise and vibration during construction of the Proposed Development has been predicted and assessed in accordance with BS 5228. Generic mitigation measures have been recommended, which when implemented are capable of ensuring that the impact of noise and vibration during the construction of the Proposed Development is adequately controlled.

9.126 An assessment has been carried out in accordance with the adopted criteria to determine the suitability of the application site for residential accommodation. Proposed units will require appropriate glazing and ventilation specification, in order to achieve the required internal noise levels.

9.127 The impact of development associated traffic has been assessed. It is predicted that on this basis, no significant increase in road traffic noise will be experienced at existing receptors adjacent to the surrounding roads.

9.128 There are no identified commercial noise sources that would be likely to cause any significant impact at the Proposed Development.

9.129 A summary of the noise significance and residual effects for the Site are presented in Table 9.18.



Table 9.18 - Noise Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Noise: Construction Impacts	Direct, Temporary Short-Term Local	Minor to Moderate	Implementation of Best Practicable Means to control noise emissions	Minor to Negligible
Vibration: Construction Impacts	Direct, Temporary Short-Term Local	Negligible	Implementation of Best Practicable Means to control vibration	Negligible
Noise: Site Suitability	Direct, Permanent Long-Term Local	Minor	Appropriate sound insulation	Negligible
Vibration: Site Suitability	Direct, Permanent Long-Term Local	Negligible	None	Negligible
Noise: Changes in road traffic noise	Direct, Permanent Long-Term Local	Negligible	None	Negligible



REFERENCES

- Ref 9.1:** Planning Policy Guidance PPG24 'Planning and Noise'. 1994 The Stationary Office, 1994
- Ref 9.2:** The National Planning Policy Framework, March 2012, The Stationary Office, 2012
- Ref 9.3:** British Standard 5228:-1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise'
- Ref 9.4:** Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3 Part 7 – HD 213/11 Noise and Vibration, 2011
- Ref 9.5:** British Standard 8233: 2014 Sound Insulation and Noise Reduction for Buildings
- Ref 9.6:** World Health Organisation (WHO): 1999, 'Guidelines for Community Noise', WHO, Geneva.
- Ref 9.7:** Noise Policy Statement for England, 2010 (NPSE)
- Ref 9.8:** Environmental Noise Directive, 2002/49/EC, Europa, 2002
- Ref 9.9:** British Standard 6472: 2008: Guide to evaluation of human exposure to vibration in buildings, Part 1, Vibration sources other than blasting. BSI, 2008
- Ref 9.10:** The Department for Transport, 1988, 'Calculation of Road Traffic Noise (CRTN)', The Stationary Office.
- Ref 9.11:** British Standard 7445: 2003: Description and measurement of environmental noise. BSI, 2003.



10 LANDSCAPE AND VISUAL AMENITY

INTRODUCTION

10.1 This Chapter assesses the impact of the Proposed Development on Landscape Character and Visual Amenity, in order to assess the likely significant landscape and visual effects of the Proposed Development on the key landscape and visual receptors that may be affected by the changes proposed.

10.2 This Chapter of the ES has been prepared by the Environmental Dimension Partnership (EDP). EDP has provided advice to the applicant on landscape matters throughout the design and assessment phases of the project.

10.3 This Chapter provides an abridged version of a full, and now updated, LVIA provided at **Appendix 10.1, 10.2 and 10.4**, in a format consistent with the adopted ES structure. The methodology adopted for the landscape and visual assessment has been devised from current legislation and 'best practice' guidance (**Ref 10.1**). Therefore, this Chapter should be read in conjunction with the following Appendices and their supporting documents:

- **Appendix 10.1:** Landscape and Visual Impact Assessment Volume I;
- **Appendix 10.2:** Landscape and Visual Impact Assessment Volume II;
- **Appendix 10.3:** Proof of Evidence of Duncan McInerney BSc (Hons), MLD, CMLI in respect of Landscape Matters Volumes I – III (edp1995_07d); and
- **Appendix 10.4:** Landscape and Visual Impact Assessment Addendum (Updated January 2019).

Planning History

10.4 Following the earlier refusal by Medway Council (Ref. MC/14/2395 (**Ref 10.2**)) and a Public Inquiry, the Secretary of State allowed an appeal (Appeal Ref. A2280/W/16/3143600 (**Ref 10.3**)) in January 2016. This permission was granted for a shorter time period of 18 months in order to accelerate housing delivery to meet the needs of Medway. The main access to the Site involved a small area of land within Medway Council's ownership. Following a long period of negotiation, Medway Council resolved not to dispose of the land at its commercial value. As a result, whilst the approved landscape framework remains similar to that of the approved scheme,



the access has changed from North Dane Way to Ham Lane. The revised proposal benefits from the feedback of the South East Design Panel in connection with an earlier 'reserved matters' layout, and as a result the submitted proposals include significantly more design detail although remaining an outline scheme.

10.5 Therefore, an LVIA Addendum was produced (see **Appendix 10.4**) to review the recent changes to the Proposed Development in landscape and visual terms, identifying any change in the predicted landscape and visual effects stated within the 2014 LVIA previously considered by the Inspector.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

10.6 Provided within this section is an abridged methodology for the LVIA. An unabridged version can be found at Appendix EDP 3 to **Appendix 10.2** of this ES Chapter, as can a glossary of terms.

10.7 The methodology adopted for the LVIA has been devised from current legislation and 'best practice' guidance, including:

- The European Landscape Convention (**Ref 10.4**) (ELC), which was signed by the UK in February 2006 and became binding in 2007 and highlights the importance of developing landscape policies dedicated to the protection, management and creation of landscapes, and establishing procedures for the general public and other stakeholders to participate in policy creation and implementation. The ELC defines landscape as "*an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*".
- Guidelines for Landscape and Visual Impact Assessment – Third Edition (LI/IEMA, 2013); and
- An Approach to Landscape Character Assessment (**Ref 10.5**) (Natural England, 2014).

10.8 The guidance acknowledges that nature of the landscape and visual assessment involves both an objective and subjective professional judgement. Accordingly, the conclusions reach in this chapter are based on the written methodology contained in Appendix EDP 3 to **Appendix 10.2** of this ES Chapter, applied using subjective professional judgement.



Landscape Assessment

10.9 Landscape effects derive from changes in the physical landscape fabric which may contribute to changes in its character and how this is experienced. These effects need to be considered in line with changes already occurring within the landscape and which help define the character of it.

10.10 Effects upon the wider landscape resource i.e. the landscape surrounding the development, requires an assessment of visibility of the proposals from adjacent landscape character areas, but remains an assessment of landscape character and not visual amenity.

Visual Assessment

10.11 The assessment of effects on visual amenity draws on the predicted effects of the Proposed Development, the landscape and visual context, and the visibility and viewpoint analysis, and considers the significance of the overall effects of the Proposed Development on the visual amenity of the main visual receptor types in the Study Area.

Identifying Landscape and Visual Receptors

10.12 This assessment has sought to identify the key landscape and visual receptors that may be affected by the changes proposed.

10.13 The assessment of effects on landscape as a resource in its own right, draws on the description of the development, the landscape context and the visibility and viewpoint analysis to identify receptors.

10.14 The locations and types of visual receptors within the defined Study Areas are identified from Ordnance Survey maps and other published information (such as walking guides), from fieldwork observations and from local knowledge provided during the consultation process.

Assessment of Landscape and Visual Effects

10.15 The assessment of effects on the landscape resource includes consideration of the potential changes to those key elements and components which contribute towards recognised landscape character or the quality of designated landscape areas; these features are termed a landscape receptor. The assessment of visual amenity requires the identification of potential



visual receptors that may be affected by the Proposed Development. As noted, following the identification of each of these various landscape and visual receptors, the effect of the development on each of them is assessed through consideration of a combination of:

- Their overall sensitivity to the proposed form of development that includes the susceptibility of the receptor to the change proposed and the value attached to the receptor; and
- The overall magnitude of change that will occur - based on the size and scale of the change, its duration and reversibility.

Defining Receptor Sensitivity

10.16 A number of factors influence professional judgment when assessing the degree to which a particular landscape or visual receptor can accommodate change arising from a particular development. Sensitivity is made up of judgements about the value attached to the receptor (determined at baseline stage) and the susceptibility of the receptor to the type of change arising from the development proposal.

10.17 A location may have different levels of sensitivity according to the types of visual receptors at that location and any one receptor type may be accorded different levels of sensitivity at different locations.

10.18 The overall sensitivity of any landscape or visual receptor is determined by combining judgements of their susceptibility to the type of change or development proposed and the value attached to the landscape as set out at paragraph 5.39 of GLVIA 3rd Edition (2013) (**Ref 10.6**). For example, a high susceptibility to change and a low value may result in a medium overall sensitivity. A degree of professional judgement applies in arriving at the overall sensitivity for both landscape and visual receptors, and a five-point word scale is used to define this – Very High, High, Medium, Low and Very Low – this reflecting the definition used for value and susceptibility individually.

10.19 The magnitude of any landscape or visual change is determined through a range of considerations particular to each receptor. The three attributes considered in defining the magnitude are:

- Scale of Change;



-
- Geographical Extent; and
 - Duration and reversibility/Proportion.

10.20 Receptor locations from which views of the Proposed Development are not likely to occur will receive no change and therefore no effect. With reference to the Zone of Theoretical Visibility (ZTV) and Site survey, the magnitude of change is defined for receptor locations from where visibility of the Proposed Development is predicted to occur.

Defining Time Horizons

10.21 The GLVIA advises that in assessing the effects on views, allowance should be made for the proposed mitigation measures to take effect (GLVIA, para 6.45). Landscape practitioners commonly adopt a time reference point of 15 years after the completion of development as a suitable time frame in which to assess the 'completed' effects of development. Year 15 onwards represents the early medium term (in the lifespan of the maturing landscape framework). Years 1-15 allow sufficient time for the landscape planting to have become established and genuinely effective in its design role and for the development to have weathered and matured. It is considered a reasonable compromise between assessing the scheme upon completion and judging effects on the basis of mitigation which in some cases may take a considerable time to become established.

10.22 EDP's assessment is therefore based on the following time horizons:

- Construction stage and 'short term' effects on the basis of likely visual impacts. Because the construction phase lasts up to 7 years, during which the scale of development grows from zero to fully built out (with associated growth in any planting), it is difficult to define exact construction stage effects. The construction of the Proposed Development is to be delivered over the period 2020 to 2027, with the early phases of construction starting
- The medium term is years 5-10 following completion of development (i.e. 12-17 years after commencement; and
- The medium to long term is 10-20 years following completion of the Proposed Development (17-27 years after commencement), with the long term being 20 years+, which gives rise to the 'residual effects' of the Proposed Development in landscape terms. Clearly, in the event of a phased development implemented over a period of years (as in the case of the Site), the assessment of effects at a fixed point in time is made



more complex and the ranges in short and medium terms (defined above) are helpful in this respect.

Significance Criteria

10.23 The purpose of the EIA process is to identify the significant environmental effects (both beneficial and adverse) of development proposals. Schedule 4 to the EIA Regulations specifies the information to be included in all environmental statements, which should include a description of:

"...the likely significant effects of the development on the environment, which should cover the direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the development."

10.24 In the interests of simplicity, the same assessment table is used for both landscape character effects and for visual effects. For each viewpoint (for visual effects) or, in the case of landscape character assessment, each aspect of landscape character, the degree of sensitivity and anticipated magnitude of change is combined to yield a predicted level of effect, ranging (as per the table below) from 'negligible' to 'substantial'. Effects of moderate or greater (bold text), are considered for the purposes of this assessment to represent a 'significant' effect in landscape terms i.e. a change to the landscape or view seen, which, alone or in combination, constitute a material change warranting 'weight' to be attached to that change when considering the scheme's landscape and visual effect, and compliance with policy. The significance of effect can be derived by combining the sensitivity and magnitude in accordance with the matrix in Table 10.1.

Table 0.1 Levels of Effect Matrix

Overall Sensitivity	Overall magnitude of Change				
	Very High	High	Medium	Low	Very Low
Very High	Substantial	Major	Major/ Moderate	Moderate	Moderate/ Minor
High	Major	Major/ Moderate	Moderate	Moderate/ Minor	Minor
Medium	Major/ Moderate	Moderate	Moderate/ Minor	Minor	Minor/ Negligible
Low	Moderate	Moderate/ Minor	Minor	Minor/ Negligible	Negligible
Very Low	Moderate/ Minor	Minor	Minor/ Negligible	Negligible	Negligible/ None



10.25 People's opinion of development proposals which change the landscape differ. Some are more accepting of change than others. Those with firm views one way or another tend to exhibit an unintentional bias or 'valency' which can influence objectivity.

10.26 The assessment process used by EDP combines objective methodology (based on that set out in Landscape Institute and IEMA (2013) "*Guidelines for Landscape and Visual Impact Assessment – Third Edition*") with professional judgement. The full assessment process is described at Appendix EDP 3 to **Appendix 10.2** of this ES. The assessment process is neither 'pro' nor 'anti' development but seeks as objectively as possible to assess the degree of change likely to be experienced, and is open to the possibility that development can engender beneficial as well as adverse effects. In the interests of transparency, thresholds for the levels of both the sensitivity of the receptor and the magnitude of the change experienced are also set out at Appendix EDP 3 to **Appendix 10.2** of this ES.

Assumptions / Limitations

10.27 Baseline conditions have been established using existing assessments, available documentation and field assessment; it is important to note that this information may change before or during the construction and operation of the Proposed Development.

10.28 Within reasonable limits, the assessment is undertaken in consideration of the 'worst case' scenario for the development, i.e. those potential outcomes, situations or locations which would result in the most profound effect on landscape and visual receptors. It therefore identifies the greatest degree of change likely to accrue and may be subject to mitigating factors or alternative conditions which might reduce those effects. For example, visual effects are considered in both summer and winter context; although the magnitude of effect is expressed for winter landscape conditions when trees are without leaf cover and the visibility of development is at its greatest. Where this is the case, the assessment identifies alternative conditions or further mitigation which might result in impacts being less pronounced.

10.29 The assessment applies a pre-determined methodology to arrive at conclusions. This procedure brings a degree of objective, procedural rigour into what otherwise might be judged to be 'personal opinion'. Certainly, professional judgement still plays its part, but the purposed of adopting a methodology is to make the process as clear and logical as possible.



LEGISLATION, PLANNING POLICY AND GUIDANCE

National Planning Policy

10.30 A corner-stone of the National Planning Policy Framework (**Ref 10.7**) (NPPF) is the presumption in favour of sustainable development. In broad terms, this means that development proposals that accord with adopted policy should be approved without delay, and where no policy exists or is out-of-date, permission should be granted unless any adverse effects of the proposal would significantly outweigh the benefits, subject to specific policies within the NPPF that restrict development (e.g. natural heritage and landscape designations). The principles of the presumption in favour of sustainable development should also be carried forward into planning policy at a local level so that it is clear what constitutes acceptable development under the new guidance.

10.31 In relation to development and landscape, Paragraph 57 seeks to achieve high quality design in development, whilst paragraph 64 states that development should improve the *“character and quality of the area and the way that it functions.”*

10.32 Paragraph 75 of the NPPF addresses PRoW, stating that *“planning policies should protect and enhance public rights of way and access”*, seeking opportunities to *“provide better facilities for users, for example by adding links to existing rights of way networks including National Trails”*.

Local Planning Policy

10.33 Local planning policies for Medway are set out within the Medway Local Plan (**Ref 10.8**) (1996-2006) adopted on 14 May 2003, Saved Policies:

- Policy S4: Landscape and Urban Design Guidance;
- Policy BNE1: General Principles for Built Development;
- Policy BNE2: Amenity Protection;
- Policy BNE6: Landscape Design;
- Policy BNE7: Access for All;
- Policy BNE22: Environmental Enhancement;
- Policy BNE25: Development in the Countryside;



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- Policy BNE34: Areas of Local Landscape Importance;
 - Policy BNE35: International and National Nature Conservation Sites;
 - Policy BNE36: Strategic and Local Nature Conservation Sites;
 - Policy BNE37: Wildlife Habitats;
 - Policy L3: Protection of Open Space; and
 - Policy L4: Provision of Open Space.

10.34 A new local plan is currently being prepared for the plan period 2012 to 2035. The plan is still in its very early stages, with consultation ending in June 2018, with the Stage 4 publication of the draft plan expected Summer 2019.

Guidance Documents

10.35 A number of guidance documents are considered relevant to the Site, including:

- Medway Housing Design Standards (**Ref 10.9**) (interim) November 2011;
- Wildlife, Countryside and Open Space Strategy (**Ref 10.10**) 2008 – 16; and
- Medway's Green Grid Action Plan Draft (**Ref 10.11**) 2007.

Landscape and Landscape Related Designations

10.36 The Site does not lie within any nationally designated landscapes such as National Parks or Areas of Outstanding Natural Beauty (AONB).

10.37 There are two statutory sites within 1km of the Site boundary: the Kent Downs AONB lies approximately 0.8km south of the Site and South Wood Local Nature Reserve (LNR) approximately 0.7km north-east of the Site.

10.38 The Site falls within the locally designated 'Areas of Local Landscape Importance' (ALLI) which covers Capstone, Darland and Elm Court. This non-statutory designation affords no formal legal protection and should be assessed with appropriate right to their importance and the contribution that they make as reflected in saved Policy BNE34 of the Local Plan which



seeks to ensure development does not materially harm the landscape character and function of the area.

10.39 Within Kent, non-statutory designations for nature conservation are known as Sites of Nature Conservation Interest (SNCIs) and protected under saved Policy BNE36 of the Local Plan. There are no SNCIs within the Proposed Development Site. However, there is one (Hook Wood) adjacent to the Site's northern boundary. A number of undesignated ancient woodland sites are also present within a 1km radius, including Chapel Hill Wood, Beechy Wood and Cowbeck Wood. Additionally, there are two Local Wildlife Sites (LWSs) within 1km of the Site's northern and western boundaries: Hook Wood and South Wood.

Heritage Designations of Relevance

10.40 No part of the Site is designated as a Conservation Area. The Site is not constrained by its proximity to any Scheduled Ancient Monuments (SAM) or listed buildings. Accordingly, related policy is scoped out of this assessment. Similarly, no part of the Site lies within or in close proximity to a garden or park listed on English Heritage's Register of Parks and Gardens (RPG) of special historic interest.

Ecology Designations of Relevance

10.41 Insofar as policies relate to ecological matters these have been considered in Chapter 11 of this ES.

10.42 There are several parcels of Ancient/Semi Natural Ancient Woodlands which bound the Site or are located in close proximity to it. These include Hook Wood (adjacent to the northern boundary), Hall Wood (western boundary), Roots Wood (southern boundary), Lord's Wood (southwest of the Site), and Holt Wood (on Ham Lane, adjacent to Gibraltar Cottages).

Tree Preservation Orders

10.43 No Tree Preservation Orders (TPOs) are located within the Site and therefore no trees are afforded statutory protection by virtue of Medway Council TPO 1993. Roots Wood, within Maidstone Borough Council administrative boundary is located adjacent to the corner of the Site's south-eastern boundary and is protected by a TPO. This does not constrain the development proposals nor prejudice its deliverability.



10.44 A full tree survey and arboricultural impact assessment was undertaken by EDP in accordance with BS5837:2012 'Trees in Relation to Demolition, Design and Construction'. The methodology employed and the results are set out in detail in **Appendix 11.4** to this ES.

10.45 EDP's arboricultural survey of the Site recorded a total of 43 individual trees, 14 groups of trees, 6 areas of woodland, and 1 hedgerow, totalling 64 items. Of these 64 items, 47 have been classified as category B (moderate quality), 16 have been classified as category C (low quality), and 1 has been identified as category U, indicating that the item should not be retained. The Site's biggest arboricultural constraints are the 4 areas of woodland (Roots Wood, Hall Wood, Hook Wood, and Holt Wood) which carry the designation of Ancient and Semi-Natural Woodland and are therefore protected by the National Planning Policy Framework as irreplaceable habitat. Further details of the arboricultural assessment are provided in **Appendix 11.4** to this ES.

Ancient/Semi Natural Ancient Woodland

10.46 There are several parcels of Ancient/Semi Natural Ancient Woodlands which bound the Site or are located in close proximity. These include Hook Wood (adjacent to the northern boundary), Hall Wood (western boundary), Roots Wood (southern boundary), Lord's Wood (southwest of the Site), and Holt Wood (on Ham Lane, adjacent to Gibraltar Cottages).

Public Rights of Way

10.47 The Site contains one Byway 'RC29' and two Public Rights of Way 'RC27' and 'RC28' running across it.

10.48 There are several permissive footpaths which have been identified surrounding the Site. Permissive footpaths are not statutory rights of way or covered by rights of way legislation. However, they indicate unofficial footpaths that the general public make regular use of. A frequently used footpath extends down the North Dane Way spur road (adjacent to Hall Wood) connecting to Roots Wood, Lord's Wood and the Restricted Byway 'KH37'. A footpath also exists to the south of Hall Wood joining the Byway 'RC29' and forming a circuit around the woodland.

10.49 There are no large areas of Open Access (OA) or Registered Common Land (RCL) within the Study Area.



BASELINE CONDITIONS

10.50 The Site comprises a single arable field, bounded to the north-west and south-west by parcels of woodland. Broadly triangular in shape, it is located to the south-east of the suburb of Lordswood and sits to the north of the M2 Motorway. Hall Wood, classified as 'Ancient Woodland', is located to the north-west of the Site (refer to Plan EDP 1 to **Appendix 10.2** of this ES). Part of the northern boundary of the Site follows a bridleway that runs through Hook Wood connecting North Dane Way to Ham Lane, while the remainder is bordered by buildings associated with Gibraltar Farm. The north/north-eastern boundary of the Site, for the most part, abuts Ham Lane, save for a small indent around two dwellings known as Gibraltar Cottages. Further south-east, along Ham Lane and on its northern side, is the Elm Court Industrial Estate consisting of a number of substantial commercial buildings. The southern Site boundary represents the administrative boundary between Medway Council administrative area and Maidstone Borough Council administrative area, although is not defined by any physical features, as shown on Plan EDP 2 to **Appendix 10.2** of this ES.

10.51 In topographic terms, the Site gently slopes from south-west to the north-east. The highest part of the Site is located at approximately 134m Above Ordnance Datum (AOD) in the south-west corner of the Site. From here the Site slopes very gradually to the north-east where it meets Ham Lane at between 113m and 115m AOD. To the north, the ground dips more sharply from the north-western boundary adjacent to Hall Wood at approximately 113-115m AOD and continues to fall reaching 105m AOD at Gibraltar Farm (the lowest point on the Site).

10.52 The Site is largely in agricultural use, as shown on Plan EDP 3 to **Appendix 10.2** of this ES, which illustrates the wider landscape character. It consists of predominantly large-scale arable fields, with no internal hedgerow network, the product of 20th century agricultural intensification. A conifer shelter belt runs around Gibraltar Cottages signalling a recent feature in the natural landscape. There is no visible boundary to the south (continuous arable fields with occasional residential properties extend to the motorway). Elm Court Industrial Estate, on the Site's eastern boundary, consists of a garden centre, craft centre and local business units. The wooded boundaries of the Site are one of the key characteristic features. The Site is surrounded by four woodland areas: Hook Wood, Hall Wood, Holt Wood and Roots Wood. EDP's Arboricultural Impact Assessment (ref edp1995_r011) demonstrates that Hall Wood (an area of Ancient Woodland, in accordance with Natural England's Ancient Woodland Inventory) contains trees of mature, and predominately moderate, quality and value, whilst suffering from a high level of public disturbance.



10.53 The boundary treatments surrounding the Site are varied, with parcels of woodland enclosing the north and south-west corner of the Site, in contrast to the lack of boundary treatment or land cover to the south. In the far northern corner, the field boundary separating the Site from Gibraltar Farm is defined by an unkempt post and wire fence. The Site's western boundary is delineated by stockproof fencing installed at the rear of gardens and recognised as 'typical' urban fringe settlement character. This is also the case at Elm Court Industrial Estate, adjacent to the eastern boundary, with a walled and gated entrance in addition to mature conifers and intact species-poor hedgerow running around the estate. These were presumably planted when the industrial estate was constructed.

Landscape Character: Baseline Conditions

National Landscape Character

10.54 The landscape character of the Site is described at a national level by Natural England in its National Character Areas (NCAs). NCAs were developed by the former Countryside Agency as part of its Character of England Landscape, Wildlife and Cultural Features Map produced in 2005 and they provide a broad-brush description of the landscape surrounding the Proposed Development.

10.55 The Site falls within the NCA 119 'North Downs' (**Ref 10.12**). A full description of the NCA is available online. The NCA 119 profile was updated and published in April 2013 and contains up-to-date and more comprehensive, fact-based analysis of the broad-landscape character of the area than the previous Natural England profile.

10.56 Broadly speaking, the NCA key characteristics are: the low undulating landscape; settlements which are generally scattered villages and hamlets, linked by deep overhanging, exposed arable/fields with sparse hedgerow pattern and limited sheltered belt; intensively cropped fields and extensive areas of grazed marsh and reed beds; and scattered small woodlands and large settlements visually dominant in the landscape due to the lack of screening woodlands or shelterbelts.

10.57 Although helpful, the NCAs are not sufficient in detail to determine the acceptability of the Proposed Development within the host landscape. However, further, more detailed, landscape character assessments have been carried out at the District level; these assessments are described below.



10.58 The NCA profile is an important matter to bear in mind when reviewing the published landscape guidelines. However, while the accompanying descriptions are broadly representative of the wider landscape, it is too generic to provide specific characterisation of the Site. This is unsurprising as the national characterisation provides a broad framework for more detailed landscape character assessments. For the scale of the development proposed, it is considered that the description of landscape character undertaken at the sub-regional level is more relevant in establishing the landscape resource baseline.

Local Landscape Character

10.59 There are two landscape character assessments relevant to the Site and its context:

- The Landscape Assessment of Kent (**Ref 10.13**) (KCA) 2004; and
- Medway Landscape Character Assessment (**Ref 10.14**) (MLCA) 2011.

The Landscape Assessment of Kent

10.60 The Site lies wholly within the 'Capstone Downs' Landscape Character Area (LCA), as defined by the KCA. With reference to this document, the Site lies in the southern portion of the North Downs, which is physically distinguished by the "*rolling open plateau landscape*" and large arable units. This is consistent with the upper chalk underlying topography creating a soft central plateau of land between two of the valleys demarcated by Shawstead Road and Lidsing Road.

10.61 The 'Landscape Analysis' section of the KCA suggests there has been much evolution of the local landscape character leading to many "visual detractors in the form of urban and industrial development", albeit the wider landscape being "*distinctly rural in character*" the urban fringe uses are described as "*encroaching on this character*". In that regard, the landscape has also evolved through a shift from pasture to predominately intense arable cultivation, lessening the ecological integrity.

Medway Landscape Character Assessment

10.62 The 'Medway Landscape Character Assessment' (MLCA) was published in March 2011 by Medway Council. This provides a greater level of detail that is required for analysis and evaluation of the Site and its immediate context. The MLCA is consistent with the KCA, as described above; not only regarding nomenclature but the description of the local landscape



itself. The Site falls within the LCA 'Capstone and Horsted Valleys' and specifically, the landscape character type (LCT) '28 Elm Court'.

10.63 The MLCA describes the characteristics of LCT Elm Court as:

- *“Gently undulating open farmed arable plateau rising in south towards North Downs;*
- *Indistinct field pattern with weak hedgerow structure;*
- *Lack of landform containment gives large scale landscape – flattening and increasingly denuded towards M2 motorway;*
- *Elm Court Industrial Estate with conifer boundary introduces discordant urban elements into rural landscape; and*
- *Leisure Centre and playing fields to western corner provides amenity feature at boundary.”*

10.64 It is not expected that an individual parcel of land will encompass all of the host landscape type's characteristic features. The large-scale plateau topography of the arable landscape is interspersed with blocks of woodland, which defines the scale and pattern of the landscape. The field pattern has been lost and fragmented by intensive cultivation resulting in the loss of historic features including hedgerows and scattered hedgerow trees. The introduction of modern constructs such as the M2 Motorway and the urban fringe of Lordswood and Hempstead form part of the character of the landscape. Extensive urban areas and elements of built form are located on all sides of the Capstone Valley (refer to Photosheet EDP 1 to **Appendix 10.2** of this ES, which illustrates the wider local landscape character).

10.65 A full extract of the relevant landscape character type description is contained at Appendix EDP 7 to **Appendix 10.2** of this ES. In accordance with EDP's methodology, the sensitivity of the 'Elm Court' LCT is considered to be medium-low.

EDP's Own Landscape Character Appraisal

Topographic and Hydrological Character

10.66 The landform of the Site is broadly flat; the southerly high point of the Site (c.134m) slopes gently north and west to approximately 113m where the Site adjoins Ham Lane and Gibraltar Cottages; then slopes more prominently from approximately 113-115m to 105m where the Site adjoins Gibraltar Farm to the north.



10.67 The Site's topography is reflective of the southern, large-scale, rolling open plateau landform. The flat terrain of the Site does afford some medium-range views outwards to the surrounding wooded horizon. Yet the close proximity and physical relationship to Hall Wood and Hook Wood provide notable containment for this expansive of open arable farmland and is a common feature of the lower slopes and plateau landform.

10.68 The Site's hydrological character is principally defined by the fact that it is wholly located in Flood Zone 1 – low risk zone for fluvial/tidal flooding. The Site is traversed by a low risk surface water flow path moving from the south to north in line with the localised topography. Furthermore, there are no ponds or water bodies within the Site. The topography and hydrology dimensions of landscape character, in accordance with the EDP methodology, are considered to be of medium sensitivity.

10.69 Given the Site is relatively level and contains no waterbodies or permanent pond features, the new SuDS attenuation basins proposed as part of the drainage strategy would provide a hydrological resource for wildlife and there would be an inclusion of damp/wet grassland (as part of the SuDS scheme) across the Site.

Visual and Sensory Character

10.70 The Site's landscape character and land use is illustrated on Plan EDP 3 and Photosheet EDP 3 to **Appendix 10.2** of this ES. It comprises principally cultivated farmland actively managed for arable cropping including a parcel of woodland, namely Hall Wood. Open road corridors (Ham Lane and Lidsing Road) with busy traffic flows form prominent physical features to the south and east. Fly-tipping and littering is evident along these routes and within the woodlands, which harms the semi-rural character and is a strong detractor on surrounding local lanes. The Site's close proximity to the urban fringe settlement and roads reduces the relative tranquillity. The nature of urban edge intrusions such as noise, moving traffic of the M2, encroachment of domestic back gardens, imposition of suburban features and over-intensification of recreational routes reduce the quality and condition of the landscape character.

10.71 The highest portions of the Site – at approximately 134m AOD – lie in the south-west corner of the Site, from which the ground falls away gently to the east and north. Despite the slight elevation of the south-west portion of the Site, this area is well enclosed by Roots Wood. Accordingly, while the Site itself is largely denuded of any hedgerow/tree cover allowing clear views across the Site itself, the combined effect of the enclosing wooded belts and dense deciduous woodlands in the wider landscape means a sense of localised enclosure is still



experienced from within large sections of the Site. Even from the highest ground, from which some long-distance views north-east can be obtained, the visitor is made aware that the Site, while agricultural, is not truly 'rural'. The overall sense is of an agricultural landscape, somewhat denuded of its original landscape features.

10.72 The Site's eastern boundary lacks any defining features which allows for broad, open views along Ham Lane as it follows the Site boundary. Despite being a fairly narrow and historic lane, this still has an effect on the visual and sensory character of the Site. Noise and movement from the road are both a present influence on the sensory qualities of the Site. This is not a tranquil rural landscape, which illustrates intrusions into the countryside by features that have an impact both visually and audibly, such as roads and urban areas. The Site's proximity to the urban conurbation of Medway towns, and nearby influences such as major transport corridors (M2) causes activity and creates a transient environment.

10.73 Other visual detractors that influence the rural qualities of this agricultural landscape are a line of poles supporting 33kV high voltage cables traversing the Site on a north-south axis, approximately 12m in height. The cables run from approximately the western edge of Gibraltar Cottages to the eastern edge of Roots Wood.

10.74 Gibraltar Farm, adjacent to the north-eastern boundary of the Site, has been well absorbed into the landscape, owing to its historical presence dating back to 1765 when the farm was entirely surrounded by ancient woodland. Presently, Gibraltar Farm is hemmed in on two sides by existing dense woodland, with Holt Wood and the surrounding land to the north-east at higher elevation, ensuring that it is not as widely seen. However, Gibraltar Farm's southern boundary, which adjoins the Site, comprises of a poor-quality post and wire fence foregrounding the corrugated iron barn and adversely affecting the visual character of the northern portions of the Site.

10.75 Gibraltar Cottages, two-storey Victorian semi-detached properties on the eastern boundary (relatively isolated), are screened from the east side by a large conifer shelter (approximately 7m in height) introducing incongruous urban features into a semi-rural landscape. The boundary treatment comprises of close-boarded fencing (approximately 1.8m in height) and hedgerow, sufficiently containing the rear gardens.

10.76 The visual and sensory sensitivity of the Site is assessed as low as a result of the following two reasons:



- As result of the presence of strong urbanising features; the urban fringe of Lordswood, industrial/commercial buildings; the M2 motorway and associated indirect effects i.e. noise and movement which arise from them; and
- The visual character of the Site is open agricultural land with a dearth of landscape elements. The baseline characterisation describes the presence of landscape detractors such as dilapidated fencing, electricity cables, littering and instances of fly-tipping within a landscape not designated for its landscape value.

Landscape Fabric and Biodiversity

10.77 As illustrated by Plan EDP 3 to **Appendix 10.2** of this ES, the landscape fabric of the Site is relatively simple, comprising a single large-scale field under arable cropping and bounded in parts by woodland (Hall Wood).

10.78 Analysis of OS maps confirms that the field pattern has been simplified and enlarged in the 19th century, owing to significant clearing of woodland and modern agricultural farming practices. The extent of the change to the landscape fabric of the Site is illustrated on Plan EDP 6 to **Appendix 10.2** of this ES.

10.79 The Site is not bordered by hedgerows. Fragmented mature hedgerows are located off-site (to the east of Ham Lane) where the boundaries are well maintained – albeit with substantial gaps and very few hedgerow trees. A newly planted hedgerow was noted on the eastern edge of Gibraltar Farm.

10.80 Hook Wood's canopy overhangs into the vicinity of the Site to the north. The woodland consists predominantly of hornbeam, occasional ash, oak, silver birch and wild cherry species. Hall Wood, within the Site to the north-west, has a similar species composition and vegetation structure. A large corrugated metal fence surrounds a metal roofed building and yard located within the woodland. Neither the structure of the building, nor the interior of the yard, is visible from within the Site. The building has received planning permission for change of use from a winter maintenance depot to an asbestos waste transfer station.

10.81 There are no ponds or water bodies on or near to the Site.

10.82 Overall, the fabric of the Site is considered to be in denuded and generally poor condition. EDP's ecological assessment (Ref. edp1995_r009) corroborates this view,



concluding that for its size, this is not a piece of agricultural land with a high ecological value. The ecological integrity within the Site is considered to be of negligible importance, by virtue of the arable habitats, lack of hedgerow structure and dearth of hedgerow trees. It is considered that significant disturbance of the woodland edge habitats is currently taking place as a result of agricultural operations and combined heavy recreational use. For these reasons EDP has assessed the landscape fabric and biodiversity aspect of the Site as having low sensitivity to change.

Visual Amenity: Baseline Conditions

10.83 Chartered landscape architects from EDP's landscape team have conducted an assessment of the views towards the Site by walking and driving, as appropriate, local roads and rights of way. The objective is to identify those surrounding areas most likely to be sensitive to visual change arising from development of the site.

10.84 First, a broad area of search was defined using a GIS based computer programme, which predicts the theoretical 'visual envelope' of the site based on the topography only. The visual envelope of the site is the area of land which is theoretically seen in views from the site and therefore, it can be presumed, from which all or part of the site can be seen looking back, on the assumption that there are no intervening landforms, hedgerows or buildings that block such views.

10.85 The actual visibility of the site is, of course, affected by these intervening elements and to a different degree in winter and summer, especially in an undulating agricultural area such as this where landform and trees filter views. Best practice guidance published by the Landscape Institute and IEMA recommends that such assessments are carried out in winter months when visual exposure is greatest. EDP's survey was undertaken between 14 January 2014 and 14 May 2014 and reviewed again in November 2018, and so complies with this guidance. These views are presented as a number of Photoviewpoints, provided within **Appendix 10.2 and 10.4** to this ES, in accordance with current guidance (**Ref 10.15**).

10.86 The theoretical visual envelope of the site is thereafter checked and refined by visiting the site and noting those areas visible from within the site itself which gives a 'search area' for further, more detailed field assessment.



Views Towards the Site

10.87 In practice, more helpful to an understanding of the potential visual effects of the Site is to identify and define those portions of the visual envelope which, characteristically (but not universally) have views towards or into the site; and therefore, where development on the site may be seen in a way which could affect the quality and character of the view. By this step by step process, the 'Zone of Visual Influence' (ZVI) of the development is refined. The actual visual envelope of the site (as opposed to the ZVI generated at the start of the process) is much smaller; it is shaded blue on Plan EDP 7 of **Appendix 10.2** to this ES to denote those areas from which at least some discernible visual change may be experienced.

10.88 As can be seen, the blue areas represent a relatively small portion of the wider area (see Inset of wider area). Translating this into possible views from roads and footpaths, as can be seen from Plan EDP 7 of **Appendix 10.2** to this ES, clear views can be obtained from several roads and footpaths in the immediate vicinity and to the south of the site, but remarkably few from the wider surrounding roads and footpaths into the site.

10.89 Within the actual visual envelope, there will be different groups of so-called 'receptors' i.e. people in cars, out for a walk, at work, or with views from their own homes. The following paragraphs summarise the main 'receptor groups' which do obtain views towards or into the site:

- **Road Users:** There are several uninterrupted, close-quarter views (i.e. less than 500m from the Site boundary) towards the Site, owing to the absence of defining roadside vegetation along Ham Lane, principally between Gibraltar Farm and Lidsing Road, Chapel Lane, and the southern end of Hempstead Road. A number of filtered or very localised views are available from parts of the surrounding road network in close-quarters to the Site where parts of the ground surface of the Site are visible, from the Capstone Road travelling south, and elevated locations on Forge Lane travelling north;
- **Users of the Public Rights of Way Network:** There is an extensive public rights of way network within the wider area. Within the Site, public right of way 'RC27' and 'RC28', directly cross the centre of the Site. Byway 'RC29' runs in part through Hall Wood before cutting through the open field and adjoins Lidsing Road to the south. At the central portion of footpath RC11, to the northeast of the Site, has middle distance views (i.e. greater than 500m from the Site boundary) to the centre of the Site through the gap between Elm Court and Roots Wood; and



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- Residential Receptors: Nearby residential receptors with close-quarter views of the Site are located immediately to the west of the Site boundary, situated in cul de sacs, accessed off Clandon Road. Approximately 50 dwellings are located adjacent to the Site's western boundary. Middle distance to close-quarter localised, filtered views towards the Site are available from exposed properties within the open landscape, such as from scattered farmsteads e.g Gibraltar Farm, Gibraltar Cottages, Elm Court, Elm Tree Cottages, Ivy Farm, Lidsing Court Farm and Abbey Court Farm. To the north and east the increasingly rolling topographical context, combined with linear belts of trees and blocks of woodland, serve to ensure that distant views from the surrounding settlement edges are highly localised and occasional.

10.90 Ten Photoviewpoints (PVPs) were initially selected in the assessment undertaken in 2014. However, the relocation of the site access within the current proposals has resulted in the need for an additional Photoviewpoint to be recorded. This is due to the potential for views of the proposed development extending to receptors travelling south on Hempstead Road. As such, to support the ten photoviewpoints already included within the LVIA (Refer to **Appendix 10.1** to this ES), Photoviewpoint EDP 11 (Refer to refer to Annex EDP 4 of **Appendix 10.4** to this ES) has been included to illustrate views for road users within a largely rural setting, travelling south on Hempstead Road.

10.91 The sensitivity for each PVP is ascribed within the original LVIA and addendum and varies based upon the type of receptor (residential, road users or users of PRoW) and their susceptibility to the type of change proposed.



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Construction Phase Effects

10.92 The construction activities that can potentially cause landscape and visual impacts include:

- Demolition and clearance of vegetation within the construction zone, where appropriate;
- Earthworks and temporary storage of topsoil;
- Removal of unwanted waste from the Site;
- Erection of Site hoarding and fencing around vegetation (tree protection scheme);
- Erection of temporary structures within the main contractor's construction compound, plus materials stockpiling and lay-down areas;
- Potential lighting of the works (during winter);
- Erection of scaffold structures;
- Movement of construction vehicles;
- Partially completed built form;
- Works associated with the implementation of the landscape scheme; and
- Removal of temporary construction facilities.

Operational Phase Effects

10.93 This section describes the likely effects of the Proposed Development on the landscape and visual resource following overall completion at operation year 1 and without landscape mitigation measures having matured. The main potential landscape and visual impacts of the Proposed Development once completed, irrespective of any mitigation measures, are summarised below:

- Potential adverse landscape impacts caused by the operational development would be localised in scale and restricted to the Site itself and immediate environs;
- Tree losses would be strictly limited, with new Site accesses designed to limit vegetation loss as far as possible;



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- Change to the character of the landscape of the Site, through alteration of land use and introduction of new temporary and permanent features, the latter including beneficial effects such as the creation of new habitats within the Site boundary;
 - A permanent, long-term adverse impact on landscape character would occur due to physical impact on landscape within the Site, introduction of new built form and ground remodelling within existing agricultural land, movement of vehicles and people within the Site, and increase in the volume of light pollution from both street lighting and internal lighting of built form.
 - There would be adverse physical impact on landscape elements and features within the Site caused by the localised removal of existing landscape features; and
 - There would be adverse visual impacts on nearby visual receptors, such as users of public footpaths and bridleways, road users and visitors to local facilities, due to visibility of the completed scheme (including built development, traffic and lighting).

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

10.94 Because this is a landscape led scheme design, an understanding of the mitigation measures embedded in the parameter plans (and masterplan) is fundamental to an appreciation of the potential landscape and visual effects. A key principle of landscape assessment is that the assessment should take account of the effect of any proposed mitigation (GLVIA, para 6.45).

10.95 The hierarchical approach toward mitigation (prevent, reduce, offset) has been (1) first to avoid where possible, any effects through the overall design and layout of the Proposed Development and disposition of its elements; this constitutes primary mitigation by preventing effects occurring through sensitive design and layout; (2) subsequently reducing effects arising through the careful siting of strategic landscape mitigation measures and careful consideration of the siting of each of the different elements of the Proposed Development; (3) Tertiary mitigation is achieved through the compensation of potential losses.

10.96 Embedded mitigation provides a form of preventative mitigation and, as discussed above, is that which has been considered as an integral part of the overall design and locational strategy for the Proposed Development. This is not an 'add-on' measure to ameliorate significant environmental effects, but part of the positive and pro-active approach whereby mitigation has been assessed and considered at all stages of the project to prevent or reduce the occurrence of environmental effects.



10.97 Those mitigation measures pertinent to landscape and visual matters are detailed with reference to the different stages of the Proposed Development below.

Demolition and Construction

10.98 The details of construction methods, timing and phasing are yet to be determined (it being very unusual for such detail to be fixed prior even to the application for outline planning permission). Therefore, this appraisal has assumed a scenario based on conventional best practice approaches. The following measures should be implemented and adhered to during the temporary construction phase:

- The adoption of an approved Construction Environmental Method Statement including an Ecological Construction Method Statement designed to avoid significant ecological effects (see Chapter 11 Ecology/Biodiversity), including those on key landscape features;
- The adoption of an approved Arboricultural Method Statement (AMS) incorporating best practice guidance set out in British Standard 5837:2012 Trees in Relation to Design, Demolition and Construction' which will ensure retained trees and other vegetation are not adversely affected during the construction process;
- The adoption of an approved topsoil and earthworks management plan (Soil Management Plan) including dust control measures;
- The use of visual screening, such as hoardings for more sensitive visual receptors in proximity to the Site, including residential receptors that have the greatest potential to be affected by the Proposed Development;
- Existing residents that live adjacent to the Site would be more sensitive to construction lighting due to the proximity, direction and type of receptor. Mitigation measures for construction lighting are likely to include directional fittings and restricted hours of operation; and
- As shown on Plan EDP 2 at **Appendix 10.2** of this ES, there are two PRow crossing the Site. Safe access for pedestrians would need to be maintained whenever practicable throughout the construction phases of development. Access along the PRow should be protected using Heras fencing or similar. Construction works which create dust should



be kept to a minimum within proximity to the PRoW, and dust prevention measures, such as damping, should be undertaken to reduce the impact on users of the PRoW network. For reasons of public safety, any informal use of the Site for dog walking, etc. should be established, and where evident, would need to be prevented during the construction phase of the Proposed Development. This would be achieved using protective fencing.

Illustrative Landscape Strategy

10.99 LVIA is useful not only as a process to define the likely landscape and visual changes resulting from the proposals, but as a design tool to influence the emerging proposals. As noted earlier, EDP has undertaken field-based assessments and advised the applicants over a number of years. The accumulated understanding of the Site has helped shape an illustrative landscape strategy, designed to reduce landscape/visual effects, to integrate the proposals into their landscape context and enhance the Site's landscape fabric.

10.100 The updated Illustrative Landscape Strategy is provided at Annex EDP 3 to **Appendix 10.4** to this ES. It illustrates the core components of the landscape strategy, demonstrating how a key, and fully-integrated component of the Proposed Development could be delivered as development parcels are completed. The following aspects of the proposals are especially relevant to the consideration of its potential landscape and visual effects:

- Up to 3.95 hectares of new strategic woodland planting. In recognition of the importance of reflecting local character, enhancing biodiversity and screening views from the wider countryside, the planting of the woodland is a parameter of the land budget and is committed to being delivered in the first year following commencement of the development.
- The proposed belts of woodland planting surround the Proposed Development, nominally 20m+ in width. They are wide enough to deliver visual filtering of the development (when seen from outside the site) even in the winter. Details of species mix and detailed design are to be agreed with MC at the Reserved Matters stage;
- The line of Byway 'RC29' through the site is retained. Careful consideration has been given to ensuring it remains a high quality and attractive route, albeit one much changed by the presence of the scheme. The route will become an 'all weather' path, located within a buffer zone allowed around Hall Wood. Its character changes along its length,



moving (west-east) from tracking alongside Hall Wood, into an avenue of trees (which emphasise the line of the Byway) and into the formal open space of the Community Park before breaking out into the open field to the east of the site;

- A Community Park is proposed at the eastern edge of the scheme, being formally laid out, this park will look like a conventional urban park, with paths, benches and specimen trees, but will have carefully managed views out across the surrounding countryside, helping to connect and orientate the user;
- The lowest part of the site adjacent Gibraltar Farm necessarily contains much of the site's necessary surface water attenuation provision. As far as possible, these areas will be designed and managed as natural features; new wetland and damp grassland communities established around the attenuation ponds will help diversify the site's habitats;
- Hall Wood is owned by Medway District Council. Although designated as 'Ancient Woodland' it has been assessed as being poorly managed, showing signs of unregulated public access and littering. The proposals include allowance to fund a Woodland Management Plan for the woodland with the aim of halting and reversing the decline in its condition in recent decades, and interpreting the works to the public;
- The scheme conserves the strategic road corridor reserved in the past for an extension of North Dane Way. This serves as a green buffer to the existing houses currently overlooking the site; and
- The overall quantity of tree and shrub planting, creation and improvement of habitat areas and value of private gardens in the longer term will result in a net gain for the landscape fabric of the site compared to the current intensive farming regime.

10.101 As part of the wider Green Infrastructure framework, public open spaces, both formal and informal, will be designed to provide high quality and traffic free green space, which satisfies a number of objectives, including:

- Public open space for informal use;
- Amenity and recreational space, including areas for play;



-
- Contribute to green networks and enhance habitat connectivity; and
 - Facilitated sustainable urban drainage (SUDS) and connectivity with the existing blue network.

10.102 In summary, the landscape elements specific to the design of the proposals include enhancements that would provide:

- Structural landscaping to provide visual screening to the Proposed Development;
- Public and private amenity; and
- Ecological value.

Residual Effects

10.103 Residual effects are those that remain in the operational phase once the landscape mitigation measures have materially begun to fulfil their design intention. As noted above, the landscape strategy will continue to increase in effectiveness over time, but for the purposes of assessment, a point in time must be selected. Conventionally, this would be some 15 years after the operational period has begun.

10.104 This section assesses effects of the Proposed Development during construction, up to completion. During construction the principal effects as a result of the Proposed Development would be as a result of the transition of the Site from an agricultural landscape to a predominantly urban development over a period of time.

10.105 The Proposed Development has been designed to consider the sensitivity of the landscape and views within and around the Proposed Development. With the exception of further evolution of the Green Infrastructure Strategy, no further landscape mitigation is proposed subsequent to the delivery of the Proposed Development. The 'residual' effects of the scheme are considered to be those that persist once the effects of mitigation – be that strategic planting or the softening of the Proposed Development provided by internal planting and areas of open space – have become established. In planning terms, these are the effects to which most 'weight' should be attached, since they represent the long-term effect on the landscape and visual baseline.



Landscape and Visual Effects During the Construction Phase/Short Term (<15 Years)

10.106 Generally, the landscape and visual effects during the construction phases of the Proposed Development would be difficult to mitigate due to the nature of these operations. However, as described above, the adoption of approved best practice construction methods will aid in reducing the perception of construction activities for those receptors most likely to be affected.

10.107 In looking to define the magnitude of change that may result from the proposals, the following changes, as indicated graphically at Annex EDP 3 to **Appendix 10.4** to this ES, are anticipated:

- Physical loss of an area of agricultural land, incorporating new public open space and 3.95ha of woodland retained surrounding the Proposed Development;
- All 64 of the arboricultural items identified during the BS5837 survey are being retained as part of the Proposed Development. The impacts are limited to the installation of a cycle path and a sustainable drainage system (SuDS) within the buffer zones of 3 items. These impacts are being mitigated by the use of specialised construction methodologies and arboricultural supervision where appropriate;
- The retention of key medium distance views, to the surrounding countryside to the south and east;
- Maximising opportunities to link into the local walking and cycling network (within the Capstone Valley and to surrounding settlements);
- Management and enhancement of Hall Wood and existing green linkages (between Hall Wood, Hook Wood and Roots Wood); and
- Ecological and landscape benefits of a new 20m wide woodland belt forming the Site's eastern boundary, extending to Capstone / Lidsing Road.



Effects on Wider Landscape Character During Construction Phase/Short Term (<15 Years):

10.108 Principally, the effect of the Proposed Development on 'Elm Court' during the short term will relate to the material change of agricultural land to urban use.

10.109 During construction, the Proposed Development will directly affect the wider landscape context of 'Elm Court' as the physical effects of construction (i.e. changes to fabric and character) would be visible predominately to the south, south-west and south-east of the Site; likely direct effects on the host landscape resources have been assessed within the context of an individual character assessment of the Site.

10.110 Direct effects would occur, principally in relation to noise, vibration and the movement of materials to/from the Proposed Development.

10.111 Additional traffic generated by the Proposed Development would be accommodated by main roads, including the Ham Lane and Lidsing Road. During construction and during the short term, on these roads vehicles heading towards or leaving the Site from the proposed access point will increase in the local context, although Lidsing Road is currently heavily used by traffic, and would provide a pre-existing context for additional activity as a result of the Proposed Development.

10.112 Therefore, principally as a result of the relatively limited geographic extent of this change, and in no small part due to the addition of elements not uncharacteristic within the existing landscape, the overall magnitude of change to 'Elm Court' is assessed as high; giving rise to a major/moderate adverse effect during construction and the short-term, which **is significant** in landscape terms.

Effects on the Landscape of the Site itself During Construction Phase/Short Term (<15 Years):

10.113 Within the Site, construction activity will inevitably result in a very high magnitude of change on the existing relatively tranquil nature of the agricultural fields, Ham Lane, and Lidsing Road as a discrete geographical unit of the wider landscape. The existing field boundary vegetation will be retained with the exception of those sections removed to accommodate the proposed new access points. A significantly adverse effect on the 'Visual and Sensory' dimension is not surprising during the temporary construction phase. Overall, the Proposed Development construction activity would result in a very high magnitude of change, giving rise to a moderate temporary adverse effect, which **is significant**.



10.114 In addition, during the construction phase, the ‘Landscape Fabric and Biodiversity’ and the Topographic and Hydrological’ dimensions would be subject to a worst-case minor adverse and temporary effect, which is **not significant**.

Visual Effects During the Construction Phase/Short Term (<15 Years):

10.115 The findings of the visual assessment, set out at **Appendix 10.1** and **10.4** to this ES, are summarised in Table 10.2 below to illustrate the pattern of short-term effects predicted.

10.116 Effects of ‘moderate’ or greater (bold text) would be considered a ‘significant’ change in visual terms. Photoviewpoint numbers are located in the body of the matrix, representing the significance of visual change likely to be experienced from that location.

10.117 As can be seen in Table 10.2 below, eight of the photoviewpoints experience ‘significant’ visual effects in the short term (Photoviewpoints 2, 3, 4, 5, 6, 7, 8 and 11, in red text). The remainder (coloured green) will not.

Table 10.2: Summary of Visual Effects Experienced in the Short Term

Sensitivity of Receptor	Magnitude of Change Experienced				
	Very high	High	Medium	Low	Very low
Very high	Substantial	Major	Major/ Moderate	Moderate	Moderate/ Minor
High	Major 2, 5, 6, 7 (Adverse)	Major/ Moderate 3, 8 (Adverse)	Moderate	Moderate/ Minor	Minor 1 (Adverse)
Medium	Major/ Moderate 4, 11 (Adverse)	Moderate	Moderate/ Minor 9, 10 (Adverse)	Minor	Minor/ Negligible
Low	Moderate	Moderate/ Minor	Minor	Minor/ Negligible	Negligible
Very low	Moderate/ Minor	Minor	Minor/ Negligible	Negligible	Negligible/ None

10.118 It would be very surprising for a project such as this not to have given rise to some predicted ‘significant’ visual effects in the temporary construction phase and in the short-term, although it is very notable how geographically confined and limited in number these significant



effects actually are for receptors within publicly accessible areas, which is an indication of how little this project, notwithstanding its extent, impacts on views from the wider landscape.

10.119 **Photoviewpoint EDP 5** and **6** are taken from Byway 'RC29', a frequently used right of way running through the Site and beyond. Although **Photoviewpoint EDP 5** represents view into the Site and **Photoviewpoint EDP 6** represents views out of the Site, both locations will accommodate rights of way users who are likely to be travelling for a purpose to enjoy the view in a landscape that is not designated for its landscape value. The Byway route retains 'semi-rural' characteristics of leaving the urban fringe of Lordswood to approach the wider 'rural' landscape, and principally for this reason, receptors have been attributed high sensitivity to change and very high magnitude of change, giving rise to a major adverse effect, which **is significant**.

10.120 **Photoviewpoint EDP 2** shows that residential receptors overlooking the Site's western boundary will view the Proposed Development at close quarters from first floor rear windows or rear gardens. In the short term, the Proposed Development will be a 'prominent' element of the view, seen across a relatively large proportion of the horizontal field of view. The magnitude of change is considered to be very high in the short term, giving rise to a major adverse effect, which **is significant**.

10.121 Due to the localised plateau topography and lack of defining field boundaries, there is a wide extent of the view from **Photoviewpoint EDP 7** (the southern end of Byway 'RC29'). Therefore, scale of change experienced in this presently open view, by rights of way users will be major adverse in the short term while the proposed tree belt planting is still immature, which **is significant** in visual terms.

10.122 From **Photoviewpoint EDP 3**, as would be expected of a view from on the Site boundary, the development will dominate the view, giving rise to a High magnitude of change. This will fall to Medium as the proposed on-site planting matures; for residential receptors and commercial workers within an undesignated landscape the resultant level of effect would be major/moderate adverse, which **is significant**.

10.123 **Photoviewpoint EDP 8** represents views from footpath 'RC11'. The illustrative masterplan proposes new public open space and belts of tree planting at this location. However, in the short term, the approximate extent of site visible will be accommodated with new residential buildings and related uses will enclose this portion of the view, in all directions from this location. Although existing conifer planting (containing Elm Court Industrial Estate)



introduces urban elements into the view, the nature of the view will change from a rural agricultural scene containing some landscape detractors and built form, to an increasingly urban scene resulting in a high sensitivity and magnitude of change, giving rise to a major/moderate adverse effect, which **is significant**.

10.124 **Photoviewpoint EDP 4** represents views from users of the footpath 'RC27' who will be stationary or slow moving and most likely at this location to enjoy the amenity resource rather than the views available from this location. Receptors using public right of way 'RC27' will be crossing an open and relatively featureless arable field, with views of existing residential properties on the edge of Lordswood, therefore are assessed as of medium sensitivity. Notwithstanding this, the scale of change experienced in this presently open view, by users of the right of way will experience a very high magnitude of change, giving rise to a major/moderate adverse effect, which **is significant**.

10.125 Due to the extension of the Site access to meet Lidsing Road, views of the Proposed Development are likely to extend to receptors travelling south on Hempstead Road. As illustrated in **Photoviewpoint EDP 11**. Receptors travelling south along Hempstead Road begin to experience views of the wider landscape context, approximately, at the access point to existing allotments. As receptors travel south, due to two breaks (which are both access points) in a roadside hedge at Broomfield Farm, views towards the Site become possible, particularly at the southern end of Hempstead Road where new site access arrangement would be seen in short-distance views. In the short-term, particularly during winter months, it would be expected that all construction activities within the Site would be seen for the duration of the temporary construction period. The magnitude of change experienced in the short-term would be very high, giving rise to a major/moderate adverse effect, which **is significant**.

Landscape and Visual Effects During the Medium Term and Beyond (>15 Years)

Effects on Wider Landscape Character During the Medium Term and Beyond (>15 Years)

10.126 The magnitude of change during the medium term would lessen over time from that experienced during construction (low magnitude). The direct effect on the wider LCT context would be reduced resulting from maturing landscape proposals and perceived as a well-integrated extension of the urban context. Mitigation measures in this form of mixed native tree belts will be reflective of that found within the wider LCT context. The use of wooded tree belts is an emblematic local settlement edge treatment to development adjacent to the Capstone Valley in the wider LCA. In the long-term, the development of the green infrastructure framework



will screen and filter views towards the development from within the wider LCT context, resulting in a legible settlement edge with a reduced urbanising effect and enhancements to the condition of 'Elm Court'.

10.127 Taking these matters into account, the overall magnitude of change for the wider landscape context at the level of Elm Court LCT is considered to be low (albeit changes locally, as described below, would be higher/lower), giving rise to a minor to minor/negligible adverse residual effect that is **not significant** in landscape terms.

Effects on the Landscape of the Site itself During the Medium Term and Beyond (>15 Years)

10.128 The assessment found that **significant** adverse effects on the landscape of the Site itself would be limited to changes to the Visual and Sensory dimension of the Site, especially in the construction phase and short term. This is not surprising. The gradual conversion of any 'greenfield' site to a major development site would yield such an outcome and this is not a reflection on the quality of the scheme masterplan, but of the process which requires an assumption to be made that most people would see the visual and sensory change from greenfield to development as 'adverse'.

10.129 The provision of a large landscape framework surrounding the Site, encasing the Proposed Development, enables the provision of approximately 6.9ha of open space. This enables the planting of new woodland blocks that, in addition to mitigating key views, will integrate the Proposed Development and address the Site's relationship to the wider setting within the Capstone Valley. Surrounding the Proposed Development, a series of connected green corridors will provide ecological connectivity at a number of scales. During the medium term and beyond, the proposed new hedgerow planting, tree belts, woodland blocks, allotments and natural greenspaces proposed on the masterplan will introduce a significant increase in the variety of landscape features on Site. The medium-term effect would, therefore, be a very high magnitude of change which gives rise to a moderate beneficial level of effect on the 'Landscape Fabric and Biodiversity' dimension of landscape character, which would be **significant** in landscape terms.

10.130 In the medium to long-term, the 'Topographic and Hydrological' dimension would be subject to a worst-case negligible adverse and temporary effect, which is **not significant**.

Summary of Landscape Effects

10.131 The effects on the key dimensions of landscape character are briefly summarised below:



- The principal effect on the visual and sensory character of the site would remain a gradual transition from a parcel of arable agricultural land to urban, with new woodland planting and landscape proposals over a period of time;
- The existing landscape fabric of the site comprises arable land bounding areas of woodland. The site is not subdivided by internal vegetation and has been significantly denuded by heavily recreational use and agricultural practices. New woodland planting, tree belts, amenity and tree planting and open green spaces proposed on the masterplan, would continue to introduce a significant increase in the variety of landscape features on site, such that there would be a long-term beneficial change to the landscape fabric; and
- There would be no significant physical amendment of the topography.

10.132 As illustrated in Table 10.3 below, two significant residual effects have been identified:

- A significantly adverse effect on the visual and sensory character of the site, especially in the construction phase and short term; and
- A significantly beneficial effect on the landscape fabric and biodiversity value of the landscape, especially in the medium and long term as the proposed new landscape fabric matures.

Table EDP 10.3: Summary of Residual Effects on Landscape Character Aspects

Sensitivity of Receptor	Magnitude of Change Experienced				
	Very high	High	Medium	Low	Very low
Very high	Substantial	Major	Major/ Moderate	Moderate	Moderate/ Minor
High	Major	Major/ Moderate	Moderate	Moderate/ Minor	Minor
Medium	Major/ Moderate	Moderate	Moderate/ Minor	Minor (Adverse)	Minor/ Negligible (Neutral)
Low	Moderate (Beneficial)	Moderate/ Minor	Minor	Minor/ Negligible (Adverse)	Negligible (Adverse)
	(Adverse)				



Very low	Moderate/ Minor	Minor	Minor/ Negligible	Negligible	Negligible/ None
	Indicates Visual and Sensory				
	Indicates Landscape Fabric and Biodiversity				
	Indicates Topographic and Hydrological				
	Indicates Landscape Designations				
	Indicates 'Elm Court' Landscape Type				

Visual Effects During the Medium Term and Beyond (>15 Years)

10.133 The Proposed Development is, over time, proven to be effective in reducing the significance of the effects perceived from these eight photoviewpoints, as discussed below.

10.134 At **Photoviewpoint EDP 6**, from within the centre of the Site, receptors are assessed as having a high sensitivity to change, and from any view within the Site boundary of a future development the magnitude of change will be Very High, and for receptors on a byway within an undesignated landscape the resultant level of effect will be major adverse which **is significant**.

10.135 From **Photoviewpoint EDP 5** ('Byway RC29'), in the medium term, the illustrative masterplan for the Proposed Development proposes wildflower margins will be established between the development and the perimeter woodlands. These provide attractive corridors for the Byway route and new informal footpaths which connect to this route ensuring that the residential parcels are set back from the right of way, thereby avoiding conflicts between residential interests and the need to maintain an attractive right of way with mature tree cover in the long term. Despite the potential effectiveness of the on-site landscape proposals and improvements to the Byway route, a high magnitude of change and the residual visual effects of development will still pertain and in medium to long term, effects will therefore be major/moderate adverse in this location, which **is significant**.

10.136 From **Photoviewpoint EDP 2**, residential receptors will unsurprisingly experience a significant level of effect in the medium term due to the close proximity to the Site boundary in this presently open view. However, as the on-site landscape proposals mature, the nature of change will be substantially softened by the proposed planting such that the level of effect will fall to major/moderate adverse, which **is significant**, providing a robust and characteristic landscape structure which aids integration of the development into its immediate context.



10.137 From Gibraltar Farm (**Photoviewpoint EDP 3**), residential receptors and commercial workers are afforded open views across the agricultural land rising to the horizon. There will be the loss of the open agricultural land on the horizon, but this will be diminished in time in any event by virtue of the growth of proposed public open space and tree planting lessening the level of effect to moderate adverse, which **is significant**.

10.138 At **Photoviewpoints EDP 7** and **8**, views would have changed in terms of openness and composition, but the components will be in keeping with the elements that are already seen. The Site is unlikely to be visible in summer conditions when the woodland planting has matured, and in the winter only glimpsed views are likely to be seen. For the reasons explained above, the magnitude of change within the view from this location has the potential to diminish over time to a moderate adverse level of effect, which **is significant**, as the proposed southern planting belt matures.

10.139 From **Photoviewpoint EDP 4** (public right of way 'RC27', within the Site boundary), in the medium term, as the proposed shelterbelt planting on the edge of the Site boundary matures to soften views of the development behind the level of effect will fall to moderate/minor, which is **not significant**. Recognising the degree of change likely to be experienced from this location in the short-term, the illustrative masterplan has ensured that the interface between the Proposed Development and the adjoining countryside to the east is softened through the use of locally represented and therefore visually appropriate new tree belts, and continuing the semi-rural enclosed character of Ham Lane presently experienced at Gibraltar Farm and further north, thus the development is not perceived as unduly abrupt.

10.140 At **Photoviewpoint EDP 11**, in the medium term and beyond, the provision of a new landscape buffer to the eastern boundary of the Site would serve to limit views of proposed built form. However, views of the new site access on Hempstead Road would remain. Overall, the view will have changed in terms of openness and composition, but the components will be in keeping with the elements that are already seen. Due to roadside vegetation, and the maturation of landscape features within the proposals, views of proposed built form are likely to be limited to winter months in the longer term. The magnitude of change for receptors travelling south on Hempstead Road in the medium term would be medium, giving rise to a moderate/minor adverse effect, which is **not significant**.

10.141 As can be seen below, as the proposed landscape measures mature, the number of PVPs predicted to experience significant effects adverse visual effects in the medium to long-



term would be 7 of the 11 PVPs (PVPs 2,3,4,5,6,7 and 8). The remainder will not. This is reflective of six of the ten viewpoints located on or within the Site boundary.

Table EDP 10.4: Summary of Visual Effects Experienced in the Medium Term

Sensitivity of Receptor	Magnitude of Change Experienced				
	Very high	High	Medium	Low	Very low
Very high	Substantial	Major	Major/ Moderate	Moderate	Moderate/ Minor
High	Major 6 (Adverse)	Major/ Moderate 2, 3, 5 (Adverse)	Moderate 7, 8 (Neutral)	Moderate/ Minor	Minor 1 (Adverse)
Medium	Major/ Moderate 4 (Adverse)	Moderate	Moderate/ Minor 11 (Adverse)	Minor 9 (Adverse)	Minor/ Negligible 10 (Adverse)
Low	Moderate	Moderate/ Minor	Minor	Minor/ Negligible	Negligible
Very low	Moderate/ Minor	Minor	Minor/ Negligible	Negligible	Negligible/ None

10.142 It would be very surprising for a project such as this not to give rise to some predicted 'significant' visual effects in the short term, although it is very notable how geographically confined these significant effects actually are as a result of the limited visual envelope of the Site. All these photoviewpoints are from locations close to or on the boundary of the Site, which is an indication of how little this project, notwithstanding its extent, impacts on views from the wider landscape.

10.143 The project design and other mitigation measures are, over time, demonstrably effective in reducing the visual effects of the Proposed Development in the follow ways:

- The general pattern is for the significance of medium and long term visual effects to be less than the short term effects;
- The fact that, in the medium to long-term, the ONLY photoviewpoints experiencing medium/long term change are located within or adjacent the Site boundary, coupled with the trend towards reducing effects from photoviewpoints further afield, allows two clear conclusions to be drawn:



-
- i) The proposed mitigation will be effective in absorbing and integrating the proposals into the landscape in an appropriate way, consistent with local landscape character; and
 - ii) That the areas where residual longer-term significant visual effects will be experienced is extremely localised, limited to photoviewpoints within and around some points immediately adjacent the Site perimeter.

10.144 The overall reduction in the magnitude of change experienced at representative Photoviewpoints, although some residual effects remaining significant, is considered to be as a result of a number of key factors:

- First, the landscape-led work undertaken at the outset of the masterplanning process set important guiding principles;
- Second, the specific on-site landscape design strategy (influenced by the findings of EDP's LVIA process) ensures that the Proposed Development is well-integrated into the landscape context;
- Third, from within the wider rolling topographic context of the 'Capstone and Horsted Valley', occasional views towards the Site can only be obtained from very elevated and exposed vantage points (for example **Photoviewpoint EDP 1**), at a higher altitude than the Site on a clear day;
- Fourth, the existing landscape is strongly defined by existing woodland blocks: Hall Wood within the Site boundary, Hook Wood to the north, Roots Wood to the south-west and Holt Wood adjacent to the Site's eastern boundary substantially reducing intervisibility with the wider landscape; and
- Fifth, in views from distant receptors, such as the elevated **Photoviewpoint EDP 1** from Darland Banks, the Proposed Development will (a) comprise a very small view cone of the expansive panoramas available, (b) be perceived in the context of extensive existing built form of Medway towns surrounding the Capstone Valley already visible and (c) be largely screened behind existing mature woodland forming the new southern and eastern boundaries. For these reasons, despite the sensitivity of these receptor points, the magnitude of change will be very low indeed and not 'significant' in visual terms.



ASSESSMENT OF CUMULATIVE EFFECTS

10.145 The cumulative landscape and visual impact assessment uses the same assessment methodology as that presented for the main LVIA above, and considers impacts on the same receptor groups.

10.146 There are 3 cumulative schemes which are either under construction, consented or in-planning. This assessment has been undertaken with the assumption that some, if not all of these schemes will have come forward by the time the Proposed Development at the Site is finished. The details of these schemes are set out below in Table 10.5.

Table 10.5 - Gibraltar Farm Cumulative Schemes

Site Name	Application No.	Distance from the Site	Location	Description
1 - Land East of Gleamingwood Drive Lordswood Kent	15/503359/OUT	Adjacent	578003, 162014	Residential development (approx 89 dwellings) plus open space, biomass plant and access road (plus emergency access)
2 - Land at North Dane Way (East Hill), Chatham, Medway	N/A	120m	577500, 165500	Erection of up to 975 dwellings (C3) including a mix of sizes, types and tenures including affordable housing; A two-form entry primary school; Potential for local community centre; Open space; and Road infrastructure.
3 - Land At Brickfield Darland Farm Pear Tree Lane Hempstead Gillingham ME7 3PP	MC/16/2776	2.3km	578213, 165607	Residential development of up to 44 dwellings with associated garaging, access, landscaping and open space

Predicted Cumulative Impacts on the Wider Landscape Character

10.147 Only one of the cumulative sites named above is located within the Elm Court LCT, namely a small section of Site 2, which extends south along North Dane Way, assumed due to highway improvements. The main body of site 2 is located to the north, bringing the settlement



edge of Hale further east to meet the western boundary of Capstone Country Park. Notably, site 2 and 3 are both located within the locally designated ALLI.

10.148 Site 1 is located in relatively close proximity to the Site, falling within the administrative area of Maidstone Borough Council and Site 2 is located 2.3km to the north.

10.149 Views of the Proposed Development, including the Cumulative Sites listed above may be possible from within the host and neighbouring LCTs, albeit limited to few areas of open ground within the local context and being limited by existing built form and residential areas. But, it is not the view that defines the landscape effect; rather it is changes to the physical and wider perceptual qualities (including visual) that lead to the level of effect. A large development such as the Proposed Development, and the sites named above, may have a noticeable effect on landscape character. Further development such as the Proposed Development would be a notable addition, but consistent with the existing context, and confined by a mature landscape framework on the Site boundaries. The protection of key landscape features at the Site boundary and the retention and enhancement of semi-natural structure, would give rise to beneficial effects. It is therefore considered that, while the Proposed Development would form a notable addition to the local context, the Proposed Development will not lead to a significant cumulative landscape effect, especially given the size of the strategic sites named above.

Predicted Cumulative Visual Impacts

10.150 The cumulative visual impact assessment uses the same assessment methodology as that presented for the main LVIA above and considers impacts on the same receptor groups.

10.151 Cumulative effects generally occur where there may be simultaneous or sequential visibility of two or more developments of the same type and scale, or where the consideration of other schemes would increase an effect identified to arise as the result of the Proposed Development.

10.152 It is pertinent to note that the cumulative baseline consists of a number of areas of urban and peri-urban development. Considering the size and distribution of cumulative developments, although not necessarily all being in close proximity to one another, it is expected that there would be locations within the landscape from which views of more than one development Site may be gained either in combination or sequentially.



10.153 In the case of the Proposed Development and the cumulative sites named above, in combination views are likely to be limited to areas of open space within the Capstone Country Park and from open agricultural land to the north of the Site, namely at Photoviewpoint EDP 8 as illustrated in **Appendix 10.2** to this ES. Nonetheless, there are few locations from which the developments would be clearly visible with each other or would be frequently sequential i.e. where the developments (or parts of) appear regularly and with short time lapses between instances.

10.154 Generally, as a result of intervening landscape features, combined with local topography, although there are predicted to be some in-combination views of taller elements of construction activity, on completion there are likely to be few locations where views of the Proposed development will be seen in combination with the cumulative Sites named above. Where in-combination views are possible, due to the distribution of the Cumulative Sites named above, these views are often heavily filtered or informed by existing urbanising features within the local context.

10.155 The cumulative assessment found that:

- For road users, dependant on timings of construction activities of the Proposed Development and Cumulative Sites, there may be sequential views of taller construction activities, although largely limited to receptors travelling on North Dane Way. However, existing woodland at the Site's eastern and southern boundaries would serve to limit views of the site such that, on completion, there are unlikely to be any in-combination or sequential views for receptors on North Dane Way;
- For road users on Lidsing Road, to the east of the Site (refer to Photoviewpoint EDP 7 at **Appendix 10.2** to this ES) there is the potential for in-combination views of construction activities within the Site and at cumulative site 1. However, on completion, views of both the Site and the cumulative schemes are likely to be filtered by existing and proposed woodland features. Where views may be possible, it is considered that the overall character will be similar to the baseline situation such that the magnitude of change would be no greater than that assessed for the Site itself;
- Similarly, in combination views during the construction phase may be possible from Photoviewpoint EDP 11, illustrated at **Appendix 10.4** to this ES. However, on completion, views of both the Site and the cumulative schemes are likely to be filtered by existing and proposed woodland features. Where views may be possible, it is



considered that the overall character will be similar to the baseline situation such that the magnitude of change would be no greater than that assessed for the Site itself; and

- For PRow users in close proximity to the Site, in-combination views would largely be limited to a byway which provides access between the Site and Lidsing Road (refer to Photoviewpoint EDP 7 at **Appendix 10.2** to this ES). From here, particularly during the construction phase and in the short-term, views of taller construction activity may be possible, although limited to in-combination views with cumulative site 1 only. However, it is not considered that there will be a greater level of effect to that of the Proposed Development in isolation. Similarly, on completion, it is unlikely that there will be any in-combination views of Cumulative Sites with the Proposed Development that would be considered to increase the effects arising from development within the Site.

10.156 While the effect of the Proposed Development at the Site would not differ, the magnitude of change experienced across the wider area will clearly be greater when taking the combined effect of the other schemes into consideration. By the same token, it may be considered that the proportion of the total visual change attributable to the Site would be proportionately less because i) the wider area will be more urbanised and therefore less sensitive to the introduction of urban components within the landscape; and ii) viewpoints that are likely to experience change as a result of the Proposed Development may have views blocked or altered by other developments.

10.157 Overall, taking all other potential cumulative schemes into consideration, there would be a perceptible increase in built development in the local area with associated consequences for the character of the landscape, which would become more urbanised.

Overall Summary

10.158 Whilst there are some significant adverse effects identified at both the construction and operational phases, they are primarily landscape and visual impacts that, in many cases are unavoidable by virtue of the fact that the Site is currently greenfield and will become developed as a result of the proposed Development. The significance of the construction phase effects is only temporary for the duration of the construction stage of each phase. Also, they will not affect all residents / viewpoints to the same degree at the same time as the construction will be phased across the Site and by the time that later phases commence, the mitigation built into earlier phases will become more established, thereby minimising effects on certain receptors.



10.159 The operational effects in landscape and visual terms have been minimised as far as possible and through the design of the scheme which ensures that the development is as sensitive as possible on the existing landscape and views.

Table 10.6: Landscape and Visual Summary Table

Receptor	Sensitivity	Effect Construction Phase/Short Term (<15 Years)	Mitigation / Enhancement measures	Residual Effect Medium Term and Beyond (>15 Years)
Landscape Receptors				
Visual and Sensory	Low	Moderate Adverse Significant	The magnitude of change will remain due to the change from open agricultural land to built development	Moderate Adverse Significant
Landscape Fabric and Biodiversity	Low	Minor Adverse Not Significant	The landscape and GI framework will have established, lessening the adverse magnitude of change and resulting in beneficial effects.	Moderate Beneficial Significant
Topographic and Hydrological	Low	Negligible Adverse Not Significant	The landscape and GI framework will have established, lessening the adverse magnitude of change over time.	Negligible Adverse Not Significant
Landscape Designations	Medium	Minor/Negligible Neutral Not Significant	The landscape and GI framework will have established, lessening the adverse magnitude of change over time.	Minor/Negligible Neutral Not Significant
'Elm Court' Landscape Type	Medium-Low	Major/Moderate Adverse Not Significant	The landscape and GI framework will have established, lessening the adverse magnitude of change over time.	Minor to Minor/Negligible Adverse Not Significant
Representative Viewpoints				
Photoviewpoint EDP 1	High	Minor Neutral	The landscape GI framework will have matured. However, through the retention of existing features, the Proposed Development will remain a barely noticeable component of the view.	Minor Neutral
Photoviewpoint EDP 2	High	Major Adverse	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Major/Moderate Adverse
Photoviewpoint EDP 3	High	Major/Moderate Adverse	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Moderate Adverse



Receptor	Sensitivity	Effect Construction Phase/Short Term (<15 Years)	Mitigation / Enhancement measures	Residual Effect Medium Term and Beyond (>15 Years)
Photoviewpoint EDP 4	Medium	Major/Moderate Adverse	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Moderate Adverse
Photoviewpoint EDP 5	High	Major Adverse	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Major/Moderate Adverse
Photoviewpoint EDP 6	High	Major Adverse	The landscape GI framework will have matured. However, due to the location of the view within the Site, the level of effect would remain.	Major Adverse
Photoviewpoint EDP 7	High	Major Adverse	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Moderate Adverse
Photoviewpoint EDP 8	High	Major/Moderate Adverse	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Moderate Adverse
Photoviewpoint EDP 9	Medium	Moderate/Minor Neutral	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Minor Neutral
Photoviewpoint EDP 10	Medium	Moderate/Minor Neutral	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Minor/Negligible Neutral
Photoviewpoint EDP 11	Medium	Major/Moderate Adverse	The landscape and GI framework, and planting measures close to the viewpoint, will have established, lessening the magnitude of change	Moderate/Minor Adverse



REFERENCES

- Ref 10.1:** Landscape Institute and Institute of Environmental Management and Assessment (LI and IEMA) (2013) "Guidelines for Landscape and Visual Impact Assessment", Third Edition
- Ref 10.2:** Medway Council (2016) "Notification of Refusal of Outline Planning Permission to Develop Land". Ref. MC/14/2395)
- Ref 10.3:** Department for Communities and Local Government (2017) Town and Country Planning Act 1990 – Section 78 Appeal Made by Messrs KD, JC & MC Attwood Land at Gibraltar Farm, Ham Lane, Hempstead, Gillingham, Kent Me7 3jj - Application Ref: Mc/14/2395. Ref. APP/A2280/W/16/3143600
- Ref 10.4:** Council of Europe (2007) European Landscape Convention
- Ref 10.5:** Natural England (2014) "Landscape Assessment Guidance for England and Scotland"
- Ref 10.6:** Landscape Institute and IEMA (2013) "Guidelines for Landscape and Visual Impact Assessment – Third Edition"
- Ref 10.7:** Department for Communities and Local Government (2012) "National Planning Policy Framework"
- Ref 10.8:** Medway Council (1996-2006) "Medway Local Plan" (adopted on 14 May 2003)
- Ref 10.9:** Medway Council (2011) "Medway Housing Design Standards"
- Ref 10.10:** Medway Council (2008-2016) "Wildlife, Countryside and Open Space Strategy"
- Ref 10.11:** Medway Council (2007) "Medway's Green Grid Action Plan Draft"
- Ref 10.12:** Natural England (2013) "NCA Profile: 119 North Downs"
- Ref 10.13:** Kent County Council (2004) "The Landscape Assessment of Kent"
- Ref 10.14:** Medway Council (2011) "Medway Landscape Character Assessment"
- Ref 10.15:** Landscape Institute (2011) Photography and Photomontage in Landscape and Visual Impact Assessment, Advice Note 01/11



11 ECOLOGY AND BIODIVERSITY

INTRODUCTION

11.1 This chapter has been prepared by The Environmental Dimension Partnership Ltd (EDP) and assesses the likely significant effects of the Proposed Development on features of nature conservation value. In particular, it considers the potential effects of the Proposed Development on the Important Ecological Features (IEFs) identified through the Baseline Ecology Report which is included as **Appendix 11.1**. The Baseline Ecology Report includes the detailed methods, results and a full set of associated drawings illustrating the baseline ecology results.

11.2 This chapter describes the methods used for the assessment, a summary of the baseline conditions currently existing at the Site and its surroundings, the potential direct and indirect effects arising from the Proposed Development during construction and operation, and the mitigation measures required to avoid, mitigate or compensate potentially significant adverse effects.

11.3 The chapter has been prepared with reference to The Chartered Institute of Ecology and Environmental Management's (CIEEM) Ecological Impact Assessment (EclA) Guidelines (**Ref. 11.1**). These are the main guidelines for such an ecological assessment. The guidelines include guidance on which ecological features should be considered in the assessment and provides a framework for assigning value to such features.

11.4 This chapter has been prepared by the Environmental Dimension Partnership Ltd (EDP); a firm of environmental planning consultants. Specifically, this chapter has been prepared by EDP Ecologists, including an EDP Associate Ecologist who is a Chartered Environmental Scientist with the Society for the Environment (SocEnv), a full member of the Chartered Institute for Ecology and Environmental Management (MCIEEM), and who has over 16 years professional and relevant experience of ecology in an environmental planning context, including undertaking numerous ecological assessments for Environmental Impact Assessments.

11.5 The Site was subject to ecological investigations by EDP during 2013-2015 in support of a successful outline planning application (planning ref: MC/14/2395). The ecological investigations culminated in an Ecological Appraisal (**Appendix 11.2**) and an Ecology Addendum Report (**Appendix 11.3**). These previous baseline investigations included a full suite of ecological surveys. A new outline planning application (albeit with a slightly modified application site boundary) has now been prepared for the Proposed Development at the Site,



and update ecological surveys were therefore undertaken by EDP in 2018 in support the new planning application.

11.6 For reasons of clarity and due to the quantity of baseline ecological and arboricultural information collated during the assessment, the detailed methods, results and a full set of associated drawings are provided in Appendices as follows:

- **Appendix 11.1:** Baseline Ecology Report (2019);
- **Appendix 11.2:** Ecological Appraisal (2014);
- **Appendix 11.3:** Ecology Addendum Report (2015); and
- **Appendix 11.4:** Arboricultural Assessment (2019);

11.7 This chapter draws upon and summarises these appendices.

11.8 The Site boundary has been slightly modified since the updated baseline work in 2018 was undertaken. The Baseline Ecology Report appended to this chapter (**Appendix 11.1**) has not been updated due to the timing of the site boundary modification to the east near Lidsing Road occurring after the baseline surveys were completed. Nonetheless, EDP considers that the results of the updated surveys are still applicable to the current application and new areas within the modified Site boundary were assessed through online resources, and taking a precautionary approach to the assessment. Overall it is therefore considered that the ecological baseline is a representative and reliable basis for an assessment, and that the assessment is robust.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Ecological Zone of Influence/Spatial Scope (Study Area)

11.9 The Ecological Zone of Influence (EZoI) is an area defined by the assessment in which there may be receptors subject to effects as part of the Proposed Development; both those which may occur as a result of land-take and habitat loss, and those which may occur through disturbance such as noise. Such receptors are likely to include designations, notable habitats and protected species, and these could be affected directly, e.g. works affecting a receptor within the Site such as removal of a building occupied by bats, or indirectly, e.g. a designation downstream of a development being affected by sediment deposition, etc.



11.10 The EZol was determined through:

- A review of existing baseline conditions in comparison with that proposed by the development;
- Consideration of the proposed activities (during all phases);
- Desk study information including an examination of mapping data;
- Consultation responses;
- Findings of the survey work; and
- Through liaison with other specialists involved in assessing the effects in other interrelated disciplines, such as lighting and noise.

11.11 The scope of the desk study reflects the sensitivity and value of potential ecological receptors while providing contextual information to assist with determining and evaluating the baseline. The following desk study search radii were employed and are considered to be sufficient to cover the EZol of the project:

- International statutory designations (5km radius);
- National statutory designations (2km);
- Non-statutory local sites (2km);
- Annex II bat species¹ records (5km); and
- All other protected/notable species records (1km).

11.12 The field surveys undertaken to inform the assessment included all land within the Site boundary (Site boundary has been modified since field surveys were undertaken).

Baseline Methodology

11.13 The baseline ecology information collated for the Site (including 'binomial nomenclature' – the species scientific names) is set out in detail within **Appendix 11.1**. Accordingly, species scientific names are not reproduced in this chapter. The appendix details the full methodologies employed, their findings and any limitations. It seeks to identify the IEFs within the Proposed Development's EZol.

11.14 A summary of the baseline investigations undertaken for the Site is provided below:

¹ Bat species listed in Annex II of the EC Habitats Directive, namely greater horseshoe, lesser horseshoe, barbastelle and Bechstein's bats.



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- Desk study (April 2013 and updated in March 2018);
 - Extended Phase 1 Habitat Survey (April 2013 and updated in March 2018);
 - Hedgerow survey (April 2013; hedgerows reviewed again during 2018 Phase 1 Survey);
 - Pilot breeding bird survey (April 2013);
 - Badger survey (April 2013 and updated in March 2018);
 - Bat activity surveys (June, August and September 2013 comprising manual transect surveys, and updated in May, June and September 2018 comprising a combination of manual transect surveys and automated detector surveys);
 - Dormouse presence/absence surveys (June - October 2013 and updated in May – September 2018);
 - Visual assessment of trees and buildings for bat roosting potential (February 2014 and updated in March 2018); and
 - Detailed botanical survey of Hall Wood (May 2015; Hall Wood was reviewed again during 2018 Phase 1 Survey).

11.15 As detailed in **Appendix 11.1**, the scope of updated detailed (Phase 2) survey work was defined following a review of historical survey information (details of historical survey work are set out in **Appendix 11.2** and **Appendix 11.3**), the update desk study and Extended Phase 1 Habitat survey. Breeding bird surveys were not repeated in 2018 because habitats supported by the Site remained under intensive management, and the spatial extent/quality of the habitats present have not changed significantly since the previous surveys.

11.16 The detailed reasoning behind certain surveys being 'scoped out' due to not being considered necessary or appropriate in this case, is also provided in **Appendix 11.1**. The scope of update surveys undertaken in 2018 are considered appropriate and sufficient to inform the current planning application given the lapse in time and lack of significant material changes to the on-site habitats and their management since the previous baseline investigations in 2013-2014.

11.17 All surveys were undertaken with reference to current best practice guidance where available. Any limitations in the survey work are detailed in **Appendix 11.1** and summarised below. Where relevant any such limitations have been factored into the assessment process.

11.18 In addition to the ecology surveys outlined above, a full tree survey and arboricultural impact assessment was undertaken by EDP in accordance with BS5837:2012 'Trees in Relation to Demolition, Design and Construction'. The methodology employed and the results are set out in detail in **Appendix 11.4**.



Assumptions / Limitations

11.19 The vast majority of surveys were undertaken in suitable weather conditions at optimum times of year with reference to current best practice guidance.

11.20 During the 2013 June bat activity survey, the transect routes walked were confined to available paths through the arable field, which contained an impenetrable rape crop at the time. Most of the Site boundaries were covered by the survey though the transect routes walked during the following surveys covered a larger extent of the Site.

11.21 The dormouse survey effort score of 18 in 2013 is not considered to be a significant constraint to the survey, indeed, on discovering the presence of dormouse in October 2013 within the boundary along Hook Wood, the assumption that dormouse are using Hall Wood could be inferred. Therefore, a further check of the nest tubes in November would not have altered the conclusions of the survey or the resulting mitigation included within the proposals.

11.22 During the 2018 June bat activity survey, anti-social behaviour occurred, particularly near Hall Wood. Therefore, for Health and Safety reasons the final transect survey in September combined the two transect routes and it was walked by a pair of surveyors covering both transect routes. Although the spatial extent and location of the September 2018 bat transect was altered, this is not considered by EDP to be a limitation to the surveys as the whole Site was covered.

11.23 As with any ecological assessment for any development, it should also be noted that owing to the seasonality of some species, as well as the ability for some species to quickly colonise sites, the absence of evidence of any particular species from within the Site should not be taken as conclusive proof that the species is not present or that it will not be present in the future. However, it is considered that the results of the Extended Phase 1 Habitat survey and additional Phase 2 surveys undertaken in 2013-2018 within the Site are robust and reliable for the identification of the habitats, the presence or absence of legally protected species, and other IEFs within the Site.

11.24 The additional area included within the Site boundary in January 2019 (as shown in **Figure 11.1**) was not part of the surveys undertaken in 2013-2018. A desk-based assessment of this area has been undertaken in January 2019, and based on the habitats present it is considered unlikely that detailed surveys in this area would have altered the conclusions of the surveys undertaken or the resulting mitigation included within the Proposed Development.



Consultation

11.25 The views of the Local Planning Authority were initially sought in 2014 in respect of likely ecological sensitivities pertaining to the Site and necessary survey scope. Kent County Council's Biodiversity Officer was contacted by EDP on 24 March 2014. A response was received on 28 May 2014 stating that at that time Kent County Council was unable to respond to the request as they had not been approached by Medway Council.

11.26 A detailed botanical survey of Hall Wood was undertaken in May 2015 in response to comments regarding a previous proposed development for the Site by Kent County Council's Biodiversity Officer on 16 September 2014. The comments and findings of this botanical survey, together with a 'Hall Wood - Heads of Terms for a Woodland Management Plan' document, are provided in the Ecology Addendum Report prepared by EDP in November 2015 (**Appendix 11.3**).

11.27 The Ecology Addendum Report also responded to comments made by Medway Council's Case Officer, regarding potential effects of the previous proposed development upon the suite of Special Protection Areas (SPA) and Ramsar sites that make up the North Kent Marshes.

Evaluation Methodology

11.28 An evaluation of Important Ecological Features (IEFs) has been made with reference to CIEEM's Ecological Impact Assessment Guidelines (2018). A summary of the evaluation approach is provided below.

11.29 The guidelines advocate an approach to valuing features that involves professional judgement based on available guidance and information, together with advice from experts, who know the locality of the project and/or the distribution and status of the species or features that are being considered.

11.30 The guidelines recommend that the value or potential value of an ecological resource or feature should be determined within a defined geographical context, and the guidelines provided a geographical range ('frame of reference') that can be adapted. The geographical frame of reference, based upon the CIEEM guidelines, used in this assessment is as follows:

- International and European value;



-
- National value (England);
 - County value (Kent);
 - District value (Medway);
 - Local value (Hempstead with Gillingham Parish);
 - Site value (the Site and immediate environs); and
 - Negligible

Valuing Designations

11.31 Within the UK, certain designations have already been assigned a level of nature conservation value through the designation process, and the guidelines recommend that the reasons for such designation need to be taken into account in an assessment. Such designations include:

- Internationally important sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar Sites;
- Nationally important sites such as Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs); and
- Regional/County important Sites, which are referred to as Local Wildlife Sites (LWSs), Local Nature Reserves (LNRs) and Roadside Nature Reserves (RNRs).

11.32 Where a feature has value at more than one designation level, its value at the highest level prevails.

Valuing Biodiversity

11.33 The guidelines recognise that there are various characteristics that can be used to identify ecological resources or features likely to be important in terms of biodiversity and, furthermore, that consultation, especially with local specialists, can be crucial for identifying less obvious important resources and features.

Valuing Habitats

11.34 The guidelines recommend that the value of areas of habitat and plant communities should be measured against published selection criteria where available. Where areas of a habitat or plant community do not meet the necessary criteria for designation at a specific level, the guidelines recommend that the assessment may consider the local context, if appropriate.



Valuing Species

11.35 Species should be assessed according to their biodiversity value rather than according to their legal status; although some species will fit into both categories. In assigning value to a species, it is necessary to consider its distribution and status, including a consideration of trends based on available historical records. The valuation of populations should make use of any relevant published evaluation criteria.

Characterising Ecological Effects

11.36 The CIEEM guidelines state that the assessment of effects should be undertaken in relation to the baseline conditions within the EZoI Zone of Influence that are expected to occur if the Proposed Development were not to take place, the 'future baseline'. Having identified the activities likely to cause significant effects, it is then necessary to describe the resultant changes and to assess the effect on valued ecological resources.

11.37 The guidelines recommend that the process of identifying effects should make explicit reference to aspects of ecological structure and function on which the feature depends. Effects must be assessed in the context of the baseline conditions within the EZoI during the lifetime of the Proposed Development.

11.38 When describing changes/activities (impacts) and effects on ecosystem structure and function, reference should be made to the following factors:

- Negative (adverse) or positive (beneficial);
- Magnitude (minor, moderate or major);
- Extent;
- Duration;
- Reversibility; and
- Timing and frequency.

Assigning Significance

11.39 The significance of a negative (adverse), or positive (beneficial) effect is the product of the magnitude of the impact and the value or sensitivity of the nature conservation feature(s)



affected. In order to characterise the impacts on each feature, the following parameters are taken into account:

- The magnitude of the impact;
- The spatial extent over which the impact would occur;
- The temporal duration of the impact;
- Whether the impact is reversible and over what timeframe; and
- The timing and frequency of the impact.

Criteria for Assessment

11.40 There is no agreed absolute method for assessing the significance of adverse or beneficial effects on nature conservation features. Since the purpose of an Ecological Impact Assessment (EclA) is to focus on potentially significant effects, it is not reasonable to expect the assessment to include every ecological feature that may be affected, since effects are unlikely to be significant where features of low (Site-level or below) value or sensitivity are, for example, subject to low or short-term impacts. The purpose of an EclA is to focus on potentially significant effects. On this basis, the assessment focuses on ecological features that are considered by EDP, based on professional judgement, experience and contextual information, to be protected and/or of **Local** nature conservation value or above.

11.41 This does not mean that effects upon features of less than Local-level nature conservation value have been discounted. Certain species and habitats that may not constitute IEFs based upon their nature conservation value, may still warrant consideration during the design of the Proposed Development (and any mitigation identified) on the basis of their legal protection, their implications for policies and plans, or other issues, such as animal welfare. Indeed, the Proposed Development still has a requirement to ensure no net loss of biodiversity, in accordance with the requirements of the NPPF.

11.42 Ecological effects within this assessment are described (where appropriate to do so) as either:

- **Significant** or **not significant**; and,
- Adverse or beneficial or neutral; and,
- Direct and/or indirect; and,
- Permanent or temporary.



11.43 Mitigation measures have been incorporated into the assessment parameter plans and taken into account during the assessment of effects, so that the residual impact assessment reflects the completed scheme. These measures include those required to achieve the minimum standard, as determined by established practice, plus additional measures to further reduce the likely effects of the scheme. The assessment takes into account the likely success of the mitigation.

11.44 The significance of the potential impacts upon IEFs has been assessed both before and after consideration of additional mitigation measures. The latter represents the assessment of the residual impacts of the project.

11.45 In addition to determining the significance of an impact on any ecological features, this chapter also identifies any legal requirements in relation to the protection of wildlife.

Cumulative Assessment

11.46 Cumulative effects have been considered, based upon the list of schemes provided in Chapter 3, with respect to the potential for in-combination impacts to arise upon the IEFs pertinent to the Proposed Development from interaction with other offsite developments (consented or committed schemes).



LEGISLATION, PLANNING POLICY AND GUIDANCE

11.47 The following topic-specific legislation and policies are relevant to the assessment. These have been taken into account during the assessment since it is against these policies and legislative background that the Proposed Development will be judged to be acceptable on the grounds of biodiversity.

Legislation

European Wildlife Legislation

11.48 The Conservation of Habitats and Species Regulations 2017 (as amended) enacts, within the UK, EU Council Directive 92/43/EEC on the Conservation of Natural Habitats and Wild Fauna and Flora ('Habitats Directive') and Directive 2009/147/EC on the Conservation of Wild Birds ('Birds Directive'). These Regulations provide for the designation and protection of statutory designated wildlife sites of European value ('European sites'), and the protection of a number of rare and vulnerable species in a European context ('European Protected Species' (EPS)). European sites, including Special Protection Areas (SPAs), Special Areas of Conservation (SACs) and Ramsar Sites are recommended for designation in the UK by the Joint Nature Conservation Committee (JNCC).

National Wildlife Legislation

11.49 The Wildlife and Countryside Act 1981 (as amended, principally by the Countryside and Rights of Way Act 2000 and the Natural Environment and Rural Communities Act 2006) enshrines the protection of statutory designated wildlife sites of national importance (Sites of Special Scientific Interest (SSSIs)) in England and Wales. The Act also sets out varying degrees of protection and offences with regard to native species and their habitats that are rare and vulnerable in a national context. The Act also provides for the control, management and offences in respect of invasive non-native species. Sites of national importance (SSSIs and National Nature Reserves (NNRs)), are designated by Natural England under the Act and are protected from any development that may destroy or negatively affect them, either directly or indirectly.

11.50 Section 40 of the Natural Environment & Rural Communities (NERC) Act 2006 places a statutory duty on Local Planning Authorities (LPAs) to consider the effects upon biodiversity when exercising their functions in England and Wales. In addition, Section 41 of the Act makes for the provision of a list of habitats and species of principal importance for the conservation of biodiversity, to which LPAS must have regard.



11.51 In addition, the Animal Welfare Act 2006 further protects wild animals from unnecessary suffering when under the control of man and combines with the Wild Mammals (Protection) Act 1996, which protects wild mammals from intentional cruelty.

11.52 The Protection of Badgers Act 1992 (as amended) affords protection specifically to badger and their setts.

11.53 Finally, 'important' hedgerows, for which there are specific wildlife and landscape criteria, are protected from removal (up-rooting or otherwise destroying) by the Hedgerow Regulations 1997.

Planning Policy

National Planning Policy

11.54 Chapter 15 of the National Planning Policy Framework (NPPF, July 2018) – '*Conserving and Enhancing the Natural Environment*' – advocates a presumption by Local Planning Authorities in favour of sustainable development that enhances the natural environment by avoiding, adequately mitigating or compensating for 'significant harm to biodiversity', and which delivers net gains for biodiversity (Paragraphs 170, 171, 174 and 175).

11.55 The ODPM Circular 06/2005 – '*Biodiversity and Geological Conservation*' (attached to the NPPF) – contains further guidance in respect of biodiversity conservation and its impact within the planning system. This document covers areas including internationally and nationally designated sites, habitats and species outside of designated sites, and protected species. The NPPF therefore affords indirect policy protection to ecological features of value (statutory and non-statutory designated sites, certain habitats and protected/notable species).

11.56 In relation to EIA and assessment of significant effects, CIEEM guidance (CIEEM, 2018) highlights that:

“A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission. For example, many projects with significant negative ecological effects can be lawfully permitted following EIA procedures as long as the mitigation hierarchy has been applied effectively as part of the decision-making process”.



11.57 Guiding principles for delivering net biodiversity gain through developments is also provided in separate CIEEM guidance (**Ref. 11.2**).

Local Planning Policy

11.58 There are five saved policies (policies BNE35, BNE36, BNE37, BNE38 and BNE39) relating to the natural environment within the Medway Local Plan 2003 (adopted May 2003) (**Ref. 11.3**), as summarised below:

- *Policy BNE35*, which provides protection to International and National Nature Conservation Sites including SACs, listed and proposed Ramsar Sites, NNRs or SSSIs;
- *Policy BNE36*, which provides long-term protection to Strategic and Local Nature Conservation Sites, including Sites of Nature Conservation Interest and designated and proposed Local Nature Reserves;
- *Policy BNE37*, which provides protection to important wildlife habitats or features not protected by the above policies;
- *Policy BNE38*, which provides protection to wildlife corridors and stepping stones through provisions of wildlife habitats within developments as part of a network of wildlife habitats or stepping stones; and
- *Policy BNE39*, which provides protection to protected and notable species.

11.59 In addition, The *Future Medway Local Plan 2018 to 2035* (currently in preparation) is also committed to “*promote the conservation and enhancement of biodiversity in Medway, by restricting development that could result in damage to designated wildlife areas, and pursuing opportunities to strengthen biodiversity networks.*”²

Biodiversity Policy

11.60 The Post-2010 Biodiversity Framework (JNCC, 2012)³ and Biodiversity 2020 (Defra, 2011)⁴ were implemented in 2012 and 2011 respectively and are the biodiversity policies for the UK and England respectively, superseding the UK Biodiversity Action Plan (BAP).

² Consultation Document - Development Strategy Section 7: *Natural Environment and Green Belt*, www.medway.gov.uk/downloads/file/2079/natural_environment_and_green_belt

³ Available at: http://jncc.defra.gov.uk/pdf/UK_Post2010_Bio-Fwork.pdf

⁴ Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/69446/pb13583-biodiversity-strategy-2020-111111.pdf



11.61 These policies aim to deliver a more strategic, holistic landscape-scale approach to nature conservation, wildlife, people's health and wellbeing from accessing nature, places, and climate change resilience. The policies make provision for large, national strategic Nature Improvement Areas (NIAs) within which nature conservation efforts can be co-ordinated and targeted, and monitor the enhancement of biodiversity through a series of monitored Priority Species and Priority Habitats ('biodiversity indicators'). These biodiversity indicators are based upon the list of Habitats and Species of Principal Importance for the Conservation of Biodiversity identified in Section 41 of the Natural Environment & Rural Communities Act 2006 (last updated in 2008).

11.62 The UK Government's 25 Year Environment Plan for England (**Ref. 11.4**) is the policy framework that will inevitably replace Biodiversity 2020. It echoes and extends many of the objectives for an integrated, holistic approach to nature conservation with particular emphasis on natural capital and the benefits to the economy and human health and wellbeing from access to nature.

Other Material Guidance

11.63 National Planning Policy Guidance for the Natural Environment (**Ref. 11.5**) biodiversity echoes what has already been described above, but there is additional emphasis in the Guidance on protecting and enhancing ecological networks and Local Wildlife Sites (non-statutory designations). National Planning Policy Guidance for biodiversity also provides further advice on preparing and determining a planning application where there may be impacts on biodiversity.

11.64 Protected species are a material consideration in the determination of planning applications and Natural England as the statutory nature conservation organisation for England provides specific 'Standing Advice' regarding various protected species (**Ref. 11.6**). This advice contains details on potentially significant impacts and recommended survey effort to support planning applications.

11.65 There is also a British Standard for biodiversity, planning and development (**Ref. 11.7**) which echoes many of the considerations already described above, and on preparing and determining a planning application where there may be impacts on biodiversity.



BASELINE CONDITIONS

11.66 This section summarises the baseline ecological conditions determined through the course of desk-based and field-based investigations described above. In particular, this section identifies and evaluates those ecological features/receptors that lie within the Site's potential zone of influence and are pertinent in the context of the Proposed Development.

11.67 Full results of the surveys undertaken are provided within **Appendix 11.1**, **Appendix 11.2** and **Appendix 11.3**, and the location of ecological features is shown on **Appendix 11.1; Plans EDP 1-7**.

Site Description

11.68 The Site broadly comprises a single arable field and adjoining ancient woodland (Hall Wood). The total Site area equates to approximately 27ha. Generally triangular in shape, the north western Site boundary is bordered by Hook Wood (ancient woodland) and Gibraltar Farm. To the north east, for the most part, the Site abuts Ham Lane, save for a small indent around two dwellings known as Gibraltar Cottages. The southern Site boundary represents the administrative boundary between Medway and Maidstone District; this runs through an existing arable field and is therefore not defined by any physical features. The Site lies immediately north east of existing urban edge of Lordswood, north of the M2 motorway corridor, and approximately 4km to the south of Gillingham.

11.69 The large arable field is actively cultivated, with no field margins. Occasional patches of scrub and tall ruderal are present particularly along the north western field boundary by Gibraltar Farm. Two hedgerows associated with Gibraltar Cottages along the northern boundary are species-poor and actively managed.

11.70 Hall Wood, an ancient woodland located south west of the Site, is unmanaged and subject to high level of public disturbance. Other ancient woodland, such as Hook Wood, Holt Wood and Roots Wood, are located off-site adjacent to the north western, northern and southern Site boundaries.



Designations

Statutory Designations

11.71 No part of the Site is covered by any statutory designation. As illustrated in **Appendix 11.1; Plan EDP 7**, there are two SACs located within 5km of the Site, and two SSSIs located within 2km of the Site. A summarised in Table 11.1, some of these designations overlap / coincide with each other. In addition, the Medway Estuary & Marshes SPA and Ramsar is located approximately 6km north east of the Site.

Table 11.1: Statutory designations within the Site's potential zone of influence

Site Name and Size	Approx. Distance and Direction at Nearest Point	Main Interest Feature(s)
<i>International Designations</i>		
North Downs Woodlands SAC (287.35ha) (overlaps with Wouldham to Detling Escarpment SSSI)	2.5km south	Yew (<i>Taxus baccata</i>) dominated woodland and beech (<i>Fagus sylvatica</i>) forests for which the SAC is considered to be one of the best areas in the U.K., and unimproved grassland habitats on chalk with rich communities of plants and animals, including a number of rare and scarce species.
Queendown Warren SAC (14.48ha)	3.5km east	An orchid rich site with semi-natural dry grasslands and scrubland facies on calcareous substrates containing rare and scarce species.
Medway Estuary & Marshes SPA and Ramsar (4684.36ha)	6km north east	Complex and diverse mixes of coastal habitats support important numbers of waterbirds of European importance. Wetland of international importance.
<i>National Designations</i>		
Purple Hill SSSI (15.1ha)	2km east	Areas of herb rich chalk grassland, scrub and woodland. The grassland supports many rare and uncommon species.

11.72 No significant direct adverse effects are considered likely to occur to any of the statutory designations described above during the construction phase, owing to the spatial separation from the Site, their reasons for the designation, and/or lack of any effect-receptor pathways connecting statutory designations to the Site (such as no obvious surface water course connections). Furthermore, the Site does not reside within the Impact Risk Zone (IRZ) around the SSSIs for the type of development proposed (residential development of up to 450 units). However, these designations could be at risk of indirect recreational pressure and / or reduced air quality as a result of increased visitor numbers and / or traffic movements.



11.73 These designations are therefore considered to constitute IEFs, of value at an international (SACs) and national (SSSIs) levels, requiring further consideration within the EclA. They are therefore taken forward as a component of the Final Scope of Assessment.

Non-Statutory Designations

11.74 There are five LWSs, three LNRs, 1 KWT reserve and four RNRs located within 2km of the Site. Of these 13 non-statutory designations, the most pertinent to the Site are:

- Hook Wood LWS – located adjacent to the Site’s western and north western boundaries, with a small outlying section (known as Hall Wood) falling within the Site’s western boundary;
- South Wood LNR / LWS – located approximately 0.3km north east of the Site; and
- RNR (RO11) – located adjacent to eastern Site boundary, east of Capstone Road / Lidsing Road.

11.75 A summary of these sites is provided in Table 11.2, and the locations are illustrated in **Appendix 11.1; Plan EDP 7**.

Table 11.2: Non-Statutory designations within the Site’s potential zone of influence

Site Name and Size	Approx. Distance and Direction from Closest part of Site	Interest Feature(s)
Hook Wood LWS (14.27ha)	Section (Hall Wood) included within the Site’s south western boundary	Ancient broadleaved woodland.
RNR (RO11)	Adjacent to the eastern Site boundary (east side of Capstone Road / Lidsing Road)	Roadside verge which supports a range of chalk grassland habitat indicator species.
South Wood LNR / LWS (6.63ha)	0.3km north east	Ancient woodland, with a population of dormice.

11.76 In addition, a number of isolated ancient woodland parcels are present within a 1km radius of the site, including Roots Wood, Lords Wood, Reeds Croft Wood, Chapel Hill Wood, and Cowbeck Wood. None of these ancient woodlands, apart from Roots Wood, are directly connected to the Site. Roots Wood is located immediately south of the Site and connected to the Site by intensively farmed arable land.

11.77 The large majority of the non-statutory designations occurring within 2km of the Site are not considered to be at risk of significant direct or indirect adverse effects as a result of the



Proposed Development. This is due to their degree of separation and / or lack of connectivity with the Site coupled with their reasons for designation.

11.78 No significant direct adverse effects are considered likely to occur to Hook Wood LWS (including Hall Wood) and South Wood LNR / LWS owing to their spatial separation from the Proposed Development footprint and lack of any effect-receptor pathways connecting these designations to the Site (i.e. no obvious surface water course connections). However, these non-statutory designations could be at potential risk of indirect adverse effects due to increased recreational pressure.

11.79 Furthermore, a small section of the roadside verge RNR (RO11) adjacent to the eastern Site boundary will be directly affected by the Proposed Development due to the construction of the pedestrian / cycle link across the Site.

11.80 These three non-statutory designations are therefore considered to constitute IEFs, of value at County (LWS and LNR) and Local (RNR) level, requiring consideration within the EclA. They are therefore taken forward as a component of the Final Scope of Assessment.

Habitats

11.81 A full description of the habitats present within the Site is provided in **Appendix 11.1**, and the distribution of habitats within and surrounding the Site is shown on **Figure 11.1**. In summary, the main habitats found within the Site include:

- Arable;
- Ancient broad-leaved woodland;
- Species-poor Hedgerows;
- Trees;
- Scrub;
- Tall ruderal; and
- Dry ditches.

11.82 The Site principally comprises a large arable field of Negligible intrinsic ecological value owing to its limited botanical and structural diversity and intensive management. Neither of the hedgerows qualified as 'important' under the Hedgerow Regulations 1997. The hedgerows, trees and areas of scrub and tall ruderal are considered to be of Site value owing to their limited botanical diversity, structure and complexity, and/or small extent. These habitats are therefore



not considered to constitute as IEFs in their own right, and therefore are taken forward as a component of the Final Scope of Assessment.

11.83 Hall Wood is considered to be of County value given its designation as an LWS (component of Hook Wood LWS) and its status as an ancient woodland. The assessment for Hall Wood is therefore undertaken as part of the assessment process for Hook Wood LWS under non-statutory designations. Hall Wood ancient woodland is therefore taken forward as a component of the Final Scope of Assessment.

11.84 The arboricultural survey of the Site recorded a total of 43 individual trees, 14 groups of trees, 6 areas of woodland, and 1 hedgerow, totalling 64 items. Of these 64 items, 47 have been classified as category B (moderate quality), 16 have been classified as category C (low quality), and 1 has been identified as category U, indicating that the item should not be retained. The Site's biggest arboricultural constraints are the 4 areas of woodland (Roots Wood, Hall Wood, Hook Wood, and Holt Wood) which carry the designation of Ancient and Semi-Natural Woodland and are therefore protected by the National Planning Policy Framework as irreplaceable habitat. Further details of the arboricultural assessment are provided in **Appendix 11.4**.

11.85 The following protected and notable species populations/assemblages are present at / within close proximity to the Site:

- Assemblage of breeding birds (Site-level value);
- Assemblage of roosting, foraging / commuting bats (Local-level value);
- Dormouse breeding population (District-level value);
- A small (presumed) population of stag beetle (Local-level value).

Summary of Important Ecological Features (Final Scope of the Assessment)

11.86 Based on the baseline ecological information described above (and presented in full in **Appendix 11.1**, **Appendix 11.2** and **Appendix 11.3**), a number of IEFs have been identified and are summarised in Table 11.3. Informed by the baseline investigations and consultations described above, the IEFs taken forward for detailed assessment comprise those assessed to be of Local-level nature conservation value and above, and/or are legally protected species.



Table 11.3: Summary of Important Ecological Features (IEFs)

Important Ecological Feature	Key Attributes	Nature Conservation Value
Statutory Designations		
North Downs Woodlands SAC, Queendown Warren SAC and Medway Estuary & Marshes SPA and Ramsar	Statutory designations	International
Wouldham to Detling Escarpment SSSI and Purple Hill SSSI		National
Non-Statutory Designations or Equivalent		
Hook Wood LWS (includes Hall Wood), South Wood LWS / LNR and RNR (RO11)	Non-statutory designations	Local - County
Fauna		
Bat assemblage	Two trees with bat roost potential plus foraging bat assemblage of 8 species recorded in low to moderate numbers (including serotine, Leisler's and Nathusius' pipistrelle).	Local
Dormouse	Breeding population present within Site boundary habitats.	District
Stag beetle	Small population assumed present.	Local

11.87 In accordance with the assessment methodology described earlier, all other habitats and species/species groups are deemed to be of only Site-level nature conservation importance or lower, and have not been taken forward for detailed assessment, since effects upon such features are unlikely to be 'significant' in EIA terms.

Projected Future Baseline

11.88 It is anticipated that in the absence of development the Site would continue to be managed as arable farmland. Depending on the farming regime, the quality of habitats and opportunities for different species may vary slightly over time, particularly farmland birds. Such variations are unlikely to be significant and would be considered as standard fluctuations in a dynamic farming environment. It is near-certain that the existing baseline described above would therefore not appreciably change.



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Introduction

11.89 An assessment of likely significant effects of the Proposed Development on the ecological features identified above has been undertaken based on the detailed proposals, which incorporate a level of inherent/intrinsic (also known as 'primary') mitigation included as a result of an iterative assessment and design process. The likely effects are assessed with the inherent mitigation included, but in the absence of the additional mitigation measures (also known as 'secondary' and/or 'tertiary' mitigation) required to address potentially significant effects.

Inherent Mitigation of the Proposed Development

11.90 The key inherent mitigation measures included within the Landscape Strategy plan and parameter plans pertinent to the ecological impact assessment include:

- Retention and provision of buffers to the ancient woodlands (Hall Wood and Hook Wood) aligning the Site's western and north western boundaries;
- Retention and provision of buffers along the Site's boundary hedgerows, trees and scrub;
- Avoidance of residential properties to back directly on to sensitive habitats including woodland, hedgerows and ecological buffer habitats;
- Provision of substantial green infrastructure areas (approximately 6.9ha open space and 3.95ha woodland planting) across the Site, including community parks and informal greenspace (with space to accommodate new meadow and marshy grassland habitats).

11.91 Development of the Site includes two main stages, namely the construction phase, comprising all site preparation works and construction of all buildings, associated infrastructure and landscaping; and the operational phase comprising the long-term occupation of the Site. Anticipated effects during the construction and operational phases of the Proposed Development are discussed in turn below.

Construction Phase Impact and Effects

11.92 Potential impacts identified which could arise as a result of the construction of the development in the absence of mitigation include the following:



- Impacts of direct habitat loss and fragmentation/severance due to land take upon habitats and species;
- Indirect impacts to habitats and species due to habitat degradation and damage;
- Impacts of noise, light and human disturbance to species; and
- Pollution of groundwater and surface water flows, as further identified and evaluated in Chapter 12 – Water Quality, Hydrology & Flood Risk.

Assessment of Effects: Statutory Designations

11.93 Even in the absence of additional mitigation, effects upon statutory designations are considered to be **not significant**, neutral, indirect and temporary at the International / National level during the construction phase owing to their spatial separation from the Site, and lack of direct receptor-effect pathway (such as surface watercourse) for site-derived pollutants to travel.

Assessment of Effects: Non-Statutory Designations or Equivalent

11.94 With respect to the non-statutory designation, Hook Wood LWS (including Hall Wood) is located partly within the Site's western boundary and adjacent to the north western Site boundary. A buffer has been retained in the proposed Development (20m at its closest point), which is more than the 15m minimum recommended by Natural England Standing Advice on Ancient Woodland⁵. Nonetheless, in the absence of additional mitigation, in a worst case scenario, effects are assessed as **significant**, adverse, indirect and temporary at the County-level, during the construction phase owing to the close proximity of construction.

11.95 Similarly, in the absence of additional mitigation, effects to South Wood LNR / LWS are assessed as **not significant**, adverse, indirect and temporary at the County-level are anticipated to South Wood LNR / LWS during the construction phase owing to its spatial separation from the Site, and lack of direct receptor-effect pathway (such as surface watercourse) for site-derived pollutants to travel.

11.96 A small section of the roadside verge RNR (RO11) adjacent to the eastern Site boundary will be lost due to the construction of the pedestrian / cycle link across the Site. Such effect, in

⁵ www.gov.uk/guidance/ancient-woodland-and-veteran-trees-protection-surveys-licences



the absence of additional mitigation, is considered as **significant**, adverse, direct and permanent at the County-level.

Assessment of Effects: Bat Assemblage

11.97 The Proposed Development layout will retain and buffer the key habitat features and corridors used by roosting, foraging and commuting bats, such as the woodland edge and hedgerow / tree network along the northern and western Site boundaries where bat activity was at its highest. Therefore, the direct loss, fragmentation and degradation of potential roosting, foraging and commuting habitat, and light spill / visual / noise disturbance during construction has been inherently minimised.

11.98 The Proposed Development will result in the loss of a small amount (approximately < 3m) of hedgerow west of the Site (by north western corner of Hall Wood) to widen an existing breach in the hedgerow in order to formalise pedestrian / cycle links. Owing to the limited extent of the habitat loss and the presence of higher quality habitats within the wider landscape, it is considered unlikely that the loss of small amount of hedgerow will impact at the population level.

11.99 Overall, in the absence of additional mitigation, the effects on the bat assemblage present at the Site are assessed as **not significant**, adverse, direct, and permanent at the Local-level.

Assessment of Effects: Dormouse Population

11.100 The Proposed Development layout will retain and buffer the key habitat features and corridors used by dormice. The development will result in the permanent loss of a small amount (approximately < 3m) of hedgerow habitat confirmed to support breeding dormice. In the absence of mitigation, works to remove this small section of hedge, in a worst case scenario, could result in direct harm / injury to dormice but is unlikely to impact at the population level. This would also be an offence under wildlife legislation. In the absence of additional mitigation, the effects on dormice present at the Site are assessed as **not significant**, adverse, direct, and permanent at the District-level.

11.101 Even in the absence of appropriate additional mitigation, it is unlikely that dormice will be indirectly, temporarily disturbed by noise and vibration and / or lighting from construction activities around hedgerows and areas of woodland, given the inherent buffer around these



retained habitats. It is therefore considered that the magnitude and extent of such temporary indirect impacts upon dormice at the population level will therefore be avoided.

11.102 In the absence of additional mitigation, effects upon the dormouse population level is assessed as **not significant**, adverse, indirect, and temporary at the District-level.

Assessment of Effects: Stag Beetle Population

11.103 The Proposed Development layout will retain and buffer the key habitat features potentially being used by stag beetle, such as the woodland edge and hedgerow/tree network along the northern and western Site boundaries. Therefore, the direct loss and degradation of potential suitable stag beetle habitat during construction has been avoided.

11.104 As discussed above, the Proposed Development will result in the loss of a small amount (approximately < 3m) of hedgerow west of the Site to formalise pedestrian / cycle links. Owing to the limited extent of the habitat loss it is considered that the loss of small amount of hedgerow will not impact stag beetle at the population level.

11.105 Overall, in the absence of additional mitigation, the effects on the stag beetle population present within and adjacent to the Site are assessed as **not significant**, adverse, direct, and permanent at the Local-level.

Operational Phase Impacts and Effects

11.106 Potential impacts which could arise as a result of the operation of the Proposed Development in the absence of mitigation include the following:

- Recreational pressures;
- Effects of light and noise / visual / human disturbance to habitats and species;
- Increased risk of collision to species arising from increased traffic movements;
- Increased risk of predation by domestic pets; and
- Alteration of groundwater flows.

Assessment of Effects: Statutory Designations

11.107 Indirect adverse recreational usage / increased visitor numbers, and / or air pollution effects as a result of increased traffic movements associated with any new development are



pertinent impacts to be assessed for any European Site where development is within a certain defined distance. Increased visitor numbers have the potential to cause trampling and erosion of sensitive habitats, disturbance to notable / protected species and a rise in number of fires lit. This could in turn result in potential degradation of the sensitive flora and fauna of these designations. Increased traffic movements could also contribute towards nitrogen deposition rates within these designations.

11.108 However, the Habitat Regulations Assessment (HRA) (**Ref. 11.8**) which assessed Medway Council's new draft Local Plan Development Strategy (and informed the emerging Local Plan 2018 to 2035) ruled out likely significant effects resulting from recreational disturbance on the two SACs owing to the spatial separation between SACs and development, presence of alternative woodland areas nearby which provide recreational opportunities and / or that existing visitor levels had currently not affected the condition of the SACs.

11.109 Likely significant effects associated with reduced air quality were also assessed within the HRA by focussing on roads which were close to the SACs (within 200m); the ones predicted to have the greatest increase in traffic. The assessment concluded that there was potential for adverse effects to arise on the woodland habitats within North Downs Woodlands SAC from increased traffic along roads within 200m. Since these roads are a considerable distance from the Site, EDP considers that North Downs Woodlands SAC will not be affected by air quality issues associated with traffic movements from the Proposed Development. The HRA also concluded that there were no likely significant effects (in HRA terms) to Queendown Warren SAC associated with reduced air quality. The Site is also not located within an Air Quality Management Area.

11.110 In addition, a NE advisory letter to the North Kent Environment Planning Group (dated 17 August 2015) stated that "...*residential development within 6km of access points to the SPAs is particularly likely to lead to an increase in recreational use of the SPAs...*". The HRA also notes the potential for increased recreational pressure within 6km of the north Kent marshes European sites, and that it has been acknowledged in Policy NE1 of the emerging Local Plan. Therefore, any new development within 6km of the north Kent marshes European sites (including the Medway Estuary & Marshes SPA and Ramsar) should consider recreational disturbance impacts on the over-wintering bird interest of these designations. The potential effects resulting from the development of the Site to these SPAs / Ramsar sites has been addressed in detail within **Appendix 11.3** as part of the previous application for the Site. In summary, it was considered that the development proposals would not result in any meaningful increase in recreational disturbance within the European Sites comprising the north Kent



marshes, and no likely significant effects (in HRA terms) were anticipated for this or any other reasons. As the boundary or the Site layout has not changed considerably since the assessment for the previous application, it is therefore considered that this assessment is still valid in regard to the new Proposed Development.

11.111 Provisions for informal and formal green space (including community parks) within which to accommodate a network of pedestrian / cycle paths has been incorporated into the Parameter Plans as an intrinsic measure and are expected to absorb much of the recreational pressure that could otherwise potentially affect the statutory designations. The new pedestrian / cycle link is to be connected to the existing cycle route on North Dane Way linking the communities of Lordswood and Hempstead and to the wider countryside. The new residential population associated with the Proposed Development will therefore have access to attractive alternative semi-natural green space within the Site and access to the adjacent countryside which provides an attractive and convenient alternative destination to the statutory designations. The combination of these inherent mitigation measures will therefore avoid recreational effects on statutory designations.

11.112 Hence, in the absence of additional mitigation, effects on the statutory designations are assessed as **not significant**, neutral, direct and permanent at the International and National-level.

Assessment of Effects: Non-Statutory Designations or Equivalent

11.113 Hook Wood LWS (including Hall Wood) and South Wood LNR / LWS may be subject to indirect adverse effects resulting from increased recreational pressure associated with the new residential population. The increased recreational pressure has the potential to damage and degrade the woodland ground flora and trees through trampling and littering and disturb associated fauna.

11.114 These two non-statutory designations are already subject to a certain level of recreational use owing to their accessibility and close proximity of the existing large residential population to the woodlands. The adverse effects of current uncontrolled access through Hall Wood are evident, such as vandalism in the form of trees set on fire, graffiti and inappropriate cutting of trees, rendering the trees unsafe. Additionally, littering is common place throughout the woodland and there are indications the woodland is being used as an informal off-road vehicle course. Significant scrub encroachment into the woodland is also taking place as a result of a disused trunk road to the south of the woodland.



11.115 It is anticipated that the construction of 450 houses would result in approximately 1080 new residents (based on an average of 2.4 persons per dwelling) in proximity to the woodland blocks. The significance and potential impacts of this are difficult to quantify precisely, however such impacts must be considered in light of the above.

11.116 In comparison to other nationally important habitat types (such as coastal wetlands or heathlands for example) woodland is relatively resilient to typical recreational uses such as dog walking. The main threats come from anti-social 'urban edge' effects including fly tipping, unauthorised vehicular access and fires. There is provision for informal and formal green space with a network of pedestrian / cycle paths as discussed above, which are expected to absorb much of the increase in recreational pressure.

11.117 Nonetheless, inherent mitigation alone is not sufficient to fully address the potential operational impacts of increased levels of human occupation and usage on-site. Accordingly, in the absence of additional mitigation (in a worst case scenario), effects are assessed as **significant**, adverse, indirect and permanent at the Local to County-level.

Assessment of Effects: Bat Assemblage

11.118 During the operational stage, the Proposed Development could result in effects of increased collision risk, light spill and disturbance upon retained and newly created habitats used for bat roosting, foraging and commuting. Such effects have been minimised through inherent buffering afforded to the woodland and hedgerow / tree network along the northern and western Site boundaries, which have been identified as the main bat activity habitat features. In addition, the generous open space provision inherent to the Proposed Development would benefit foraging bats.

11.119 In the absence of additional mitigation, these effects are considered as **not significant**, adverse, direct to indirect, and permanent at the Local-level.

Assessment of Effects: Dormouse Population

11.120 Increased predation of dormice may also arise following occupation, as a result of cat ownership across the development, and predation by cats. However, predation by other wildlife, such as owls, weasels, grey squirrels and badgers is an existing natural occurrence. Whilst cats are known to catch a variety of small mammals, and whilst there is no research/evidence into the effects of cat predation on dormouse at the population level, it is not an issue that has gained



prominence in the nature conservation sector. The overriding threat to dormouse populations across England is inappropriate woodland management or no woodland management at all.

11.121 A buffer between the built development and suitable woodland and hedgerow habitat has been included in the Proposed Development, which will help to minimise increases in noise / visual / light spill and human disturbance arising from increased human presence, vehicular use, anti-social activities, mismanagement and / or recreational use, which otherwise could lead to dormice abandoning nests and breeding territories.

11.122 Nonetheless, inherent mitigation alone is not sufficient to fully address the potential operational impacts of increased levels of human occupation and usage on site affecting the woodland. On this basis, in the absence of additional mitigation (in a worst case scenario), the effect is assessed as **significant**, adverse, indirect and permanent at the District-level.

Assessment of Effects: Stag Beetle Population

11.123 A buffer between the built development and suitable woodland and hedgerow habitat has been included in the Proposed Development, which will minimise increases in noise / visual / light spill and human disturbance arising from increased human presence, vehicular use, anti-social activities, mismanagement and / or recreational use, which otherwise could lead to displacement of stag beetle populations.

11.124 Nonetheless, inherent mitigation alone is not sufficient to fully address the potential operational impacts of increased levels of human occupation and usage on-site affecting the woodland.

11.125 On this basis, in the absence of additional mitigation (in a worst case scenario), the effect is assessed as **significant**, adverse, indirect and permanent at the Local-level.

Summary of Significance of Effects

11.126 The potentially significant effects of the Proposed Development on the IEF's identified for the Site are summarised in Table 11.4 at the end of this chapter.



ASSESSMENT OF CUMULATIVE EFFECTS

11.127 As mentioned in paragraph 1.46 above, cumulative effects have been considered, based upon the list of schemes provided in Chapter 3, with respect to the potential for in-combination effects to arise upon the IEFs pertinent to the Proposed Development, in the absence of additional mitigation (only intrinsic mitigation is included).

11.128 EDP considers that the probability of in-combination cumulative effects during construction is negligible, such that the below focuses on operational phase cumulative effects only.

Designations

11.129 As described previously, the Proposed Development contains intrinsic mitigation (retention of open space for greenspace within the Site), to ensure that recreational pressures to statutory and non-statutory designations are minimised. These were assessed above as **not significant**, neutral, direct and permanent effect for statutory designations and as **significant**, adverse, indirect and permanent for non-statutory designations.

11.130 Since planning policy and HRA requirements applicable to all planning applications requires harm to designations to be adequately avoided as the primary position for design, the likelihood of adverse cumulative effects on the designations from in-combination effects associated with multiple developments is minimal.

11.131 Accordingly, in the absence of additional mitigation, the cumulative effect on statutory designations of European value is considered to be **not significant**, neutral, direct and permanent, and on non-statutory designations of County value is considered to be **significant**, adverse, indirect and permanent.

Habitats (Ancient Woodland)

11.132 As discussed above, intrinsic mitigation will help minimise effects, but on a precautionary basis, the assessment of the Proposed Development concluded that in the absence of additional mitigation, the operational effects upon ancient woodland IEFs (namely Hall Wood, which is included within Hook Wood LWS above) could be significant, adverse, indirect, permanent in a worst case scenario. This reflects that intrinsic mitigation alone may not be sufficient to fully



address increased level of disturbance from human activity on the site which may impact the woodland.

11.133 Since planning policy applicable to all planning applications requires no net loss and a net gain to be delivered to biodiversity as the primary position for mitigation (starting with intrinsic mitigation to avoid key habitats and provide sufficient open space to create new ones), the likelihood of adverse cumulative effects on habitats from in-combination effects associated with multiple developments is unlikely.

11.134 Accordingly, in the absence of additional mitigation, the cumulative effect on ancient woodland habitats is considered to be **not significant**, adverse, direct, and permanent.

Species (Bats, Dormouse and Stag Beetle)

11.135 The assessment of the Proposed Development concluded that in the absence of additional mitigation, the effects upon bat assemblage would be **not significant**, adverse, direct / indirect and permanent.

11.136 Intrinsic mitigation will help minimise effects, but on a precautionary basis, the assessment of the Proposed Development concluded that in the absence of additional mitigation, the operational effects upon dormouse and stag beetle could be **significant**, adverse, indirect, permanent in a worst case scenario. This reflects that intrinsic mitigation alone may not be sufficient to fully address increased level of human activity at the Site which may impact the woodland and associated dormouse and stag beetle populations.

11.137 Since planning policy applicable to all planning applications requires no net loss and a net gain to be delivered to biodiversity as the primary position for mitigation (starting with intrinsic mitigation to avoid key habitats and provide sufficient open space to create new ones), the likelihood of adverse cumulative effects on species from in-combination effects associated with multiple developments is unlikely.

11.138 Accordingly, in the absence of additional mitigation, the cumulative effect on species is considered to be **not significant**, adverse, direct, and permanent.



IMPACT OF CLIMATE CHANGE

11.139 The valued habitats and species IEFs within the Site are not near the edge of their geographical ranges. Therefore, change anticipated as a result of the Proposed Development in combination with climate change is not considered to cause significant impacts on the habitat and species IEFs.

11.140 Furthermore, it is considered that the generous provision of greenspace within the Proposed Development (intrinsic mitigation), will provide sufficient resilience to any potential effects of future climate change, by providing a range of habitat opportunities.

11.141 Therefore, the effects likely to arise as a result of climate change in the absence of additional mitigation, are assessed as **not significant**, neutral, direct or indirect and temporary or permanent on the habitat and species IEFs.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Proposed Additional Mitigation

11.142 Overall, adverse (negative) effects have been avoided or reduced through inherent mitigation incorporated into the Parameter Plans and set out in the submitted application documents. However, not all potential adverse effects can be avoided or reduced in severity through inherent mitigation alone. This section identifies any additional mitigation measures required to avoid, reduce or offset the potential for such significant negative effects. The key mechanisms described will include measures to:

- Conform with relevant and pertinent legislative requirements, particular those associated with legally protected species; and
- Deliver and, where possible, maximise opportunities for biodiversity enhancement and gain through the proposed development.

11.143 The key mechanisms which would be implemented are:

- Detailed Design Measures – An outline application for the Proposed Development is being made with all matters, except access, reserved. The indicative masterplan is therefore illustrative and allows flexibility for specific detailed design measures to be secured and included within the Proposed Development. Such detailed design measures can, where necessary, be agreed with the Local Planning Authority (LPA) and secured through



suitably worded planning conditions and addressed at the Reserved Matters stage for each phase of the development;

- Ecological Construction Method Statement (ECMS) – This would set out in detail the measures which will require implementation with respect to IEFs during the demolition and construction phase of the proposed development. It is proposed that the methodologies prescribed within the ECMS will be overseen by an appointed Ecological Clerk of Works (ECoW), whose scope and remit will be set out within the ECMS. The ECMS and appointment of the ECoW could be secured by way of a suitably worded planning condition, as would a Construction Environmental Management Plan (CEMP) setting out more general environmental control measures during construction (e.g. pollution control);
- Ecology Management Plan (EMP) – This would set out the measures for the ongoing management, maintenance and monitoring of the IEFs and of those newly created habitats to maximise opportunities for biodiversity enhancement and gain, secured by way of a suitably worded planning condition and / or obligation; and
- Woodland Management Plan (WMP) – This would set out the measures for the ongoing management, maintenance and monitoring of Hall Wood to maximise opportunities for biodiversity enhancement and gain, secured by way of a suitably worded planning condition and / or obligation.

11.144 The proposed mitigation in respect to the potentially adverse effects of construction and during operation, even if not considered to be significant in EIA terms are described below.

Construction Phase Additional Measures

11.145 All necessary surveys are considered up-to-date at the time of submission. However, where relevant and depending on development timescales and phasing, certain detailed species surveys may require updating prior to commencement of the relevant phase of development. The findings will be used to inform the measures set out below.

11.146 Detailed measures to protect habitats and species during the construction phase will be set out in an ECMS and CEMP which it is anticipated would be secured through an appropriately worded pre-commencement condition attached to planning permission. The ECMS will cross



reference the Arboricultural Method Statement (AMS) also prepared at the post outline consent stages.

11.147 The ECMS will contain measures to ensure that valued habitats retained within the Site, which include the woodland (Hall Wood) and boundary hedgerow and tree network, are fully protected during construction activities.

11.148 Measures will include:

- Establishment of Ecological Protection Zones (EPZs) within the Proposed Development layout, protected by fencing and signage to prevent activities such as the incursion by vehicles or personnel, fires and stockpiling of materials; and
- The risk of potential pollution events including spills, leaks and other incidents during the construction phase will be minimised through key measures included within a CEMP, including the adherence to the Environment Agency's Pollution Prevention Guidance Notes (PPGs).

11.149 The measures above will address construction effects on retained habitats, ensuring that they are reduced to insignificant levels. Habitat losses will be addressed through new habitat creation during and after construction. This is discussed further under the operation mitigation section.

Species

11.150 Protection of species during construction will be ensured through the provisions set out in the ECMS. As a general measure aimed at protecting species, "tool box briefings" will be provided by a suitably experienced ecologist to the principal contractor (as appointed by the developer), for distribution to all employees involved in any enabling works / vegetation clearance. This will ensure that identification and protection of the relevant species and their habitats is understood by the contractors.

11.151 In addition to the habitat protection measures described above, which will deliver much of the necessary species protection, further measures to be included in the ECMS for IEFs are summarised below.



Bats

- To avoid harm / disturbance of roosting bats, any trees with bat roost potential would be subject to update survey prior to felling or pruning, if required. If bat roosts are confirmed to be present, no further works would be undertaken until an appropriate strategy is devised and agreed (which may require obtaining a licence from Natural England (NE)). In the event that this is required, retained trees would provide ample opportunity to provide replacement roosting habitat to mitigate any losses, thereby maintaining the favourable conservation status of the bat population and ensuring that a licence would be granted by NE; and
- Restriction of construction activities to daylight hours as far as possible to mitigate effects of increased visual and noise disturbance, with the use of temporary, artificial lighting avoided during the hours between dusk and dawn, with directional and low-level lighting used away from sensitive habitat corridors to mitigate effects relating to increased use of artificial lighting to roosting, foraging and commuting habitats.

Dormouse

- To avoid harm / disturbance to dormice, above-ground woody vegetation will be removed during the winter period only (namely December-February) to avoid the dormouse breeding and dispersal periods, and the removal of below-ground vegetation (including stumps, roots and any other debris) will be undertaken between May and September to avoid periods when dormice are in torpor;
- In the event that any dormice or their nests are discovered, then works would cease until a strategy is agreed with NE and, if necessary, an EPS licence obtained; and
- Sensitive lighting scheme as discussed above to mitigate effects relating to increased use of artificial lighting to breeding, foraging and dispersal habitats.

Stag Beetle

- Suitable habitat hand search by Ecologist prior to vegetation removal.

Operation Phase Additional Measures

11.152 Avoidance or mitigation of potential adverse effects, and delivery of biodiversity gains (in line with national and local planning policy), during the operational stage of the development will be ensured through the following key mechanisms:



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- Soft Landscaping Scheme (SLS), including detailed specifications for creation of new habitats of ecological value within all areas of proposed green open space;
 - Ecological Management Plan (EMP), integrated with arboricultural and landscape management requirements, detailing measures for the ongoing management, maintenance and monitoring of the IEFs and of those newly created habitats to maximise opportunities for biodiversity enhancement and gain;
 - Woodland Management Plan (WMP), integrated with arboricultural management requirements, detailing measures for the ongoing management, maintenance and monitoring of Hall Wood to improve the habitat for biodiversity; and
 - Lighting Scheme, providing detailed specifications for lighting associated with the proposed development designed, where appropriate, to avoid light spillage onto sensitive habitat areas.

11.153 The habitats on-site would be appropriately managed to create attractive spaces for both wildlife and people (including community parks), with clearly marked pedestrian / cycle routes that connect with the existing public right of ways linking the site to the wider landscape, and appropriate planting and landscaping to facilitate different recreational uses, as illustrated in the parameter plans and illustrative Landscape Strategy. These management details would be set out in the EMP / WMP and encourage new residents to utilise Public Open Space (POS) within the development itself, thereby minimising the potential for off-site recreational disturbance to designated sites in the adjacent landscape and beyond.

11.154 The EMP / WMP should include structural planting and woodland edge management, particularly along the Site's northern and western boundary, to further mitigate light spill, noise and visual effects on Hook Wood LWS (including Hall Wood) and further discourage recreational incursion into this non-statutory designated site. This would include measures such as:

- Selective planting of dense thorny bushes such as hawthorn and blackthorn and / or erection of fences to restrict access along the boundary;
- Clear demarcation of pedestrian / cycle routes;
- Wildlife interpretation boards to encourage community engagement; and
- Signs and bins to discourage littering and dog fouling.

11.155 The provisions for informal and formal green space (including creation of species-rich meadow grassland) within the Proposed Development are also expected to compensate for the small amount of habitat loss incurred through to construction of the eastern end of the pedestrian / cycle route which runs through the Site. Approximately 6.9ha of open green spaces and 3.95ha



of new woodland planting is proposed, as detailed within the Illustrative Landscape Strategy and Design & Access Statement produced for the Site. 6.9ha of open green spaces equates to 25% of the Site, whilst 3.95ha of woodland planting equates to 15% of the Site. These figures may be subject to variance at the detailed design stage, however subject to the delivery of appropriate conditions relating to habitat provision and management.

11.156 Overall, the green infrastructure within Site is anticipated to provide a net gain in biodiversity.

11.157 The EMP and WMP will include measures to restore, maintain and enhance the woodland, hedgerows, trees and scrub within the Site boundaries in order to increase their resilience and mitigate long-term disturbance effects. In addition, the EMP / WMP would include measures to establish and maintain new habitats of long-term ecological value within the development's open spaces, as illustrated in the Illustrative Landscape Strategy plan.

11.158 Measures to be included within the EMP to create, enhance and manage habitats are summarised below.

- Retained hedgerows will be enhanced, where relevant, through selective trimming/laying and planting with native species in gaps;
- Existing and proposed hedgerows will be managed via a wildlife-sensitive management regime, which includes trimming on a 3-year rotation as opposed to annually, in order to allow plants to develop flowers and fruits in order to enhance the wildlife value of the hedgerow; and
- Planting of new mixed native hedgerows within the development's open spaces.
- Ongoing viability and safety of tree stock on-site maintained including arboricultural inspections in accordance with industry best practice;
- Ongoing management of retained woodland (Hall Wood) (e.g. thinning, scrub removal, coppicing, clear demarcation of footpaths, fencing, litter picking, creation of wood piles);
- New native tree planting (in addition to woodland planting) within the Site's open spaces and along the streets; and
- Creation and management of approximately 3.95ha of new native woodland planting.
- Sowing of up to approximately 0.14ha of new species-rich meadow and marshy grassland in open spaces and within attenuation features – this would be within the open space provision of 6.9ha; and
- Management of grassland to encourage botanical diversity, and to benefit bats, badgers and invertebrates.



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- Creation and management of SuDS (including attenuation features and swales) that will not only ensure the rate of surface water run-off from the Proposed Development matches current levels, but would also intercept pollutants and provide habitat for a variety of wildlife; and
 - Planting and management of the attenuation features to enhance their ecological value and effectiveness at intercepting pollutants.

11.159 It is anticipated that the above will be secured by a suitably worded planning condition, and details progressed at the more detailed design stages as part of future Reserved Matters submissions.

Species

11.160 In addition to the favourable management of retained and created habitats, the following additional species measures include:

- Installation of durable bird boxes, including a range of designs to suit different species, will be erected on retained mature trees in appropriate locations within the Site;
- Bird nesting features (e.g. swallow/swift ledges and sparrow terraces) will be incorporated into selected new buildings in appropriate locations within the Site.
- Installation of durable bat boxes, including a range of designs to suit different species, will be erected on retained mature trees, in appropriate locations within the periphery of the scheme, to enhance roosting opportunities within the Site;
- Bat roosting features (e.g. bricks and access tiles) will be incorporated into selected new buildings in appropriate locations within the Site; and
- A sensitive lighting scheme, which ensures retained and new bat habitats are not illuminated to a level where bat activity is deterred, will be incorporated at the detailed design stages of the development.
- Durable dormouse boxes erected on suitable mature trees within Hall Wood and the south eastern edge of Hook Wood; and
- A sensitive lighting regime to avoid excessive illumination of the retained and new dormice habitats will be incorporated at the detailed design stages of the development.
- Enhancement measures for stag beetle will include the following:
 - Retention of existing deadwood within woodland;
 - Avoidance of 'tidying up' woodland (i.e. burning or chipping of deadwood, and stump-grinding tree stumps);



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- Creation of new deadwood by retention of logs from felled trees on the ground; and
 - Creation of partially buried log piles.
- Creation of hibernacula and/or wood piles in appropriate locations within the periphery of the scheme, will enhance opportunities for invertebrates, amphibians and small mammals such as hedgehogs.

Future Monitoring

11.161 Newly created habitats and the success of bird, bat and dormice boxes is subject to future monitoring following the completion of the development to assess the success of the mitigation strategies detailed within the EMP / WMP. Such monitoring should be detailed within the EMP / WMP and management prescriptions reviewed and amended to reflect the monitoring results and protect these habitat and species interests over the long term.

RESIDUAL EFFECTS

11.162 The residual effects are the likely effects occurring following implementation of the intrinsic design measures and construction phase and operational phase additional mitigation measures described above. The measures proposed are industry-standard and are not novel unproven measures. There is therefore high confidence that such measures will adequately mitigate the potential effects described.

11.163 Subject to the mitigation measures outlined above being implemented residual construction effects are assessed as **not significant**, neutral, direct / indirect and temporary upon IEFs during the construction phases, and **not significant, beneficial**, direct and permanent upon the majority of the IEFs during the operation phases. EDP predicts the Proposed Development will deliver a net biodiversity gain overall.

11.164 A summary of the residual effects after completion is provided in Table 11.4 at the end of this chapter.

SUMMARY

11.165 This chapter provides an assessment of the significance and consequences of likely significant effects upon identified Important Ecological Features (IEFs) arising from the Proposed Development of land at Gibraltar Farm, Ham Lane, Hempstead, Gillingham, Kent. It



has been prepared by EDP as part of an Environmental Statement (ES) that accompanies a new outline planning application for the Site.

11.166 Avoidance, mitigation and compensation measures have been prepared as part of a holistic ecology strategy for the Proposed Development to address any potential significant effects that may arise during construction and after completion (operation) of the Proposed Development. Additional measures to further ensure all residual effects are avoided, mitigated and compensated for, in addition to further enhancements recommended to enable the Proposed Development to deliver positive ecological gain are also discussed.

11.167 Further baseline information in support of this chapter is included within the Baseline Ecology Report (**Appendix 11.1**), Ecological Appraisal (**Appendix 11.2**) and Ecology Addendum Report (**Appendix 11.3**), and are referred to throughout the assessment. The approach taken in this assessment is made with reference to the guidelines published in 2018 by the Chartered Institute of Ecology and Environmental Management (CIEEM).

11.168 In addition, further details of the Arboricultural Assessment are provided within **Appendix 11.4**.

11.169 The baseline survey work has identified the following IEFs pertinent to the development proposals:

- Statutory Designations – North Downs Woodlands SAC, Queendown Warren SAC, Medway Estuary & Marshes SPA and Ramsar, Wouldham to Detling Escarpment SSSI and Purple Hill SSSI (International to National-level value);
- Non-statutory Designations – Hook Wood LWS (includes Hall Wood), South Wood LWS / LNR and RNR (RO11) (Local to County-level value);
- Bat assemblage (Local-level value);
- Dormouse (District-level value); and
- Stag beetle (Local-level value).

11.170 The impact assessment has identified that certain actions could result in significant adverse effects on these IEFs in the absence of mitigation. Inherent avoidance, mitigation and compensation measures and the implementation of an Ecological Construction Method Statement (ECMS), Ecology Management Plan (EMP) and Woodland Management Plan (WMP) are considered to ameliorate those significant effects identified to a residual level where no



significant adverse effects are likely. Furthermore, such measures can deliver significant beneficial effects with respect to biodiversity gain.

11.171 A summary of those activities during the construction and operational phases of the development impacting upon identified IEFs, including the proposed mitigation, enhancement and, where necessary, compensation mechanism, should any residual effects remain, are provided within Table 11.4 below.

11.172 Based on the impact assessment and consideration of the IEFs, it is concluded that the proposals will conform to the legislative protection afforded to these IEFs and with national, regional and local planning policy requirements.

Table 11.4: Summary of Ecological Impact Assessment



Ecological Receptor	Value	Nature of Effect	Significance of Unmitigated Effect (Geographic Scale)	Mitigation/ Enhancement Measures	Residual Effects
Construction					
Non-statutory designations or equivalent (namely Hook Wood LWS (including Hall Wood) and RNR RO11)	Local to County	Direct loss of habitat (minor magnitude and extent, temporary / permanent)	Significant, adverse (County)	ECMS / CEMP – protection of retained habitats EMP, WMP and Landscaping Scheme – new habitat creation and long-term management of retained and created habitats	Not significant, neutral
Bat assemblage	Local	Direct loss, fragmentation and degradation of roosting and foraging / commuting habitat (minor magnitude and extent, permanent)	Not significant, adverse (Local)	ECMS / CEMP – protection of retained habitats, update survey of any trees with bat roost potential prior to felling / pruning works, and sensitive timing of works EMP, WMP and Landscaping Scheme – new habitat creation and long-term management of retained and created habitats	Not significant, neutral
		Indirect light spill, visual and noise disturbance of roosting and foraging / commuting habitat (minor, temporary, uncertain magnitude)		ECMS – protection of retained habitat corridors from light spill and disturbance	
Dormouse	District	Direct loss of habitat, harm of killing / injury (minor extent, permanent)	Not significant, adverse (District)	ECMS / CEMP – protection of retained habitats, sensitively timed and supervised vegetation clearance EMP, WMP and Landscaping Scheme – new habitat creation and long-term management of retained and created habitats	Not significant, neutral



		Indirect light spill, vibrational and noise disturbance of breeding, foraging and dispersal habitat (minor extent and duration, temporary)	Not significant, adverse (District)	ECMS / CEMP – protection of retained habitat corridors from light spill and disturbance	
Stag beetle	Local	Direct loss of habitat, harm of killing / injury (minor extent, permanent)	Not significant, adverse (Local)	ECMS / CEMP – protection of retained habitats, supervised vegetation clearance EMP, WMP and Landscaping Scheme – new habitat creation and long-term management of retained and created habitats	Not significant, neutral
Operation					
Statutory designations	National – International	Indirect disturbance and degradation through increased recreational use and traffic movements (minor magnitude and extent)	Not significant, neutral (National – International)	EMP and Landscaping Scheme – detailed design and management of green infrastructure, and pedestrian / cycle connections into the wider landscape	Not significant, neutral
Non-statutory designations or equivalent	Local – County	Indirect disturbance and degradation through increased recreational use (moderate magnitude and extent, uncertain)	Significant, adverse (Local – County)	EMP / WMP and Landscaping Scheme – new planting and other design features to complement the existing habitats and prevent uncontrolled access	Not significant, beneficial



Bat assemblage	Local	Disturbance and light spill of roosting, foraging / commuting habitat, increased collision risk (minor magnitude, permanent)	Not significant, adverse (Local)	EMP / WMP and Landscaping Scheme – new roosting, and foraging / commuting habitat creation, and long-term management of retained and new habitats Detailed Lighting Scheme – avoid illumination of key retained habitats, namely retained woodland, hedgerows, and mature trees	Not significant, beneficial
Dormouse	District	Habitat damage, disturbance and predation (minor magnitude, permanent)	Significant, adverse (District)	EMP / WMP and Landscaping Scheme – new habitat creation, and long-term management of retained and new habitats	Not significant, beneficial
		Light spill and disturbance of breeding, foraging and dispersal habitat (minor magnitude, permanent)		Detailed Lighting Scheme – avoid illumination of key retained habitats, namely retained woodland and hedgerows	
Stag beetle	Local	Indirect degradation and disturbance of suitable habitat (minor magnitude, uncertain)	Significant, adverse (Local)	EMP / WMP and Landscaping Scheme – new habitat creation, and long-term management of retained and new habitats	Not significant, beneficial



REFERENCES

Ref 11.1: CIEEM (2018); 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine', Chartered Institute of Ecology and Environmental Management, Winchester.

Ref 11.2: CIEEM (2016); 'Biodiversity Net Gain: Good Practice Principles for Development' © CIEEM, CIRIA, IEMA.

Ref 11.3: Medway Council (2003); 'Medway Local Plan – Adopted 14th May 2003'

Ref 11.4: Defra (2018); 'A Green Future: Our 25 Year Environment Plan to Improve the Environment', Department for Environment, Food and Rural Affairs, London.

Ref 11.5: MHCLG (2016); 'National Planning Policy Guidance for the Natural Environment', Ministry for Housing, Communities and Local Government, London.

Ref 11.6: Natural England and Defra (2016); 'Protected Species: How to Review Planning Applications', Natural England, Cheshire and Department for Environment, Food and Rural Affairs, London.

Ref 11.7: BSI (2013); 'BS42020: 2013 Biodiversity. Code of Practice for Planning and Development', British Standards Institute, London.

Ref 11.8: ARUP (2018); 'Medway Local Plan Development Strategy – Interim Consideration of the Implications of Development Strategy Scenarios on European Sites', Medway Council.



12 WATER QUALITY, HYDROLOGY & FLOOD RISK

INTRODUCTION

12.1 This chapter considers the potential effects of the Proposed Development on flood risk and water resources. It includes consideration of effects on surface and groundwater resources, flood risk to the Site and effects on flood risk to the surrounding area.

12.2 A Surface Water Management Strategy was undertaken by Herrington Consulting, and is included within **Appendix 12.1**.

12.3 The assessment has been based on information provided within the Flood Risk Assessment produced by Create Consulting Engineers Ltd. reference GL/HB/P14-630/ included within **Appendix 12.2**.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Predicted Impacts

12.4 The scope of the assessment includes an assessment of both the construction and operational phases. The following key issues have been considered in this assessment for these phases:

- whether the proposed development is likely to be affected by current or future flooding from any source
- whether the measures proposed to deal with these effects and risks are appropriate
- effects on water quality of surface water and groundwater resources;
- effects of proposed peak discharge rates on local infrastructure
- flood risk to the Proposed Development, considering all potential sources of flooding;
- effects on offsite flood risk associated with the surface water runoff from the Site and management of extreme rainfall events.

Assessing Significance

12.5 The assessment of effects refers to the change that is predicted to take place to the existing condition of the environment as a result of the Proposed Development.



12.6 The significance of an effect is generally determined as the combination of the sensitivity of the affected environment receptor and the predicted extent and/or magnitude of the effect. The assessment of significance ultimately relies on professional judgement, although comparing the extent of the effect with criteria and standards specific to each environmental topic can guide this judgement scope. Details of criteria specific to this assessment are defined in Table 12.1 and Table 12.2.

Table 12.1: Receptor Sensitivity for Flood Risk and Water Resources

Receptor sensitivity	Description
High	Main Rivers. Highly Vulnerable Land Use as defined in NPPF (Ref. 12.1) (e.g. basement dwellings, installation requiring hazardous substances consent). Local population, including future occupants of the development and surrounding residents. Aquifer of National Importance (e.g. Chalk Aquifer).
Medium	More Vulnerable Land Use as defined in NPPF (Ref. 12.1) (e.g. hospitals, dwellings, residential institutions, hotels, health services, nurseries and educational establishments). Site buildings and surrounding structures. Offsite abstraction from groundwater or surface water. Non-main river/ordinary watercourses. Spring/Pond/lake/standing water with outfall to a watercourse. Principal (Major) Aquifer. Infrastructure of importance at district scale.
Low	Less Vulnerable Land Use as defined NPPF (Ref. 12.1) (e.g. commercial buildings and offices). Secondary (Minor) Aquifer (River Terrace Deposits). Spring/Pond/lake/standing water with no outfall to a watercourse. Infrastructure of local level importance, public sewer network in vicinity of the Site.
Very Low	Water Compatible Land Use as defined in NPPF (e.g. open spaces, outdoor sports facilities). Shallow alluvium and unproductive strata. Infrastructure of importance to a street.



Table 12.2: Magnitude of Effect

Magnitude of Effect	Description
Major	Large change to existing environmental conditions. Irreversible change affecting receptor functioning (e.g. significant depletion of groundwater resource, permanent damage or insufficient capacity of drainage infrastructure). Permanent change in flood risk onsite or adjacent sites (greater annual probability than 1 in 100 year frequency).
Moderate	Noticeable change to existing environmental conditions. Long term irreversible change to the hydrology/water conditions. Long term or irreversible change affecting receptor capacity (e.g. partial depletion of groundwater resources, reduced capacity of drainage infrastructure). Permanent increase in flood risk onsite or adjacent sites (lower annual probability than 1 in 100 year frequency).
Minor	Small change to existing environmental conditions. Short term and reversible change affecting receptor capacity (e.g. temporal depletion of groundwater resources, temporarily reduced/increase to capacity of drainage infrastructure). Temporary increase/decrease in flood risk onsite or adjacent sites.
Negligible	No discernible change to existing environmental conditions. No discernible change in flood risk. No discernible change to receptor capacity and functionality.

12.7 The predicted significance of the effect was determined through a standard method of assessment based on professional judgement, considering both sensitivity and magnitude of change as detailed in Table 12.3 below. Major and moderate effects are considered significant in the context of the EIA Regulations.

12.8 With the significance criteria define in Table 12.3, the effects may be beneficial or adverse.



Table 12.3: Significance Criteria Effect

Sensitivity	Magnitude of Change			
	Major	Moderate	Minor	Negligible
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

Assessment Assumptions and Limitations

12.9 The assessment has been based on information provided within the Flood Risk Assessment produced by Create Consulting Engineers Ltd reference GL/HB/P14-630/03, as well as the supplementary Flood Risk Assessment provided by Herrington Consulting.

12.10 The surface water drainage system has been based on site investigations carried out by Ground Technology Services ref GTS-14-198 **Appendix 12.3**.

Design Considerations

12.11 The following describes the measures and environmental enhancements which have been proposed to be incorporated within the design and management of the Proposed Development. These design and management measures will avoid, prevent, reduce or offset potential environmental effects.

12.12 Flood Risk Management – No significant risk of flooding has been identified for the Site. Entry thresholds to dwellings and drainage overflows will be designed to ensure the buildings are not at risk of flooding from its own drainage system (e.g. becoming overwhelmed during extreme



event, or in the event of a blockage/failure of the system). The same measures will also protect the building from flooding by local surface water sewer during extreme events.

12.13 Sustainable Drainage –If the Site remained as current, no significant changes would be expected to water resources, the capacity of local sewers, or local flood risk.

LEGISLATION, PLANNING POLICY AND GUIDANCE

12.14 The National Planning Policy Framework (NPPF) (**Ref. 12.1**) was published on the 27th March 2012 and updated in 2018. This Framework is a key part of the Government's reforms to make the planning system less complex and more accessible, to protect the environment and to promote sustainable growth. The NPPF sets out the Government's planning policies for England and is used in the preparation of local plans, as well as in decision making with respect to planning. The framework is executed by means of the accompanying Planning Policy Guidance Suite (March 2014) which supersedes PPS25: Development and Flood Risk Practice Guide (2009).

12.15 The Flood and Water Management Act (FWMA) (**Ref. 12.2**) was implemented in England and Wales in April 2010. The act outlines the responsibilities for managing flood risk and drought, with an increased focus on the risk of flooding from local sources.

12.16 The National Standards for the design, construction, maintenance and operation of Sustainable Drainage Systems (SuDS) (**Ref. 12.3**) came into effect from the 6th April 2015 and relate to Schedule 3, Paragraph 5 of the Flood and Water Management Act 2010. These (non-statutory) Technical SuDS Standards provide additional detail and requirements not initially covered by the NPPF, through specifying criteria to ensure sustainable drainage is included within applications classified as major development.

12.17 Medway Council is the Lead Local Flood Authority (LLFA) and has the duty to manage local flooding, which covers the risk of flooding from surface water, groundwater and ordinary watercourses. In accordance with the Flood and Water Management Act, Medway Council produced a Local Flood Risk Management Strategy (LFRMS) (**Ref. 12.4**), which was published in 2014. The strategy sets out to outline the approach to managing local flood risk within the district and how these could be implemented.

12.18 The Surface Water Management Plan (SWMP) (**Ref. 12.5**) for the Medway was released in November 2016. The report provides an assessment of the risk of surface water flooding in Medway by utilising hydraulic modelling, which has been undertaken as part of the report. The results of the modelling have been used to recommend suitable surface water management strategies which could



reduce the risk of flooding. This was primarily aimed at high risk areas within the urban confines of the Medway Towns, including the settlements of Strood, Rochester, Chatham and Gillingham.

12.19 The current Local Plan (**Ref. 12.6**) was adopted in 2003 and is currently in the process of being updated. The updated plan is due to be adopted in 2020, and will cover the period up until 2035. The Local Plan sets out policies for Medway in line with the Council's objectives for development. The SFRA forms part of the evidence base for the updated Plan, which will be used to update Local Planning Policies in relation to flood risk and surface water management, as well as informing the development allocation process.

12.20 As part of the current Local Plan (**Ref. 12.6**), reference is made to Policies in respect to flood risk. Policy BNE45 relates to development along the undeveloped section of the coastline with respect to the existing standard of protection provided by the defences. Policy CF13 outlines requirements for development in tidal flood risk areas.



BASELINE CONDITIONS

Existing Site

12.21 The Site covers an area of approximately 27 hectares between Ham Lane to the north and Lordswood Estate to the south. The Site is currently classified as greenfield land and is agricultural. As such, the site is considered to be permeable.

12.22 Ground levels on the Site vary between 103.9m Above Ordnance Datum Newlyn (AODN) to the north and 131.4m AODN to the south.

12.23 According to the Geotechnical Study the natural geology is made up of Seaford Chalk Formation, underlain by Lewes Nodular Chalk Formation.

Water Resources

12.24 In relation to water resources the Geotechnical Study states the following:

- The Site is located approximately 6km to the south of the estuary of the River Medway.
- The Seaford Chalk Formation and the Lewes Nodular Chalk Formation are both classified as Principle Aquifers.
- The Site is situated within a zone 3 Source Protection Zone (SPZ). The soils are defined as having an Intermediate to High Leaching potential.
- The Site is not situated within a Nitrate Vulnerable Zone.

Flood Risk

12.25 The findings of the FRA show that the Site is located within Flood Zone 1 (the zone of lowest flood risk) on the EA Flood Map. Consequently, the Site is at low risk of flooding from fluvial or tidal waters.

12.26 The EA Surface Water Flood Map shows a Low to High risk of flooding from surface water, as a consequence of local topography and the surrounding catchment.

12.27 No significant risk of flooding associated with groundwater or water infrastructure have been identified.

12.28 The occupants of the Proposed Development and the local residents are potential receptors. The sensitivity of the local population to flooding is considered to be high.



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

The 'Do Nothing' Scenario

12.29 If the Site remained as current, no significant changes to water resources, capacity of local sewers or local flood risk would be expected.

Construction Effects

Predicted Construction Effects

12.30 Construction activities and the presence at the construction site of fuels, chemicals and construction materials (e.g. cement) could lead to release of pollutants into the groundwater within the identified principle chalk aquifer. The sensitivity of the aquifer to pollution has been assessed to be Medium and the effect will be of Moderate magnitude. The significance will therefore be Moderate.

12.31 A temporary surface water drainage system will be provided until a permanent system comes into operation. Most site runoff will be discharged via infiltration. Pollution from the construction site or accidental spillage could therefore enter the principle aquifer. The sensitivity of the aquifer to pollution has been assessed to be Medium and the effect will be of Moderate magnitude. The significance will therefore be Moderate.

12.32 During the construction phase there could be a potential risk of local flooding on the Site or to the local neighbourhood, due to the limited capacity of the temporary drainage system. During extreme pluvial events, or during decommissioning of the existing drainage system, the temporary system could become overwhelmed. The sensitivity of the local population to flooding is considered to be High and the magnitude of effect is considered to be Minor. The significance will therefore be Moderate.

Proposed Mitigation

12.33 The measures will be set out in a Construction and Environmental Management Plan (CEMP) which will mitigate any potential adverse effects on the water environment. In particular, the CEMP will be developed following best guidance of pollution control from construction sites and will include the following guidance (**Ref. 12.7**):

- Whenever possible, any mixing and handling of concrete done onsite, together with any washing down and cleaning of equipment used for concrete handling will be undertaken in designated contained areas.
- Appropriate storage and refill areas for oils, fuels and other potentially hazardous materials will be provided. Plant and machinery will include drip trays wherever possible.



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- An emergency response plan is to be followed in the event of a pollution incident and this will be developed in consultation with the EA. The plan will include the provision of appropriate emergency response equipment onsite and staff training in emergency procedures.
 - Contained wheel-washing facilities, silt traps and cut-off ditches and/or silt fences to be installed around excavations, exposed ground and stockpiles to prevent uncontrolled release of suspended solids.
 - Operations will be appropriately contained to ensure that the risk of surface water flooding to neighbouring sites does not increase during construction.
 - Appropriate temporary pollution control interceptors (oil traps) are to be installed upstream of any infiltration features.

Residual Construction Effects

12.34 The development and implementation of the CEMP, (once the main contractor has been appointed), will significantly reduce the likelihood of any pollution caused by construction activities leaching into the chalk aquifer and therefore, will reduce the and magnitude of effect. No waste or surface water will be discharged into the aquifer without documented authorisation has been obtained through a discharge consent notice, or an environmental permit. The residual adverse effects will be Negligible.

12.35 The CEMP will ensure that any temporary drainage system leading into infiltration systems is approved, and appropriate mitigation methods such as temporary pollution interceptors are put into place before surface water is discharged into the aquifer. The residual adverse effects will therefore be Negligible.

12.36 The development and implementation of the CEMP, (once the main contractor has been appointed), will significantly reduce the likelihood of any flooding to the neighbourhood during construction and therefore, will reduce the magnitude of effect. Due to the relatively low density of existing houses at the lowest point of the Site, the buildings can be protected by a series of cut-off drains designed to limit any adverse impact which could be caused from flooding. The residual adverse effects will be therefore be Minor.



Operational Effects

Predicted Operational Effects

12.37 The construction of a residential development within the surface water flow paths located across the Site could have potential effects to the risk of flooding to the Proposed Development and surrounding area during higher return period events. The sensitivity of flooding has been assessed to be High and the effect will be of Moderate. The significance will therefore be Major.

12.38 As surface water runoff for events up to 1 in 100 year + 30% will be contained onsite, the Proposed Development will have a moderate beneficial effect on local flooding. At present the existing greenfield runoff from the Site catchment area is anticipated to contribute to surface water flooding north of the Site (e.g. on Ham Lane and Shawstead Road). The Proposed Development utilises attenuation features to store runoff and allow water to gradually soak into the underlying ground, therefore reducing the rate at which surface water is discharged off site. It can be estimated that the effect of a reduction in local flooding will be of minor magnitude. The effect will therefore be minor beneficial and not significant.

12.39 The Proposed Development will introduce roads and infrastructure to an otherwise greenfield site. This will increase the risk of pollutants arising from roads and trafficked areas, which could be infiltrated into the ground through surface water runoff. This could have an impact of the underlying principle chalk aquifer. The sensitivity of the aquifer to pollution has been assessed to be Medium and the effect will be of Moderate magnitude. The significance will therefore be Moderate.

12.40 The Proposed Development will introduce additional foul water to the local sewer system which has been identified as having insufficient capacity. This will increase the risk of the sewers surcharging, which could result in sewer flooding. The sensitivity of the flood risk is assessed to be Medium and the effect will have a Moderate magnitude. The significance will therefore be Moderate.

Proposed Mitigation

12.41 The Proposed Development has been designed to provide a green corridor through the Site, and therefore maintaining the existing surface water flow paths through the Site. The proposed buildings are located outside of the flood risk area and therefore it is concluded that the residual adverse effects will be Minor.

12.42 On completion of the Proposed Development, the addition of Sustainable Drainage Systems such as permeable paving and swales will provide additional water quality benefits to remove and treat surface water runoff in accordance with current guidance. This approach therefore reduces the



risk of contamination into the underlying watercourse through mitigation. The residual adverse effects are considered to be Minor.

12.43 On completion of the Proposed Development, additional local sewer upgrades will be necessary to increase the local capacity of the foul sewer and thus, reduce the risk of sewer flooding. Through mitigation, the residual adverse effects are considered to be Minor.

ASSESSMENT OF CUMULATIVE EFFECTS

12.44 The cumulative development set-out in Chapter 3 have been considered as part of the cumulative assessment.

12.45 The relationships between the environmental effects of the construction and operation of the Proposed Development and the anticipated effect of committed adjacent developments has been considered and is classified as negligible, or negligible to minor adverse. Therefore, the cumulative effects are not considered to be significant.



SUMMARY

12.46 All significant effects on the water environment, local water infrastructure and flood risk during the construction period will be mitigated by the development and implementation of appropriate construction methods, and implementation of a CEMP. These effects will be controlled by discharge consents which will regulate construction drainage discharges. The effects have therefore been assessed as neutral.

12.47 The Proposed Development will contribute to an increase in wastewater discharge to the local sewer infrastructure and therefore, additional sewer upgrades will be necessary to accommodate any additional wastewater flows. With the additional sewer upgrades, but also the additional increase on infrastructure, the effects have therefore been assessed as neutral.

12.48 The Proposed Development will result in a reduction to the peak rate at which surface water is discharged from the Site when compared to the current greenfield runoff rates. The Proposed Development has also been designed to manage surface water runoff for events up to and including the 1 in 100 year return period, including a 30% increase to account for climate change. The additional water will be contained onsite, and therefore the Proposed Development will have a beneficial effect on local flooding.

Table 12.4: Summary of Construction Effects

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/Enhancement Measures	Residual Effects
Pollution into groundwater from construction on site	Temporary	Moderate	CEMP and certification	Negligible
Pollution into groundwater from temporary drainage systems	Temporary	Moderate	CEMP and certification	Negligible
Flooding during extreme events and during decommissioning of temporary drainage	Temporary	Moderate	CEMP	Minor adverse



Table 12.5: Summary of Operational Effects

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Existing surface water flow paths	Permanent	Major Adverse	Development design outside of flow path	Negligible / Neutral
Surface water runoff from the Proposed Development	Permanent	Major Adverse	SuDS systems	Beneficial / Negligible
Pollution into groundwater from infrastructure	Temporary	Moderate	SuDS systems	Minor adverse



REFERENCES

Ref 12.1: Department for Communities and Local Government, 2012 (and 2018 updates). National Planning Policy Framework

Ref 12.2: Flood and Water Management Act 2010

Ref 12.3: Defra (2015) The National Standards for the design, construction, maintenance and operation of Sustainable Drainage Systems (SuDS)

Ref 12.4: Medway Council (2014) Local Flood Risk Management Strategy

Ref 12.5: Medway Council (2016) Surface Water Management Plan

Ref 12.6: Medway Council (2003) Local Plan

Ref 12.7: Environmental Protection, England and Wales (2010) The Environmental Permitting (England and Wales) Regulations



13 SOILS, GEOLOGY AND CONTAMINATED LAND

INTRODUCTION

13.1 This chapter of the Environmental Statement has been prepared by Ground Technology Services Ltd and assesses the potential effects of the Proposed Development relating to soils, geology and contaminated land. The chapter outlines the scope, relevant legislation, baseline conditions of the Site, identifies the potential key effects of the Proposed Development on the ground conditions and assesses these key effects. The assessment includes potential mitigation measures which may be required to reduce any of the key effects and describes any likely residual effects.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

13.2 The method for assessing the significant effects of the Proposed Development due to natural hazards and soil contamination is outlined in the paragraphs below.

Scope of Assessment

13.3 Historical land uses can cause contamination of soils and groundwater which along with natural ground hazards such as chalk dissolution and ground gases can have adverse effects on the Proposed Development and the health of any future site users. Assessment of the existing ground conditions of the Site is therefore necessary to sufficiently determine the risks.

13.4 The assessment contains a review of information provided by Statutory and Non-statutory bodies relating to the Sites setting, geology, minerals, historic land use and contamination.

13.5 The main source of information used in preparation of this chapter is a Phase 1 Desk Study report by Ground Technology Ltd dated July 2014, a copy of which is included within **Appendix 13.1**. This report includes a review of historical land uses, geology, hydrogeology, natural hazards, results of intrusive site investigation and a human health and environmental risk assessment.

13.6 Other sources of information are listed in Table 13.1 below:



Table 13.1 – Sources of Information

Document	Source
Phase 1 Geo-environmental Desk Study, 2014	Ground Technology Services Ltd
Sheet 272, Chatham, 1:50,000 Drift Geology Plan, 1977	British Geological Survey
Digital 1:50,000 Geology Mapping	British Geological Survey
Envirocheck Report 56016142_1_1, 2014	Landmark Information Group
Maidstone Borough Adopted Local Plan, 2017	Maidstone Borough Council
Maidstone Borough Council – Mineral Safeguarding Areas	Kent County Council
Medway Adopted Local Plan, 2003	Medway Council
Magic Digital Mapping Services	DEFRA
Digital River Catchment Data Explorer	Environment Agency

13.7 These sources of information have been used to establish the baseline conditions for the Site, relating to soils, geology and contamination. Assessment of the existing baseline conditions and the impact of the Proposed Development on the existing baseline conditions is assessed.

Methodology

13.8 Current best practice on the assessment of potentially contaminated sites acknowledges the need for a tiered risk-based approach comprising an initial screening (Preliminary Qualitative Risk Assessment) and moving to higher tiers (Generic or Detailed Quantitative Risk Assessment) using more site-specific data as warranted. This tiered based approach is employed to enable low risk sites to be filtered out such that attention is focused on those sites where the risk is greatest.

13.9 The Preliminary Qualitative Risk Assessment is usually covered by a desk study, site visit and the production of a preliminary conceptual site model. This has been carried out within the 2014 Ground Technology Services Report (**Appendix 13.1**). The preliminary conceptual site model identifies potential risks or pollutant linkages through a source, pathway receptor model. The risk of each linkage is estimated based on the potential magnitude of effect and the sensitivity of the receptor and then amended in line with the probability of the linkage occurring.



13.10 The assessment for the Environmental Statement uses the potential risks identified in the preliminary conceptual site model and assigns a significance to each one using the matrix outlined below in Table 13.2.

Table 13.2 – Significance Matrix

Receptor Sensitivity	Magnitude of Effect			
	Negligible	Minor	Moderate	Major
Low	Insignificant	Insignificant	Minor	Moderate
Medium	Insignificant	Minor	Moderate	Major
High	Insignificant	Moderate	Major	Major

13.11 There is no specific published guidance for determining levels of receptor sensitivity or the magnitude of effects. Therefore, the sensitivity and magnitude will be assigned based on the qualitative descriptions used below.

Receptor Sensitivity

- Low – For example, low sensitivity receptors such as vegetation, construction workers, commercial/industrial structures, commercial/industrial future site users, secondary aquifers and low sensitivity water courses.
- Medium – Medium sensitivity receptors including Principal aquifers outside source protection zone, poor quality graded watercourses, residential structures and residential future site users without plant uptake.
- High – High sensitivity receptors including ground water source protection zones, sensitive environmental designations (e.g. SSSI), high quality water courses, residential future site users with plant uptake.

Magnitude of Effects

- Negligible – Little or no noticeable effect.
- Minor – Some limited but still measurable effect.



- Moderate – Measurable effect resulting in a key change.
- Major – An effect resulting in complete change.

13.12 Effects can be described as having an Adverse, Beneficial or Neutral effect based upon their outcomes.

LEGISLATION, PLANNING POLICY AND GUIDANCE

Legislation

13.13 Contaminated Land is covered by legislation including the Environmental Protection Act 1990 (**Ref 13.1**) and The Contaminated Land (England) Regulations 2006 (**Ref 13.2**). Part 2A of the Environmental Protection Act establishes a legal framework for dealing with contaminated land in England. It sets out a definition for what can be classed as contaminated land and sets out how local authorities deal with contaminated sites. All local authorities are required to keep a register of contaminated land within their jurisdiction.

13.14 Contaminated land is defined as:

“...any land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

- a) significant harm is being caused or there is the significant possibility of such harm being caused; or*
- b) pollution of controlled waters is being, or is likely to be, caused...”*

13.15 If a site is deemed to be contaminated land, then the party responsible for causing the pollution is responsible for dealing with it under the guidance from the local authority. The local authority may also send a remediation notice if the contamination hasn't been dealt with. If a site is not deemed to be sufficiently contaminated to be legally described as contaminated land, then the owner of the site may be responsible for dealing with any contamination whether they were responsible for causing the contamination or not.



Planning Policy

National Policy

13.16 The National Planning Policy Framework (NPPF) (**Ref 13.3**) states that: “As a minimum, the land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990”. It is the responsibility of the developer to demonstrate that the land to be developed is not affected by contamination by means of a risk assessment.

13.17 The NPPF also encourages the remediation and re-use of contaminated, brownfield or unstable land where appropriate.

Local Policy

13.18 Medway Council's adopted Local Plan (2003) (**Ref 13.4**) policy number BNE23: Contaminated land states that:

“Development on land known or likely to be contaminated or affected by adjacent or related contamination must be accompanied by the findings of a detailed site examination to identify contaminants and the risks that these might present to human health and the wider environment. Appropriate measures to reduce, or eliminate, risk to building structures, services and occupiers of the site and of adjoining sites must be agreed. Such remedial measures must be satisfactorily implemented before the development is occupied.”

Guidance

13.19 Statutory guidance on the Part 2A of the Environment Agency is published by DEFRA (**Ref 13.5**) (and aims to help to clarify how to decide if land is contaminated and aims to help local authorities to take more targeted precautionary approach rather than a blanket overcautious approach.

13.20 A recognised Code of Practice is published within BS10175:2011 Investigation of potentially contaminated sites (**Ref 13.6**).

13.21 Guidance published by the Environment Agency and DEFRA is included within the 2004 document, CLR11 Model Procedures for the Management of Land Contamination (**Ref 13.7**). This guidance sets out the process for risk assessing a site and preparing a remediation strategy.



BASELINE CONDITIONS

13.22 The baseline *conditions* for the Site have been established through desktop researches of statutory and non-statutory information and a review of a Phase 1 Geo-environmental desk study including a site walkover undertaken in 2014.

Location and Description

13.23 The Site *comprises* predominantly of arable farmland with an area of woodland located in the west of the site. The eastern part of the Site gently slopes to the north from a topographical high of approximately 130m above ordnance datum (AOD) in the far south of the Site to a low of 112m AOD in the north east of the Site. The west of the Site is separated from the east by a dry valley and is much steeper than the east ranging from 117m AOD in the south to 105m in the north close to Gibraltar Farm.

13.24 The site walkover conducted in 2014 made the following observations. Hall Wood lies to the western boundary, between the Site and Lord's Wood. Roots Wood and Holts Wood are situated to the north. Within Hall Wood lies a fenced compound with buildings currently used as a builder's yard, marked as depot. The Site is bounded to the north by Ham Lane with a farmyard beyond the north western corner of the Site. The farmyard buildings are now utilised for commercial purposes, comprising a haulage business in the southern building and a double glazing and conservatory business in the northern buildings. An above ground fuel storage tank associated with the haulage business at Gibraltar Farm was noted. A compound within Hall Wood was also noted but was not inspected further during the site walkover.

Geology

13.25 Information from published geological mapping (**Ref 13.8**) indicates that the Site is underlain by solid geology comprising the Seaford Chalk Formation and the Lewes Nodular Chalk Formation, both of the Cretaceous period. The Seaford Chalk Formation is present at rockhead under the majority of the Site. The Lewes Nodular Chalk Formation is present at rockhead in the north east of the Site where topography is lower. The Lewes Nodular Chalk Formation also underlies the Seaford Chalk Formation. Nearby BGS borehole logs from historical works indicate white chalk with occasional flints.



13.26 The solid geology is overlain by Head deposits to the far north west of the Site at lower elevations and the Clay with Flints Formation to the south and east over higher elevations. No drift deposits are indicated within the central area of the Site.

13.27 Made Ground or mass movement deposits are not recorded on published mapping and were not identified during the site walkover.

Hydrology

13.28 There are no surface water features on site. The River Medway is located approximately 6km to the north and west of the Site.

13.29 The low-lying land approximately 1km north west of the Site is situated within areas at risk of flooding and extreme flooding. The Site itself is not considered at risk from flooding or extreme flooding from rivers or the sea.

Hydrogeology

13.30 The hydrogeology of the Site is likely to be characterised by the Seaford Chalk Formation and The Lewes Nodular Chalk Formation, both of which are classified as being Principal Aquifers.

13.31 These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale. In most cases, principal aquifers are aquifers previously designated as major aquifers.

13.32 The Head deposits in the far north of the Site close to Gibraltar Farm are classified as a Secondary undifferentiated Aquifer.

13.33 A secondary Aquifer has been assigned in cases where it has not been possible to attribute either category A or B to a rock type. In most cases, this means that the layer in question has previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type.

13.34 Secondary A aquifers 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. These are generally aquifers formerly classified as minor aquifers.



13.35 Secondary B Aquifers are predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

13.36 The Clay with Flints Formation is classified as Unproductive Strata. These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.

13.37 The Site is situated within a Zone 3 Source Protection Zone for drinking water. The soils are defined as having an Intermediate to High Leaching Potential (U, H1, L1). These are defined as soils which readily transmit liquid discharges because they are either shallow, or susceptible to rapid bypass flow directly to rock, gravel or groundwater.

13.38 The Site is not within a Nitrate Vulnerable Zone.

13.39 Given the proximity of the River Medway to the north, and the sloping topography towards the north west, the anticipated direction of groundwater flow is likely to be to the north west and north. However cohesive layers within the Head Deposits and Clay with Flints Formation may yield perched groundwater levels.

Chalk Related Subsidence Risk Assessment

13.40 The presence of Chalk at relatively shallow depths beneath the Site indicates that the possibility of subsidence, related to swallow holes and other chalk solution features or man-made cavities, should be considered. Two solution features have been recorded in close proximity to the Site, located c.200m and c.240m south east of the Site.

13.41 On the basis of the predictive numerical subsidence model for natural solution features (Ref 13.9), the Phase 1 Geo-environmental Report indicates that the Site falls into the moderate subsidence risk category.

Geological Hazards

13.42 Table 13.3 below summarises the potential for key natural geological hazards from the British Geological Survey's database.



Table 13.3: Summary of Natural Geological Hazard Potential

Hazard	Potential
Collapsible Ground	Very Low
Compressible Ground	No Hazard
Ground Dissolution	Very Low to High
Landslide Hazards	No Hazard to Very Low
Running Sands	No Hazard to Very Low
Shrinking or Swelling Clays	No Hazard to Low

13.43 The Site is not located in an area affected by Coal Mining.

13.44 The Site is situated within an intermediate probability radon area, as between 1 and 3% of properties are above the action level. No radon protection measures are required for the construction of new dwellings or extensions.

Environmental Records

13.45 Table 13.4 below summarises the environmental records searches conducted in 2014 for the Site and the surrounding area.

Table 13.4: Summary of Environmental Records Searches

Data Type	On Site	Within 250m
Contaminated Land Register Entries and Notices	None Recorded	None Recorded
Discharge Consents	None Recorded	None Recorded
Integrated Pollution and Prevention Controls	None Recorded	None Recorded
Local Authority Pollution and Prevention Controls	None Recorded	None Recorded
Local Authority Pollution and Prevention Controls Enforcements	None Recorded	None Recorded
Pollution Incidents to Controlled Waters	None Recorded	None Recorded
Prosecutions Relating to Authorised Processes	None Recorded	None Recorded
Water Abstractions	None Recorded	None Recorded
Water Industry Act Referrals	None Recorded	None Recorded



13.46 An area of potentially infilled land (nonwatery) is located approximately 10m to the north west of the Site adjacent to Gibraltar Farm relating to a former chalk pit. A former gravel pit is located approximately 500m to the north east of the Site. A further three former chalk pits are located more than 500m to the north and south west of the Site.

13.47 The Site is not situated within an Environmentally Sensitive Area.

13.48 There are no SSSI or RAMSAR sites located on or within 1km of the Site. The Purple Hill Woodland SSSI is located approximately 2km to the west of the Site, designated due to its chalk grassland, scrub and woodland habitats.

13.49 The Site is located approximately 850m north west of the Kent Downs Area of Outstanding Natural Beauty.

Industrial Land Use

13.50 There were 21 contemporary trade directories located within 250m of the Site in the 2014 researches. These include dry cleaners, window frame manufacturers, industrial services, garage services, stair lift manufacturers, car dealers, joinery manufacturers glass fibre moulding, motor cycle repairs, cladding suppliers and installers, blinds awning and canopies, engineers, confectionary manufacturers, swimming pool contractors and car body repairs.

13.51 There are no fuel station entries within 250m of the Site.

Waste

13.52 There are no recorded Landfill sites or registered waste management, or transfer facilities located on or within 250m of the Site.

Historical Map Review

13.53 The Site was shown as an agricultural field and woodland on mapping c.1869. The Site was developed over time, with the clearing of most of the woodland by 1938 to make way for agricultural expansion.



13.54 The surrounding area was predominantly rural from at least 1869, with large woodland areas and isolated dwellings and farms with limited road network. By c.1932, residential development began with the partial clearing of Lords Wood.

13.55 The next phase of major development began in the 1970s with residential and infrastructure development of Lords Wood, including the construction of the M2 motorway to the south. The surrounding area underwent gradual residential and infrastructural development up to the present day.

Previous Intrusive Investigations

13.56 An intrusive site investigation was carried out in 2014 by Ground Technology Services on behalf of Create Consulting engineers Ltd. The investigation comprised a series of boreholes, trial pits, permeability and soakaway tests with geotechnical laboratory testing. No environmental sampling was undertaken during this phase of works. The following paragraphs summarise the relevant findings of the investigation. The full details of the investigation are included within the 2014 Phase 1 Geo-environmental Report (**Appendix 13.1**).

13.57 The investigation identified Topsoil in all investigation locations to depths of up to 0.40m below ground level (bgl). The Topsoil was generally cohesive soils comprising dark brown locally silty sandy and slightly gravelly clays.

13.58 The Clays with Flints Formation was encountered underlying the Topsoil in most locations to depths of between 1.0m and 4.2m bgl. The Clay with Flints formation was noted to comprise greyish brown clay with gravels of flint.

13.59 Chalk was encountered underlying the Clay with Flints Formation and was noted to comprise a chalk silt matrix with gravels comprising intact chalk and flints. Chalk grade ranged from Dm to Dc.

13.60 Groundwater was not encountered in any investigation location.



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Sources

13.61 The potential sources of key effects of contamination and other hazards identified from the researches are outlined below:

- On site Agricultural activities resulting in residual pesticides, herbicides and Hydrocarbon (TPH and PAH) contamination.
- On site Chalk ground dissolution hazards.
- On site soils and rocks with potential for ground gas generation and aggressive sulphate conditions.
- Off-site fuel tank resulting in petroleum hydrocarbon contamination.
- Off site nearby industrial land uses.
- Off site infilled historic chalk pits.

Pathways

13.62 The following potential pathways have been identified for the sources.

- Ingestion and of soil and dust.
- Dermal contact.
- Inhalation of dust.
- Inhalation of vapours.
- Inhalation of gases.
- Lateral and vertical migration of soluble leachates in groundwater on to and off site.
- Lateral and vertical migration of ground gases onto and off site.
- Surface water runoff.
- Direct attack.

Receptors

13.63 The following receptors have been identified for the operational phase of the Proposed Development:



- Future site users, the most sensitive of which are residents with plant uptake from home ground vegetables and allotment users.
- Buildings and Structures
- Underground water supply pipes
- Chalk Principal Aquifer within Source Protection Zone 3.
- Flora and Fauna

13.64 The following receptors have been identified for the Construction Phase of the Proposed Development:

- Construction Workers
- Nearby residents
- Chalk Principal Aquifer within Source Protection Zone 3.

Significant Effects

13.65 The potential effects of the identified source and receptor linkages identified above for the Operational Phase are outlined in Table 13.5 below:

Table 13.5: Operational Phase Potential Effects

Source	Pathway	Receptor	Sensitivity	Potential Effect	Potential Magnitude	Significance
Agricultural Activities	1. Ingestion of soil and dust 2. Inhalation of dust 3. Inhalation of vapours 4. Inhalation of gases 5. Dermal contact	Future Site User – Resident with plant uptake	High	Illness caused by contamination	Major Adverse	Moderate*
	1. Migration of groundwater 2. Surface water runoff	Chalk Principal Aquifer	High	Reduced surface water runoff and infiltration due to construction of impermeable surfaces	Minor Beneficial	Moderate
	1. Ingestion of soil and dust 2. Migration of groundwater 3. Direct Contact 4. Surface water runoff	Flora and Fauna	Medium	Unsuitable habitat for plants and animals.	Minor Adverse	Minor
	1. Direct Attack	Water Pipes	Medium	Contamination of water supply	Moderate Adverse	Moderate



Source	Pathway	Receptor	Sensitivity	Potential Effect	Potential Magnitude	Significance
Chalk	1. Direct Attack	Buildings	Medium	Collapse of ground causing subsidence or damage	Major Adverse	Major
On site soils and rock	1. Gas migration	Future Site Users – Residents	Medium	Death or illness caused by inhalation or explosion of hazardous gases	Major Adverse	Moderate*
	1. Gas Migration 2. Direct Attack (sulphate)	Buildings	Medium	Damage to buildings	Minor to Moderate Adverse	Minor to Moderate
Off-site Fuel Tank and nearby Industrial Activities	1. Inhalation of Vapours	Future Site User - Resident	Medium	Illness from inhalation of hazardous vapours	Moderate Adverse	Moderate
	1. Migration of groundwater	Principal Aquifer	High	Continued contamination of principal Aquifer	Negligible	Insignificant
Off-site infilled chalk pits	1. Gas Migration	Future Site Users – Residents	Medium	Death or illness caused by inhalation or explosion of hazardous gases	Major Adverse	Moderate*
		Buildings	Medium	Damage to buildings	Moderate Adverse	Moderate

*The significance of the potential effects on the health of future site users from contamination and ground gas has been altered from major to moderate. The potential magnitude of effect and the receptor sensitivity would result in a major significance, however it is considered highly unlikely that such conditions exist on site. Whilst this cannot be proven until a scheme of site investigation and sampling has been undertaken, professional judgement has been used to lower the significance due to the low probability of any gross contamination existing.

13.66 The potential effects during the Construction Phase are outlined in Table 13.6 below:

Table 13.6: Construction Phase Potential Effects

Source	Pathway	Receptor	Sensitivity	Potential Effect	Potential Magnitude	Significance
Agricultural Activities	1. Ingestion of soil and dust 2. Inhalation of Dust 3. Inhalation of Vapours 4. Inhalation of Gases 5. Dermal Contact	Construction Workers	Low	Illness caused by contamination	Moderate Adverse	Minor
	1. Migration of groundwater 2. Surface water runoff	Principal Aquifer	High	Increased runoff and infiltration during construction due to earthworks and soils stripping	Moderate Adverse	Major



	1. Ingestion of dust 2. Inhalation of dust	Nearby residents	High	Increased dust generation from construction activities causing illness	Moderate Adverse	Major
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ASSESSMENT OF CUMULATIVE EFFECTS

13.67 There are no cumulative effects on ground conditions from other schemes.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

13.68 Where a moderate or major significant effect has been identified, remedial measures may be required. The following paragraphs outline potential further investigative works and remedial measures.

13.69 There is a potential for contamination resulting from the agricultural use of the Site. Potential contaminants such as pesticides, herbicides and hydrocarbons could exist. As no chemical testing of the soils has been undertaken at the Site to date, then it must be assumed that some contamination exists. This has resulted in a classification of a Major Adverse potential effect on human health of a Major Significance which has been altered to Moderate based on the low likelihood of such gross contamination existing. It is likely that if any contamination is present it will be localised and low level and therefore, should be dealt with through standard industry practice remedial techniques such as removal of hot spots or import of clean cover. An intrusive site investigation with chemical analysis of soils should be undertaken to determine the actual risks to human health, controlled waters and the environment.

13.70 The potential for chalk solution features on the Site has been classified as moderate, however the magnitude of any effect of chalk solution could be Major adverse if a house were to collapse. Potential remedial measures would most likely include a watching brief during construction of the foundations to check for any anomalies in the ground. The Proposed Development should also be designed with chalk solution in mind. Any proposed soakaway drainage should be located remotely from any structures. It may also be prudent to use reinforced foundations designed to be able to withstand a partial collapse of ground.



13.71 The soils and rock on site have the potential to generate ground gases including carbon dioxide and methane. No testing of the soils has been undertaken to date to model the ground gas regime at the Site. An intrusive investigation comprising monitoring boreholes should be conducted to determine the gas regime. Once known a mitigation strategy if needed can be implemented which may include the use of gas proof membranes and underfloor voids in new buildings. It is unlikely that the soils and rock at the Site have a potential to generate excessive volumes of gas to prohibit development.

13.72 The off-site fuel tank identified during the walkover has the potential to cause hydrocarbon contamination. These contaminants could then migrate onto the Site through groundwater or gas/vapour migration, potentially causing harm to human health or buildings. Any site investigation should sample and monitoring boreholes from locations adjacent to the fuel tank. This will determine if a viable risk is present or not. Remedial measures could then include groundwater treatment or construction of a gas vent trench. The other nearby industrial activities could have impacted the Site. Any investigation should target the potential contaminants from these activities. It is considered unlikely that any of these activities will affect the Proposed Development.

13.73 The infilled historic chalk pits have the potential to generate gas which could migrate onto the Site. Any future investigation should target the areas adjacent to these pits to determine if any gas is migrating onto the Site. Potential mitigation measures could then include gas vent trenches, gas proof membranes and underfloor voids.

13.74 The potential for agricultural contamination could also have an effect during the construction phase. Groundworkers involved in the construction will have an increased exposure to the soils putting them at higher risk. However, these risks can be minimised through standard hygiene practices and the use of PPE. Construction works may increase the potential for dust generation which could impact on nearby residents and workers. Effective dust control is part of standard best practice on construction sites and if managed effectively should not increase the risk to nearby residents and workers. Construction activities can also increase the potential for contaminants in the soils to leach and become mobile. Effective surface water runoff control and drainage is also a part of best practice in the management of construction sites. If managed well, the risk to groundwater and the aquifer will be minor.

13.75 Any remedial measures undertaken to reduce contamination of the soils or stop contamination and gases entering the Site will have a beneficial effect on the Site from its current baseline conditions.



SUMMARY

13.76 A desk-based research of the baseline conditions of the Site has been conducted with respect to soils geology and contaminated land. The effect of the Proposed Development on these baseline conditions has been considered with the significance of the potential effects assessed.

13.77 Potential remediation and mitigation measure have been proposed to reduce the effects of the Proposed Development.

13.78 Table 13.6 below provides a summary of the potential effects, their significance, potential mitigation measures and the potential residual effects after mitigation.

13.79 Overall, the effects of the proposed development on soils, geology and contaminated land are expected to be negligible to minor beneficial with the exception of chalk dissolution which has been given a rating of minor adverse as the risks cannot be entirely ruled out.



Table 13.6: Soil Geology and Contamination Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Potential Magnitude of Effect	Mitigation/ Enhancement Measures	Residual Effects
Illness to future residents and allotment users caused by soil contamination.	Temporary to permanent	Major Adverse	Ground investigation and targeted remediation of soils if necessary.	Minor Beneficial
Illness to construction workers caused by soil contamination.	Temporary to permanent	Moderate Adverse	Use of PPE and good hygiene.	Negligible
Illness to nearby residents and workers from contaminated dust during construction.	Temporary to permanent	Moderate Adverse	Use of best practice to minimise dust. Potential remediation of soils prior to construction.	Negligible
Contamination of Principal Aquifer during operational phase.	Temporary	Minor Beneficial	Ground Investigation and targeted remediation of soils and water if necessary.	Minor Beneficial
Contamination of Principal Aquifer during construction phase.	Temporary	Moderate Adverse	Use of best practice to manage surface water runoff. Potential remediation of soils prior to construction.	Negligible
Contamination of water supply pipes.	Temporary to permanent	Moderate adverse	Ground investigation and targeted remediation of soils if necessary or use of barrier pipes.	Minor Beneficial
Subsidence caused by chalk dissolution.	Permanent	Major Adverse	Watching brief during construction, remote soakaway drainage, reinforced foundations	Minor Adverse
Death or illness caused by inhalation or explosion of hazardous gases or vapours and damage to buildings.	Permanent	Major Adverse	Ground investigation and use of gas proof membranes and vented underfloor voids if necessary.	Negligible



REFERENCES

Ref 13.1: HMG (1990); 'Environmental Protection Act', legislation.gov.uk.

Ref 13.2: HMG (2006); 'The Contaminated Land (England) Regulations', legislation.gov.uk.

Ref 13.3: HMG (2018); 'National Planning Policy Framework', gov.uk/government/publications.

Ref 13.4: Medway Council (2003); 'Medway Local Plan', medway.gov.uk.

Ref 13.5: DEFRA (2012); 'Environment Protection Act 1990: Part 2A, Contaminated Land Statutory Guidance', gov.uk/government/publications.

Ref 13.6: British Standards Institution (2017); 'BS 10175:2011+A2:2017, Investigation of potentially contaminated sites. Code of practice', BSI Standards Ltd.

Ref 13.7: Environment Agency (2004); 'Contaminated Land Report 11: Model Procedures for the Management of Land Contamination', Environment Agency.

Ref 13.8: British Geological Survey (1977); 'Sheet 272, Chatham 1:50,000 Drift', British Geological Survey



14 ARCHAEOLOGY AND CULTURAL HERITAGE

INTRODUCTION

14.1 This chapter has been prepared by a consultant at the Environmental Dimension Partnership (EDP) who is Associate Member of the Chartered Institute for Archaeologists (CIfA). It considers all matters relating to both designated and non-designated heritage assets and the potential for both direct and indirect effects as a result of the Proposed Development proceeding.

14.2 The chapter has been informed by a desk-based assessment (**Ref 14.1**), which is appended to this ES chapter (**Appendix 14.1**).

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Desk Based Assessment

14.3 An archaeological Desk-based assessment (DBA) was drafted in July 2015. The current version '1.6' is reproduced as **Appendix 14.1** and includes any new information for the Site and its wider zone of influence from an updated HER search undertaken in August 2018 (**Ref 14.1**).

14.4 The report was undertaken in accordance with the *Standard and Guidance for Historic Environment Desk-based Assessment* issued by the Chartered Institute for Archaeologists (CIfA 2014) (**Ref 14.2**). It involved consultation of the available archaeological and historical information from documentary and cartographic sources which included records, documents, maps and photographs curated by the Kent Historic Environment Record (HER); the National Heritage List for England and Environment Agency LiDAR.

Impact Assessment

14.5 As far as this assessment is concerned, Tables 14.1, 14.2 and 16.3 (below) set out the criteria which have been employed in attributing 'sensitivity' to archaeological and cultural heritage assets, identifying the magnitude of likely impact upon them and assessing the significance of the resulting effects in EIA terms.

14.6 The significance of effect has been assessed with reference to the sensitivity of the receptor (heritage asset) affected and the magnitude of impact. The sensitivity of heritage asset receptors was defined using the criteria in Table 14.1, which is based on those established by the



Highways Agency in its Design Manual for Roads and Bridges (HA 2007) (**Ref 14.3**). This is an industry standard assessment methodology, and the only one adopted by a Government agency.

Table 14.1 – Sensitivity of Receptor

Receptor	Sensitivity of Receptor			
	High	Medium	Low	Negligible
World Heritage Site	Grey			
Scheduled Monument	Grey			
Grade I or II* Listed Building	Grey			
Grade I or II* Registered Park or Garden	Grey			
Registered Battlefield	Grey			
Other Nationally important archaeological asset	Grey	Grey		
Grade II Listed Building	Grey	Grey		
Grade II Registered Park or Garden	Grey	Grey		
Conservation Area		Grey	Grey	
Other asset of Regional or County importance		Grey	Grey	
Locally important asset with cultural or educational value			Grey	
Heritage site or feature with no significant heritage value or interest				Grey

14.7 The classification of the magnitude of impact on heritage assets is rigorous and based on consistent criteria. This takes account of such factors as the physical scale and type of disturbance to them and whether features or evidence would be lost that are fundamental to their historic character, integrity and therefore significance. Both physical and non-physical (e.g. visual) changes to heritage assets were considered. The magnitude of impact is assessed using the criteria in Table 14.2.



Table 14.2 – Magnitude of Impact

Scale of Change	Magnitude of Impact					
	High	Medium	Low	Negligible	No Impact	
	Change to a heritage asset so that it is completely altered (Beneficial or Adverse) or destroyed (Adverse)					
		Change to a heritage asset so that it is significantly modified (Beneficial or Adverse)				
			Change to a heritage asset so that it is noticeably different (Beneficial or Adverse)			
				Change to a heritage asset that hardly affects it (Beneficial or Adverse)		
					No change to an asset	

14.8 Following the evaluation of sensitivity of specific cultural heritage receptors and the magnitude of the impact, the significance of the effect is assessed using the criteria shown in Table 14.3 below.



Table 14.3 – Significance of Effect Assessment Matrix

		Sensitivity of Receptor			
		High	Medium	Low	Negligible
Magnitude of Impact	High	Major	Moderate or Major	Minor or Moderate	Minor
	Medium	Moderate or Major	Moderate	Minor	Negligible or Minor
	Low	Minor or Moderate	Minor	Negligible or Minor	Negligible or Minor
	Negligible	Minor	Negligible or Minor	Negligible or Minor	Negligible
	No Impact	Neutral	Neutral	Neutral	Neutral

14.9 The assessment matrix defined in Table 14.3 is not intended to be ‘prescriptive’, but rather it allows for the employment of professional judgement to determine the most appropriate level of effect for each heritage asset which is identified.

14.10 Only those effects defined as ‘Major’ or ‘Moderate’ are considered to be significant in terms of the EIA Regulations. All other effects are deemed to be ‘not significant’.

LEGISLATION, PLANNING POLICY AND GUIDANCE

14.11 The following topic-specific policies and legislation are relevant to this assessment and have been taken into account in the following chapter.

National Planning Policy Guidance

14.12 National planning guidance for England is set out in the NPPF (MHCLG, July 2018; Ref 14.4), where *Section 16 Conserving and Enhancing the Historic Environment* sets out national planning guidance of relevance to heritage matters.

14.13 Paragraph 189 concerns planning applications, stating 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."

14.14 With regard to non-designated heritage assets, Paragraph 197 states that:

"The effect of an application on the significance of a non-designated heritage asset should be taken into account in determining the application. In weighing applications that directly or indirectly affect non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset."

Local Planning Policy

14.15 The Medway Local Plan 2003 (**Ref 14.5**) was formally adopted by Medway Council on 14 May 2003 and is the principal planning policy document for the Medway area. Policy addressing non-designated archaeological sites is contained in *Policy BNE21: Archaeological Sites* which states

"Development affecting potentially important archaeological sites will not be permitted, unless:

- (i) the developer, after consultation with the archaeological officer, has arranged for an archaeological field evaluation to be carried out by an approved archaeological body before any decision on the planning application is made; and*
- (ii) it would not lead to the damage or destruction of important archaeological remains. There will be a preference for the preservation of important archaeological remains in situ; and*
- (iii) where development would be damaging to archaeological remains, sufficient time and resources are made available for an appropriate archaeological investigation undertaken by an approved archaeological body. Such investigations should be in advance of development and in accordance with a specification and programme of work approved by the council. Resources should also be made available for the publication of the results of the investigation."*



14.16 The Medway Local Plan also contain policies in regard to designated heritage assets. These are not necessary for this report and as such are not reproduced.

CONSULTATION

14.17 Given the sparse archaeological and historical background of the Site, the archaeological advisor to Medway Council was contacted regarding the scope of any requirements for archaeological work to be undertaken to inform the consented outline planning application, in line with the NPPF.

14.18 It was agreed that a formal desk-based assessment would not be required to accompany the planning application (**Appendix 14.1** and Appendix EDP 1 of that report). However, further archaeological work would be required on the Site as the area has some potential for early settlement activity and as such, the archaeological advisor requested that:

“Given the size of the site and its broad archaeological potential it is likely that we would look to secure some archaeological investigation works ahead of development. In this instance evaluation by trial trench would seem appropriate. I am satisfied that such evaluation works could be undertaken following determination of any outline planning consent, being secured by an appropriately worded planning condition. In this instance I would suggest a standard programme of archaeological works condition would seem likely.”

14.19 Consultation with the archaeological advisor will need to be undertaken, further to the receipt of planning consent, to establish the nature and extent of the required works. An additional mitigation phase may be required in the event that significant archaeological finds are present.

BASELINE CONDITIONS

Designated Heritage Assets

14.20 There are no designated heritage assets, as defined in Annex 2 of the NPPF, such as world heritage sites, scheduled monuments, listed buildings, registered parks and gardens or registered battlefields, within the site.

14.21 There are no designated heritage assets within c.1km of the site, the nearest assets are a group of listed buildings within Bredhurst, c.1.4km to the south east and to the south of the M2.



14.22 The methodology and outcome of the heritage setting assessment undertaken to inform the planning application and this chapter are set out in **Appendix 14.1**. This determined that the identified designated heritage assets are too far distant from the site to receive any effect from its development, as the site forms no part of their setting. As such, all designated heritage assets have been scoped out of this assessment as there will be a neutral or no significance of effect.

Non-Designated Heritage Assets

Palaeolithic - Iron Age (c.500,000 BC – AD 43)

14.23 No prehistoric remains have been recorded within the Site. In the wider study area, there is scant evidence for prehistoric activity. The records that exist comprise a possible barrow (TQ 76 SE 6; Plan 14.1) to the north of the site, and three dene holes (TQ 76 SE 43; TQ 76 SE 8 and TQ 76 SE 44) to the west, north and east. With regard to small finds, two Bronze Age gold bracelets (TQ 76 SE 15) were recorded to the west, and a flint scraper (MKE102383) which dated from the late Neolithic to the late Bronze Age was recorded to the north.

14.24 Based on the current information there is low potential for any archaeological finds or features of this date to be present within the site. If any finds or features relating to this broad period are present, these would be of low or local significance as defined by Table 14.1.

Romano-British to Early Medieval (AD43 – 1066)

14.25 There is no evidence for Roman activity recorded on the HER within the Sites wider zone of influence. The evidence for early medieval and Saxon activity is sparse. A skeleton with associated burial goods (TQ 76 SE 16; Plan 14.1), dating to the early medieval period, was found to the north of the site.

14.26 Based on the current information there is low potential for any archaeological finds or features of this broad date range to be present within the Site. If any finds or features are present, these would be of low or local significance.

Medieval (1066 - 1485)

14.27 The site of a former medieval chapel (TQ 76 SE 3; Plan 14.1) is located to the east of the Site and may indicate the location of settlement in that area during this period. A fragment of a



copper medieval bracelet (MKE71767) was recorded during a metal detector survey some c.750m south-east of the Site.

14.28 Based on the current information there is low potential for any archaeological finds or features of this date to be present within the Site. If any finds or features relating to this broad period are present, these would be of low or local significance, as defined by Table 14.1.

Post-medieval - Modern (AD 1485 – present)

14.29 The HER data for this period relates to a number of farmsteads and their related outbuildings within the wider study area, the closest of which being Gibraltar Farm and its associated outbuilding (MKE84797 and MKE84798; Plan 14.1). These buildings date to the 18th and 19th centuries. Further farms of this date are also recorded within the wider area (MKE84796/TQ 76 SE 62; MKE84845; MKE88898; MKE84799; MKE84777; and MKE84848). The Historic Landscape Character of the site area is recorded as 'Prairie fields (19th cent enclosure with extensive boundary loss)' (**Ref 14.6**).

14.30 No archaeological finds or features dating from the post-medieval period have been recorded within the Site, or the wider study area. As such, it is considered there is low to no potential for archaeological remains of this date to be present within the Site, other than the remains of former field boundaries or other agricultural features which would be of negligible or no significance.

14.31 To the north-west of the Site is the site of a former World War II heavy artillery anti-aircraft battery (TQ 76 SE 77 and TQ 76 SE 42; Plan 14.1) now located within the Elm Court Industrial Estate, though only the support buildings remain. A bombing decoy site was also recorded in the area (TQ 76 SE 76) and only traces of the road layout remain. The anti-aircraft battery was located some c.80m from the north-eastern boundary of the site and there is no evidence to suggest any related features extended into the site.

14.32 On this basis there is low or no potential for any archaeological finds or features dating from the modern period to survive within the Site. Any such remains would relate to the modern agricultural use of the Site and would be of negligible or no significance.



LiDAR

14.33 The LiDAR data (Plan 14.2) supplied from the Environment Agency (1m Digital Terrain Model (DTM)) shows linear features representing former field boundaries. The imagery also shows an area of chalk extraction with the farmyard of Gibraltar Farm, with further potential chalk extraction pits in the southern area of the Site.

14.34 As identified above the remains of former field boundaries are of negligible or no significance, the same assessment is made for the remains of the former modern quarry activities that extend into the southern area of the Site.

IDENTIFICATION AND EVALUATION OF KEY EFFECTS

14.35 The following paragraphs identify and describe each impact that is likely to arise, as a result of the proposed development of the Site. As identified above no designated assets will be affected. The impact on the non-designated heritage assets will be assessed in terms of effects during construction, where direct impacts may be anticipated and whether these effects are adverse or beneficial. In relation to the non-designated heritage assets, these are represented by potentially buried deposits and as such all effects will take place during the construction phase. On this basis there can be no effects during the operational phase of the Proposed Development. The extent and form of the Proposed Development are described in detail in Chapter 5: The Proposed Development.

Effect during construction phase: short to medium term

14.36 The effects from the construction phase will be direct, or physical, within the boundary of the Proposed Development where groundworks are proposed for buildings or infrastructure.

14.37 There are no recorded non-designated heritage assets within the Application Site relating to the prehistoric, Roman, early medieval or medieval periods. However, as identified by the archaeological advisor, there remains the potential for the buried remains of a wide range of activities to be present within the Site.

14.38 If present these buried remains will be of low sensitivity as defined by Table 14.1. However, the nature of the development is such that any buried remains from these broad periods will be entirely removed, such that a high adverse magnitude of impact will result as defined by Table 14.2.



14.39 The non-designated heritage assets within the Application Site that date to the post-medieval and modern periods relate to former field boundaries and potential chalk extraction pits identified through LiDAR imagery. The remains of post medieval field boundaries or quarries are not significant in archaeological terms and are therefore not considered further.

Effects during operational phase: long term

14.40 This assessment has identified that no designated heritage assets have the potential for an effect from the Proposed Development.

14.41 In terms of the non-designated heritage assets, all potential archaeological deposits will have been removed by the construction phase of the Proposed Development. As such, all effects will have taken place during this phase and there can be no further effects as a result of the operational phase.

ASSESSMENT OF CUMULATIVE EFFECTS

14.42 The assessment of the effects of the Proposed Development has identified that there will be no effects on any designated heritage assets within the Site or in its wider zone of influence. In this regard there can be no cumulative effects.

14.43 With regard to any non-designated heritage assets, the presence of these is limited to the potential for buried deposits as identified above within the boundaries of the Site itself. However, if present these deposits will be limited to the Site and unlikely to extend much beyond its boundaries and certainly not more widely into the landscape. As such there is unlikely to be any cumulative effects from sites in the wider area.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Mitigation

14.44 The extent and scale of mitigation will be dependent upon the results of any trial trenching undertaken across the Site. Further to the results of this, discussion with the archaeological advisor to the LPA will establish the need for and extent of any mitigation.

14.45 Where any groundworks for the construction of the housing or supporting infrastructure are proposed within the Site coincide with areas identified as having archaeological potential there



will be an agreed programme of archaeological work which will need to be undertaken prior to the commencement of any works in this area. The nature and scope of this work will be agreed in writing with the archaeological advisor prior to the works commencing.

Residual Effects

14.46 The residual effects (Table 14.4) described below are the likely impacts that will remain following implementation of the mitigation measures as described above. Only those assets where a residual effect is considered likely are addressed.

Construction and Operation

14.47 The ground works required for the construction of housing and associated infrastructure within the Site will completely remove any potential archaeological deposits present, and as such, the predicted high adverse impact will result in a moderate effect on the significance of any such non-designated heritage assets present, the potential significance of which has been identified as of low or negligible if present. The excavation and recording recommended by way of mitigation will preserve any such features which survive by record, therefore the residual impact will be reduced to a minor significance of effect.

14.48 Table 14.4 summarises the impacts relating to non-designated heritage assets.

SUMMARY

14.49 None of the buried features identified, or those which may potentially survive within the Site are considered to be of any greater value than local or low significance. Should these be present, following on from a programme of site investigation, and where they will be affected by the Proposed Development, a programme of archaeological excavation and recording is proposed as set out within an Outline Mitigation Strategy which will insure that they are recorded in line with the requirement of the NPPF and local planning policy.



Table 14.4: Archaeology and Cultural Heritage Summary Table

Description of Likely Significant Effects	Significance (High / Medium / Low / Negligible)	Effects (Beneficial or Adverse) (B/A), (Permanent or Temporary) (P/T), (Direct or Indirect) (D/I), (Short Term, Medium, Long Term) (ST, M, LT), (Local, Regional, National) (L, R, N) (B/A) (P/T) (D/I) (ST, M, LT) (L/R/N)	Description of Mitigation / Enhancement Measures	Description of Residual Effects	Significance (Major, Moderate, Slight, Negligible or Nil)	Residual Effects (B/A) (P/T) (D/I) (ST, M, LT) (L/R/N)
Potential archaeological features prehistoric - post medieval	Low	A/P/D/LT/L	Excavation, recording and reporting	Preservation by record	Minor	A/P/D/LT/L
Post-medieval to modern chalk pits	Negligible	None	NA	NA	NA	NA
Potential modern features	Negligible	None	NA	NA	NA	NA



REFERENCES

Ref 14.1: Vallender, J (2019); 'Gibraltar Farm, Ham Lane, Hempstead, Gillingham, Kent: Archaeological and Heritage Assessment', The Environmental Dimension Partnership.

Ref 14.2: Chartered Institute for Archaeologists (CIfA), (2017); '*Standard and Guidance for Historic Environment Desk-based Assessment*', Reading.

Ref 14.3: (2007); 'Highways Agency in its Design Manual for Roads and Bridges Highways Agency'.

Ref 14.4: Ministry of Housing Communities and Local Government (MHCLG), (2018); 'The National Planning Policy Framework', London.

Ref 14.5: Medway Council, (2003): 'Medway Local Plan Adopted 14th May 2003'.

Ref 14.6: Croft, A., Munby, J., & Ridley, M., (2001); 'Kent Historic Landscape Characterisation Final Report Volume 1: Main Report', Kent County Council, Historic England and Oxford Archaeology Unit.



15 SOCIO-ECONOMIC

INTRODUCTION

15.1 This Chapter presents a review of the relevant national, regional and local policy objectives with regard to social and economic considerations and details the current social and economic conditions of the application Site and surrounding area to establish the baseline case against which the significance of the socio-economic effects from the Proposed Development are examined.

15.2 It then identifies the likely socio-economic impacts generated from the Proposed Development, and assesses their significance, and the need for mitigation.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

15.3 The assessment will be addressing the impact of the Proposed Development on the following:

- Population numbers, including Child Yield;
- Population health profile;
- Housing;
- Open space, amenity space and play space provision;
- Local community facilities;
- Primary healthcare provision;
- Community cohesion and crime;
- Quantum of construction work and associated direct & indirect employment;
- Quantum of operational direct & indirect employment generation; and
- Wider socio - economic impacts, such as on community facilities and on health and wellbeing.

Methods of Data Assessment

15.4 The following sources will be used for data assessment to establish the socio-economic effects of the proposed scheme:



15.5 A policy review of the relevant local and regional, social and economic objectives for the application Site.

15.6 A desk-based assessment of the relevant information on current socio-economic conditions through reviewing the relevant local, regional and national data.

15.7 A quantitative and qualitative evaluation of the social and economic effects of the Proposed Development.

15.8 A qualitative evaluation of the significance of the impacts identified using professional judgement and applying significance criteria.

15.9 An identification of suitable mitigation measures that should be applied during both the construction and operational phases to reduce any potential negative impacts.

Study Area

15.10 It is important when undertaking an assessment of the social and economic effects that the geographical scope of the assessment is clearly understood.

15.11 The Proposed Development is located at Gibraltar Farm, Lordswood and largely lies within the administrative boundary of Medway Council. A small proportion of the Site of the Proposed Development is within the administrative boundary of Maidstone Borough Council. Furthermore, the Site is within two wards. These are Lordswood and Capstone Ward, and Boxley Ward.

15.12 The Local Impact Area (LIA) has been defined using the Data Shine Commute (**Ref 15.1**) website. Data Shine Commute derives the LIA through using 2011 Census data in order to show the most likely locations of where workers are anticipated to travel from to the area in which the Proposed Development is located, thus sourcing the information for the most likely places for employees to live. The areas in which commuters are suggested to come from on the map are local authorities and so wards can be deduced from this also. As a result, the LIA is defined as Medway Council as the majority of workers to the Site are anticipated to come from this area.

15.13 For comparison purposes and to understand the wider context of the baseline conditions reviewed, the following additional geographic scopes have been considered where appropriate:

- **The Site:** Gibraltar Farm;



-
- **Site Wards:** Lordswood and Capstone Ward, Boxley Ward and Hempstead and Wigmore Ward;
 - **Borough:** Medway Council and Maidstone Borough Council;
 - **LIA:** Medway Council;
 - **Regional:** Kent; and
 - **National:** averages for England, Great Britain, or the United Kingdom dependent upon data availability to provide context.

Significance Criteria

15.14 The assessment of potential effects as a result of the consented development, has taken into account both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the consented development, and the sensitivity of the affected receptor/receiving environment to change. Magnitude of change and the sensitivity of the affected receptor/receiving environment are both assessed on a scale of major, moderate, and minor.

Significance of Impacts

15.15 The definition and terms used to describe the significance of impacts are set out below:

- **Major Beneficial or Adverse Impact** - where the development would cause a significant improvement or deterioration to the existing socio-economic conditions;
- **Moderate Beneficial or Adverse Impact** - where the development would cause a marginal improvement or deterioration to the existing socio-economic conditions;
- **Minor Beneficial or Adverse Impact** - where the development would cause a barely perceptible improvement or deterioration to the existing socio-economic conditions; and
- **Neutral** - no discernible improvement or deterioration to the existing socio-economic conditions.



15.16 A distinction between direct and indirect; short and long-term; permanent and temporary; primary and secondary; positive and negative; and cumulative impacts; has been made, where applicable.

Assumptions and Limitations

15.17 The following section uses data from the most recent 2011 Census, which was published on 16 July 2012 (**Ref 15.2**), as well as mid-year estimations published by the Office of National Statistics. This has been supplemented with recent mid-year annual estimates where these were available, as well as other data sources where appropriate.



LEGISLATION, PLANNING POLICY AND GUIDANCE

15.18 A few social and economic policy documents, area assessments and regeneration strategies have been produced, by a range of organisations, which together set the social and economic policy context for the area. The key policy documents relevant to the study area, in descending order of national, regional to local scale, are:

- The Government's National Planning Policy Framework (NPPF) (**Ref 15.3**);
- Medway Council Local Plan (2003) (**Ref 15.4**); and
- Maidstone Borough Local Plan Adopted October 2017 (2017) (**Ref 15.5**).

National

National Planning Policy Framework

15.19 The revised National Planning Policy Framework (NPPF) was published in July 2018 which replaces the previous NPPF which was adopted in March 2012. The revised NPPF sets out the Government's planning policies for England and how they are expected to be applied. It sets out a framework which aims to achieve sustainable development throughout the planning system with three overarching objectives – economic, social and environmental.

15.20 At the heart of the NPPF is a 'presumption in favour of sustainable development', which requires Local Authorities as part of any plan-making or decision-making, to provide clear guidance on how the presumption should be applied locally.

15.21 The NPPF sets out how to deliver sustainable development under 13 subheadings. Of these subheadings, the following are the most relevant for the potential social and economic impacts of the Proposed Development at Gibraltar Farm:

1. Developing a sufficient supply of homes: This objective states that local planning authorities should establish a housing requirement figure for their area, understand the availability of land in the area, and ensure that the supply and delivery of housing is maintained.

2. Building a strong, competitive economy: his objective sets out the need for planning policies to identify opportunities for local investment and seek to address potential barriers to investment, including poor environments or a lack of housing.



It states that local planning authorities should encourage sustainable economic growth and enable the development of accessible local services and community facilities.

4. Promoting healthy and safe communities: This objective states that planning policies need to create new places that encourage social interaction and provide safe and accessible environments. Policies should also enable and support healthy lifestyles.

Local

Medway Local Plan

15.22 Medway Local Plan (2003) outlines the Council's strategy for addressing the key issues in the borough. Medway's strategy is developed from the following four main factors:

- Changes in policy at the national level;
- Regional and sub-regional planning policy;
- The adopted Kent Structure Plan 1996; and
- An analysis of local problems, issues and opportunities which need to be addressed over the period of the Plan.

15.23 Medway Council is currently working on a new Local Plan to replace the 2003 Medway Local Plan which will cover the period up to 2035. This plan review is at an early stage of preparation with current spatial options heavily reliant on required HIF funding upon which there is unlikely to be any certainty until the summer of 2019.

15.24 The policies that are of particular relevance to the ES chapter are the following:

15.25 Policy H3 Affordable Housing: This policy states the requirement that affordable housing will be sought as a proportion of residential developments of substantial scale, where the need is identified.

15.26 Policy BNE7 Access for All: Medway Council states that developments should ensure that accessibility is considered in the design so that the development meets the needs of all community members. This includes those with disabilities, the elderly and people with young children.



15.27 Policy L3 Protection of Open Space: This policy states that any development that would involve the loss of existing open space, informal open space, allotments or amenity land would not be accepted unless they comply with specific criteria.

15.28 Policy L4 Provision of Open Space in New Residential Developments: The Council state that if there is a deficiency in open space, residential development proposals must make an open space provision. This provision is dependent on the size of the proposed scheme.

15.29 Policy CF1 Community Facilities: If a development is going to result in the loss of an existing community facility, the development will only be permitted if exceptional circumstances can be demonstrated. Additionally, these losses must be replaced and they should be easily accessible by the local community.

Maidstone Borough Local Plan

15.30 The Maidstone Borough Local Plan was adopted in October 2017 and sets out the framework for development within the Borough up until 2031. It plans for homes, shopping, jobs, leisure and the environment.

15.31 The local plan sets out the strategic plan for the Borough. The Council's vision is to keep Maidstone Borough an attractive place for all, and securing a successful economy for Maidstone.

15.32 The policies that are of particular relevance to the ES chapter are the following:

15.33 Policy SP19 Housing mix: Maidstone Borough Council seeks to ensure the delivery of sustainable mixed communities across new housing developments and within its existing housing areas.

15.34 Policy SP20 Affordable housing: On housing Sites or mixed use development Sites of 11 residential units or more, or which have a combined floor space of greater than 1,000m³, a delivery of affordable housing is required. The indicative targets for tenure are:

- 70% affordable rented housing, social rented housing, or a mixture of the two; and
- 30% intermediate affordable housing (shared ownership and/or immediate rent).



15.35 Policy SP21 Economic development: The Council is committed to supporting and improving the economy of the Borough and providing for the needs of businesses.

15.36 Policy SP23 Sustainable transport: As part of this policy, the Council has made various commitments to promote and facilitate the delivery of sustainable transport. These commitments include improving transport choices across the Borough, influencing travel behaviour and deliver strategic and public transport links to and from Maidstone, including increasing bus service frequency.

15.37 Policy DM19 Publicly accessible open space and recreation: For new housing of mixed use proposals, Maidstone Borough Council will endeavour to deliver publicly accessible open space provision in accordance with specified standards. This includes a range of open space types, such as amenity green space, provision for children and young people and allotments/community gardens.

15.38 Policy DM20 Community facilities: This policy states that the adequate provision of community facilities is an essential component of new residential development. Community facilities include social, education and other facilities.



BASELINE CONDITIONS

15.39 The baseline conditions will examine various socio-economic indicators that will enable the assessment of the anticipated impacts of the Proposed Development on the social and economic status of the area (see 15.3 for full details on impacts addressed). The baseline will be developed through looking at these indicators for the LIA, which is Medway Council as well as for Lordswood and Capstone Ward. Upon review of the location of the site across the three wards that it covers **(Ref 15.6)**, approximately 90% of the the Proposed Development is within Lordswood and Capstone Ward. Furthermore, it can be assumed that the parts of the Site that are within Boxley Ward and Hempstead and Wigmore Ward are not populated as there are no residential areas. Therefore, a baseline assessment of these two wards has not been included.

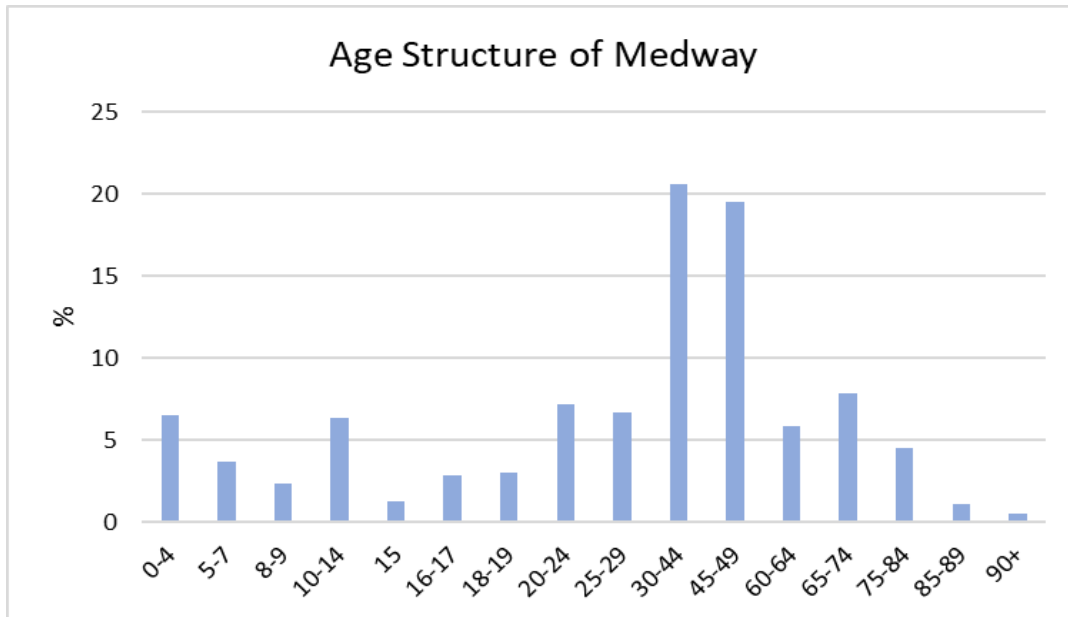
15.40 The previous section details the socio-economic baseline conditions at the start of the construction period which is anticipated to commence in 2020.

Population

15.41 According to the 2011 Census, Medway has a population of 263,925, with 49.6% of residents' male and 50.4% female **(Ref 15.7)**. Lordswood and Capstone Ward has a population of 9,079 residents and of this total, 49.2% are male and 50.8% female **(Ref 15.8)**. The median age of Medway is 37.

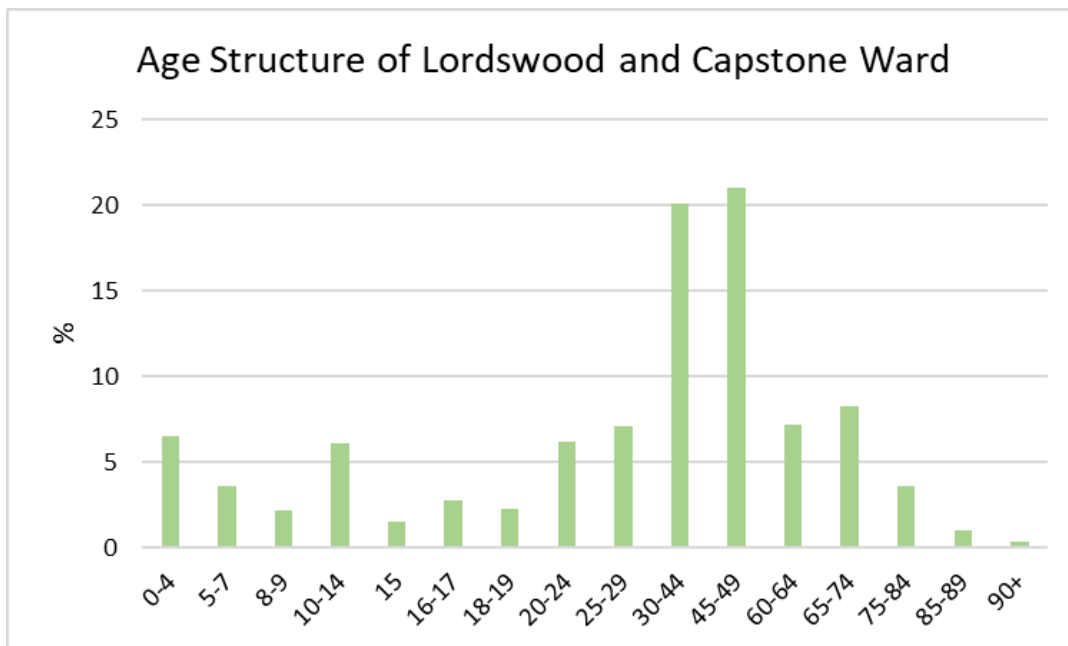
15.42 In Medway, the largest proportion aged 30-44, comprising of 20.6% of residents, followed by the 45-59 age bracket, comprising of 19.5% of residents **(Ref 15.9)**. The greatest proportion of residents are aged 45-59 in Lordswood and Capstone Ward, equating to 21.0% of residents **(Ref 15.10)**. Figures 15.1-15.2 demonstrates the age structure in Medway and Lordswood and Capstone Ward.

Figure 15.1 Age Structure of Medway



Source: 2011 Census

Figure 15.2 Age Structure of Lordswood and Capstone Ward



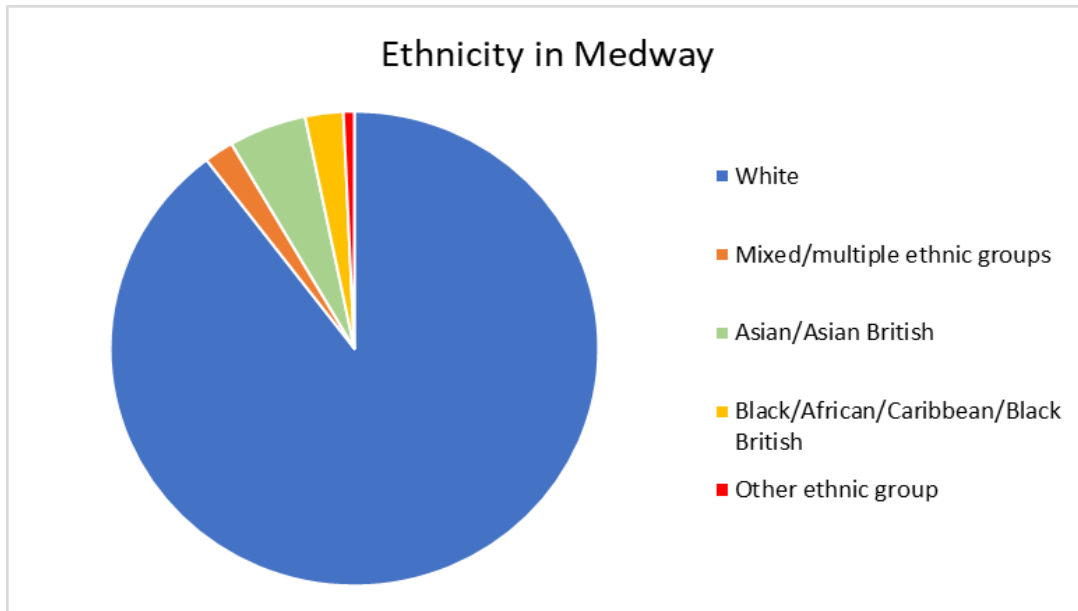
Source: 2011 Census

Ethnicity

15.43 The majority of Medway is of White (English/Welsh/Scottish/Northern Irish/British) origin. 85.5% of residents in Medway are of this ethnicity (**Ref 15.11**). This is lower than at ward level in

which 93.4% of residents in Lordswood and Capstone Ward are of this ethnicity (**Ref 15.12**). Figure 15.3 demonstrates ethnicity in Medway.

Figure 15.3 Ethnicity in Medway



Source: 2011 Census

Migration

15.44 The greatest proportion of residents in Medway were born in the UK, equating to 88.4% of its residents. This is similar to averages across the regional and national level. When examining at ward level, a significant proportion of residents were born in the UK. This equates to 95.2% of the population in Lordswood and Capstone Ward, suggesting little migration in and out of the ward. Tale 15.1 demonstrates a full breakdown (**Ref 15.13**).



Table 15.1 Length of Residence in the UK in Lordswood and Capstone Ward, Medway, Kent and England

Residence in the UK	Lordswood and Capstone Ward	Medway	Kent	England
Born in the UK	95.2%	88.4%	90.9%	86.2%
Less than 2 Years	0.2%	1.2%	1.2%	1.8%
2 Years or More but Less Than 5 Years	0.4%	1.7%	1.5%	2.2%
5 Years or More but Less Than 10 Years	0.8%	2.3%	1.8%	2.9%
10 Years or More	3.4%	6.4%	4.6%	7.0%

Source: 2011 Census

Population Forecasts

15.45 Population change comprises the difference between birth rates and death rates, and the effects of internal and international migration.

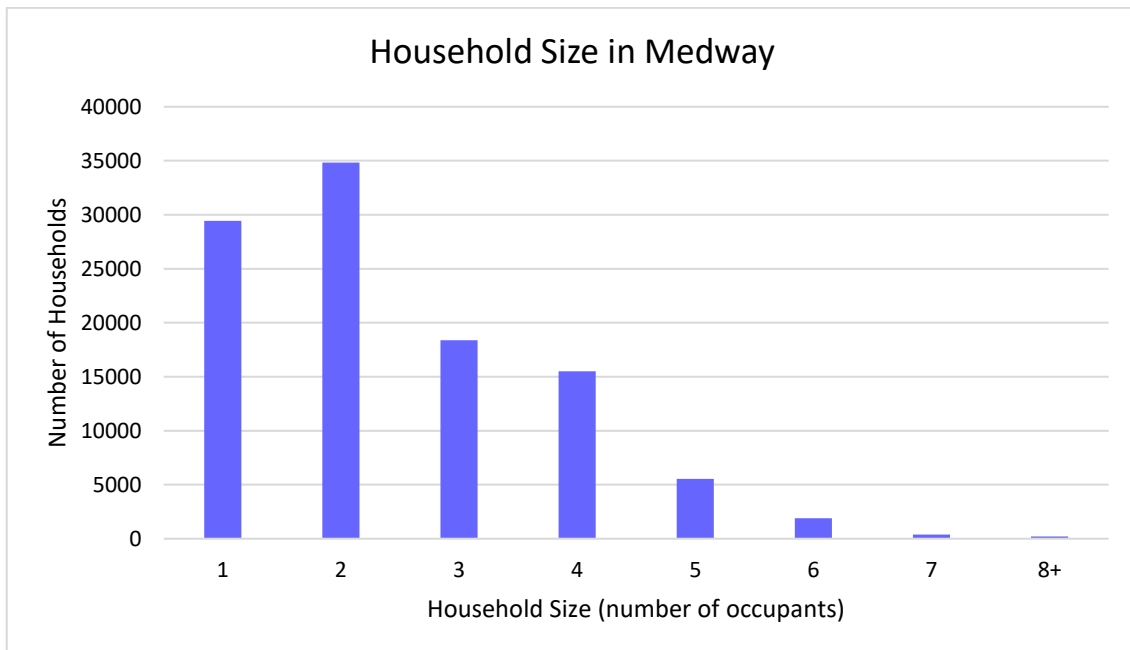
15.46 Population forecasts for Medway show a positive population trend assuming that recent trends in fertility, mortality and migration will continue and provide an estimate of future population levels that would result from these trends.

15.47 According to the 2011 Census, population forecasts of Medway show a rising population of approximately 50,000 residents from mid-2016 to mid-2041 (**Ref 15.14**). This is predicted to be largely driven by rises in numbers of the older age brackets, in particularly the 70-79 bracket. In addition, population of the younger age brackets is meant to rise also but at a much less significant amount.

Housing

15.48 The majority of households in Medway Council are occupied by either 1 or 2 persons, according to the 2011 Census. Approximately 60.5% of households in the borough have this household size (**Ref 15.15**). The full breakdown of household size can be seen in Figure 15.4.

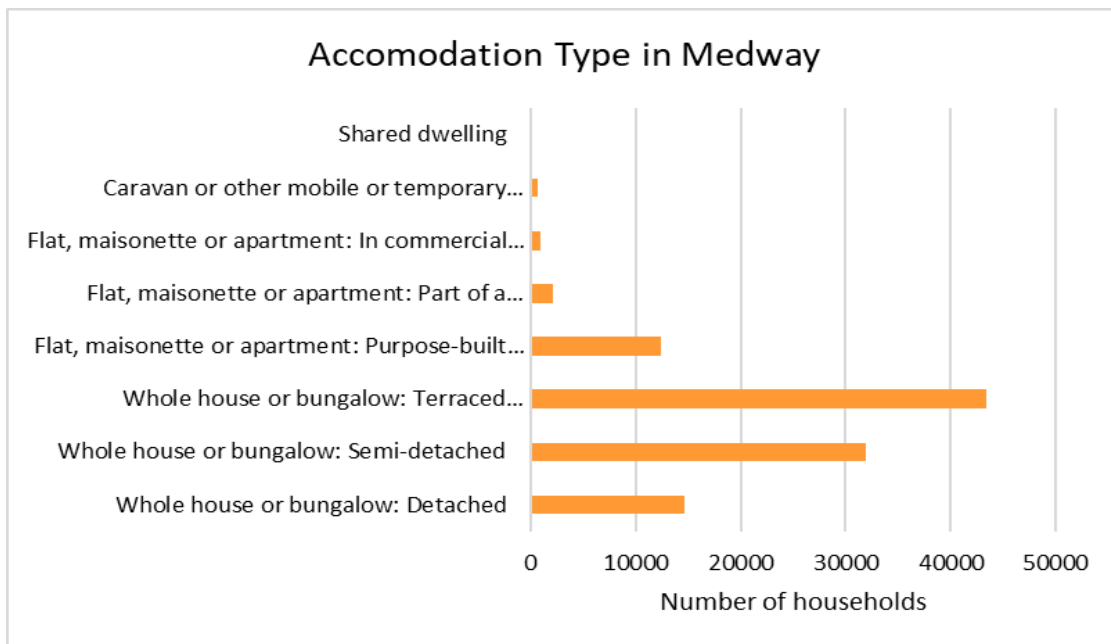
Figure 15.4 Household Size in Medway Council



Source: 2011 Census

15.49 In Medway, 99.9% of its population live in unshared dwellings. According to the 2011 Census, the majority of residents in Medway live in houses or bungalows and of this, over 43,000 households live in terraced houses or bungalows. This is followed by a large proportion of residents residing in semi-detached houses (**Ref 15.16**). Figure 15.5 illustrates the various unshared dwellings across the borough.

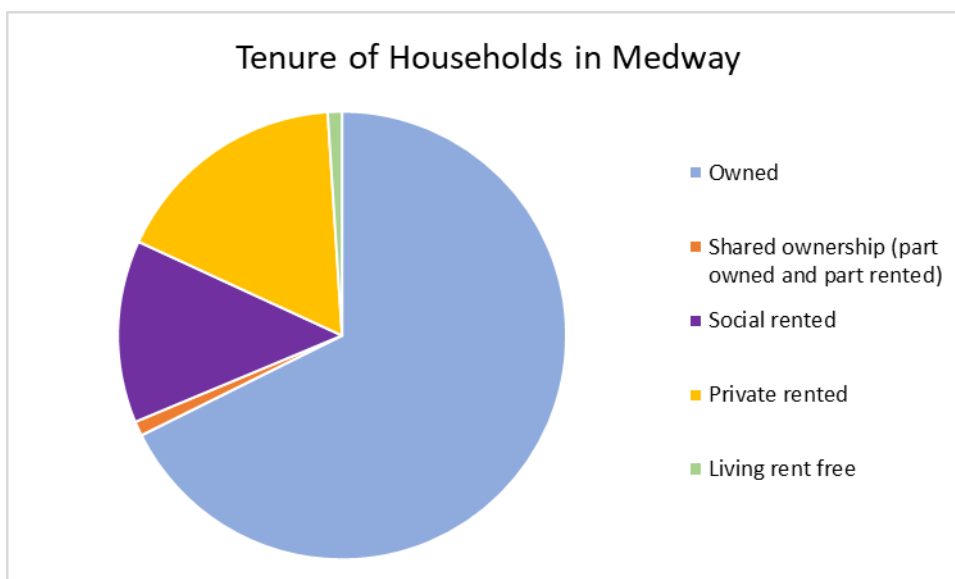
Figure 15.5 Accommodation Type, Unshared Dwellings in Medway



Source: 2011 Census

15.50 67.7% of residents in Medway own their homes, either outright or with a mortgage. This is followed by households that are privately rented which equates to 17.1% of households (**Ref 15.17**). The full details of the tenure of households can be seen in the figure below.

Figure 15.6 Tenure of Households in Medway

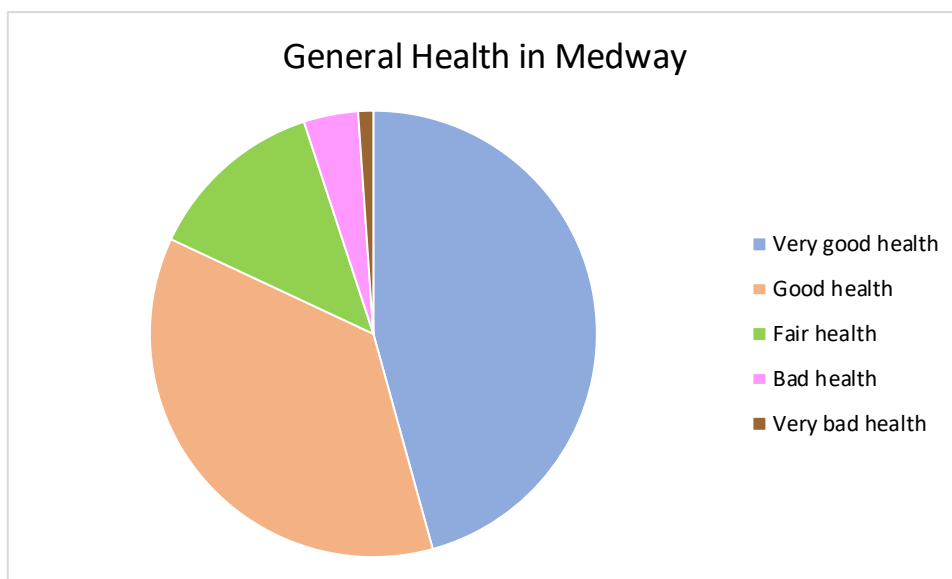


Source: 2011 Census

Health

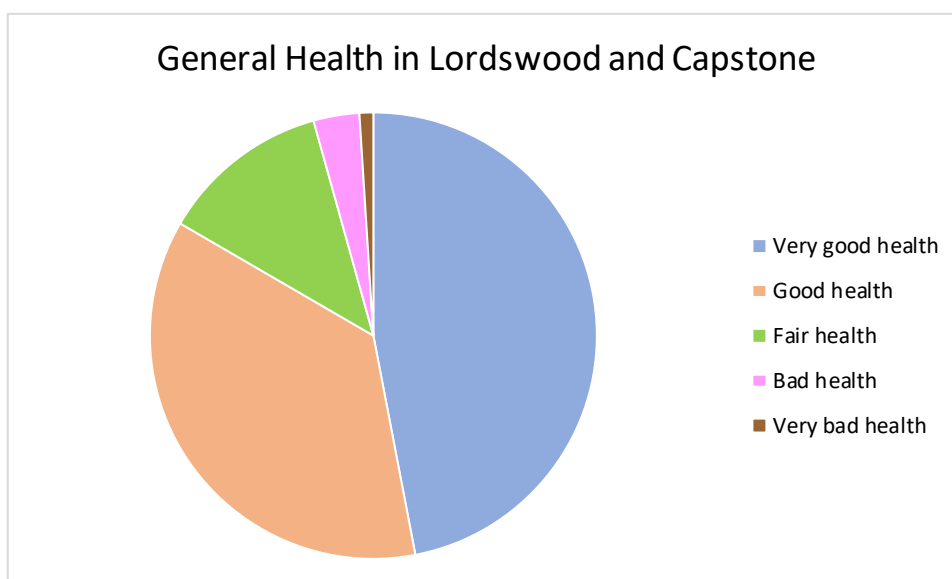
15.51 According to the 2011 Census, 82% of Medway Council's residents are classified as in either 'Very Good Health' or 'Good Health' (**Ref 15.18**). In Lordswood and Capstone, 83.4% of residents are classified in either of those categories too (**Ref 15.19**). These figures are similar, and slightly higher, than the national average in which 81.4% of the population are either in 'Very Good Health' or 'Good Health' (**Ref 15.20**). Figures 15.7 and 15.8 illustrate the health of Medway and the Ward.

Figure 15.7 Health in Medway



Source: 2011 Census

Figure 15.8 Health of Lordswood and Capstone

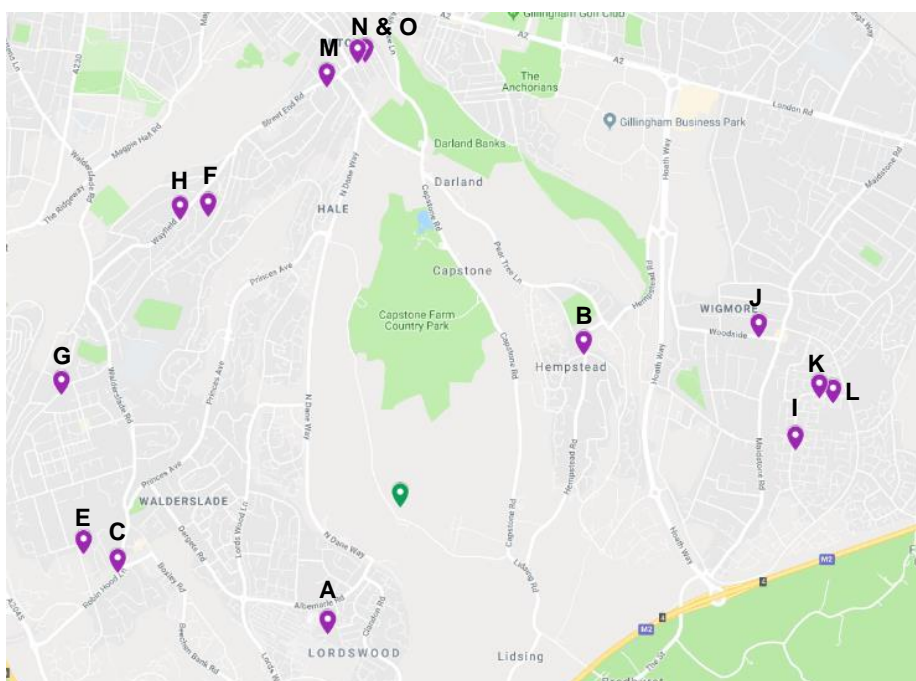


Source: 2011 Census

Local Primary Healthcare Facilities

15.52 According to the NHS choices website, using the postcode ME7 3JJ, there are 15 GP surgeries within a 2-mile radius of the centre of the Proposed Development. This is summarised in Table 15.2 and a corresponding map in Figure 15.9. All GP surgeries are currently accepting new patients. The average ratio of patient per GP of these practices is 2,311 which is 511 above the best practice of 1,800 people per GP recommended by the General Medical Council (GMC) used by the Department of Health (DoH) and Primary Care Trusts. Out of the 15 GP surgeries, only 4 are below this best practice ratio.

Figure 15.9 Location of GP surgeries within a 2 mile radius



*Site = green; GP surgeries = purple

Table 15.2 GP surgeries within a 2 mile radius of the Proposed Development

Map Ref.	Surgery	Address	Distance (miles)	No. of GPs	No. of patients	Current ratio of GP to patients	Accepting new patients
A	Reach Healthcare, Lordswood Community Centre, Sultan	Lordswood Community Healthy Living Centre, Sultan	0.6	9	23,075	2,564	Yes



	Healthy Living Centre	Road, Chatham, Kent ME5 8TJ					
B	Hempstead Medical Centre	144 Hempstead Medical Centre, Hempstead, Gillingham, Kent ME7 3QE	1.1	2	4,492	2,246	Yes
C	Walderslade Village Surgery	62A Robin Hood Lane, Walderslade, Chatham, Kent ME5 9LD	1.3	5	23,075	4,615	Yes
D	Princes Park Medical Centre	Dove Close, Walderslade, Chatham, Kent ME5 7TD	1.3	3	3,229	1,076	Yes
E	Tunbury Avenue Surgery	16 Tunbury Avenue, Walderslade, Chatham, Kent ME5 9EH	1.4	2	5,141	2,570	Yes
F	The Churchill Clinic	94 Churchill Avenue, Chatham, Kent ME5 0DL	1.6	3	5,560	1,853	Yes
G	King George Road Surgery	52A King George Road, Walderslade, Chatham, Kent ME5 0TT	1.6	2	5,748	2,874	Yes
H	Wayfield Road Surgery	183B Wayfield Road, Chatham, Kent ME5 0HD	1.7	2	5,141	2,571	Yes

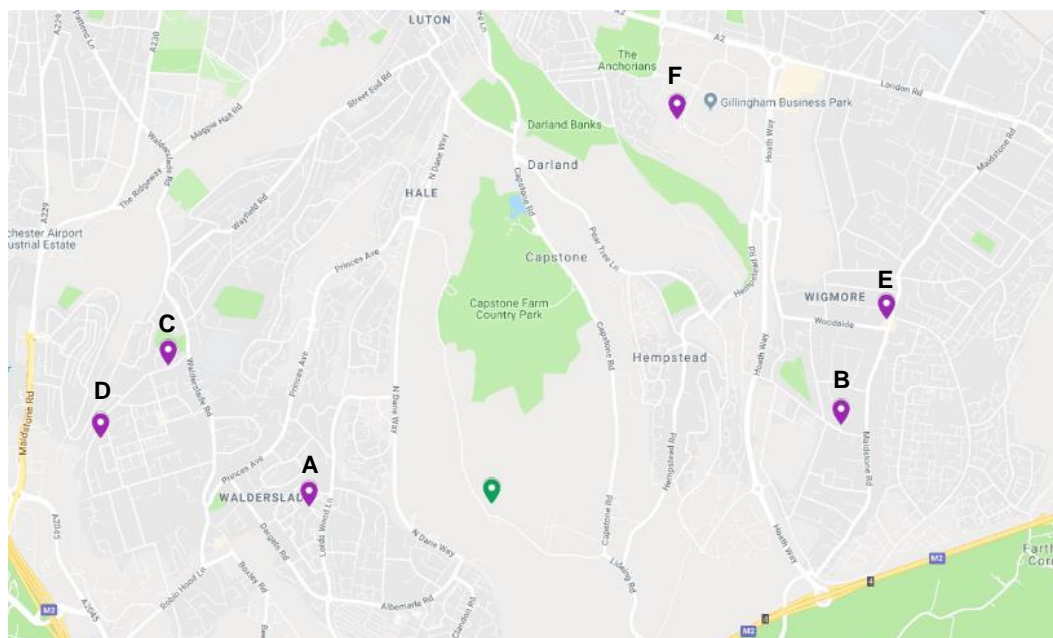


I	Parkwood Family Practice	191-121 Long Catlis Road, Parkwood, Rainham, Gillingham, Kent ME8 9RR	1.7	1	3,654	3,654	Yes
J	Wigmore Medical Centre	114 Woodside Road, Wigmore, Gillingham, Kent ME8 0PW	1.7	5	4,492	898	Yes
K	Long Catlis Road Surgery	Parkwood Health Centre, Long Catlis Road, Rainham, Kent ME8 9PR	1.9	4	3,794	949	Yes
L	Parkwood Health Centre	Long Catlis Road, Rainham, Kent ME8 9PR	1.9	2	7,474	3,737	Yes
M	Stonecross and West Drive Surgery	25 Streetend Road, Chatham, Kent ME5 0AA	2.0	5	8,346	1,669	Yes
N	Matrix Medical Practice	10a Beacon Hill, Matrix Medical Centre, Chatham, Kent ME5 7JX	2.0	1	2,588	2,588	Yes
O	Luton Medical Centre	10a Beacon Hill, Matrix Medical Centre, Chatham, Kent ME5 7JX	2.0	2	5,141	2,571	Yes

15.53 According to the NHS choices website, using the postcode ME7 3JJ, there are 6 dentists within a 2 mile radius of the centre of the Proposed Development. Table 15.3 lists these practices

and their proximity to the Site is shown in a corresponding map. The table additionally shows whether the practices are accepting new patients.

Figure 15.10 Location of dentists within a 2 mile radius



*Site = green; dentists = purple

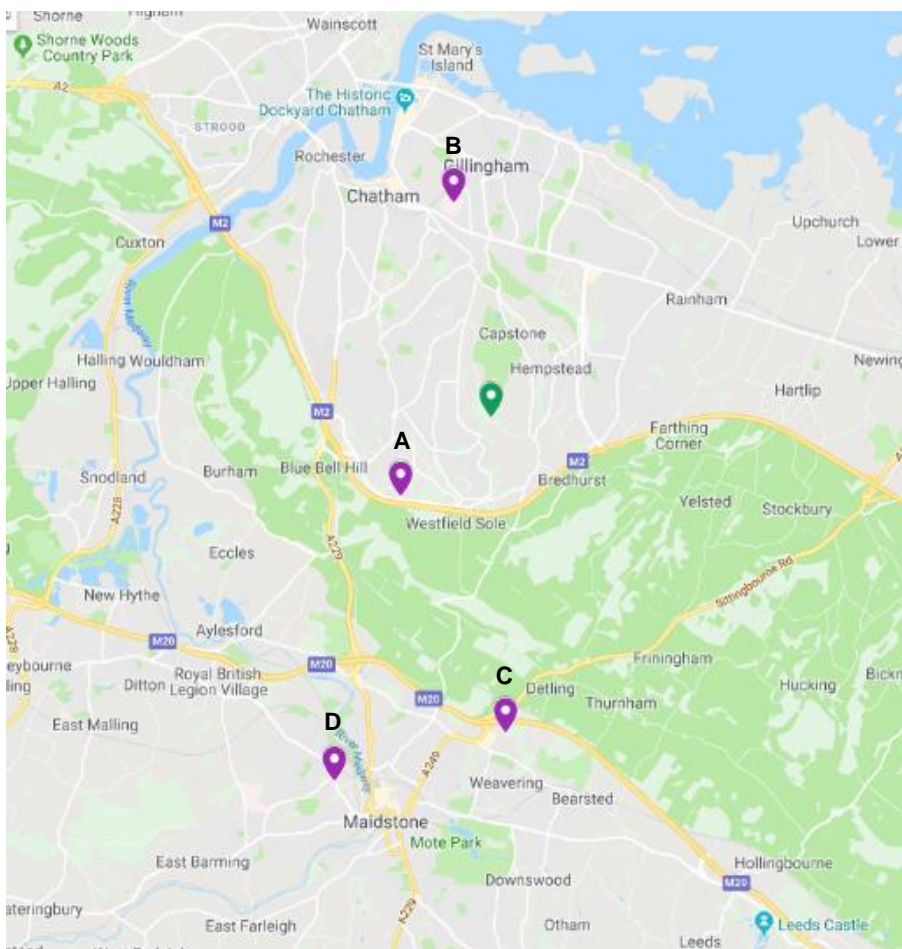
Table 15.3 Dentists within a 2 mile radius of the Proposed Development

Map Ref.	Dental Practice	Address	Distance (miles)	Accepting new patients?
A	S Meads & Associates	17-19 Gould Road, Dargets Wood, Chatham, Kent ME5 8DP	0.8	No data available regarding the acceptance of new NHS patients. Accepting urgent NHS dental appointments.
B	Wigmore Dental Practice	198 Fairview Avenue, Wigmore, Gillingham, Kent ME8 0PX	1.5	Accepting NHS patients by referral. Accepting urgent NHS dental appointments.
C	Medway Dental Care Ltd	26 King George Road, Chatham, Kent ME5 0TX	1.6	No data available.
D	Lavender Dental Care	1 Lavender Close, King George Road, Walderslade, Kent ME5 0PU	1.7	Yes

E	Toothcare Dental	367 Maidstone Road, Wigmore, Gillingham, Kent ME8 0HT	1.8	No data available regarding the acceptance of new NHS patients. Accepting urgent NHS dental appointments
F	MCH Community Dental Service	MCH House, 21 Bailey Drive, Gillingham Business Park, Kent ME8 0PZ	1.9	Accepting NHS patients by referral. Not accepting new NHS patients.

15.54 According to the NHS choices website, using the postcode ME7 3JJ, there are 4 hospitals within a 5 mile radius of the centre of the Proposed Development. Table 15.4 shows these hospitals and a corresponding map is seen below. Medway Maritime Hospital has the greatest number of departments and service, including accident and emergency services.

Figure 15.11 Location of hospitals within a 5 mile radius





*Site = green; hospitals = purple

Table 15.4 Hospitals within a 5 mile radius of the Proposed Development

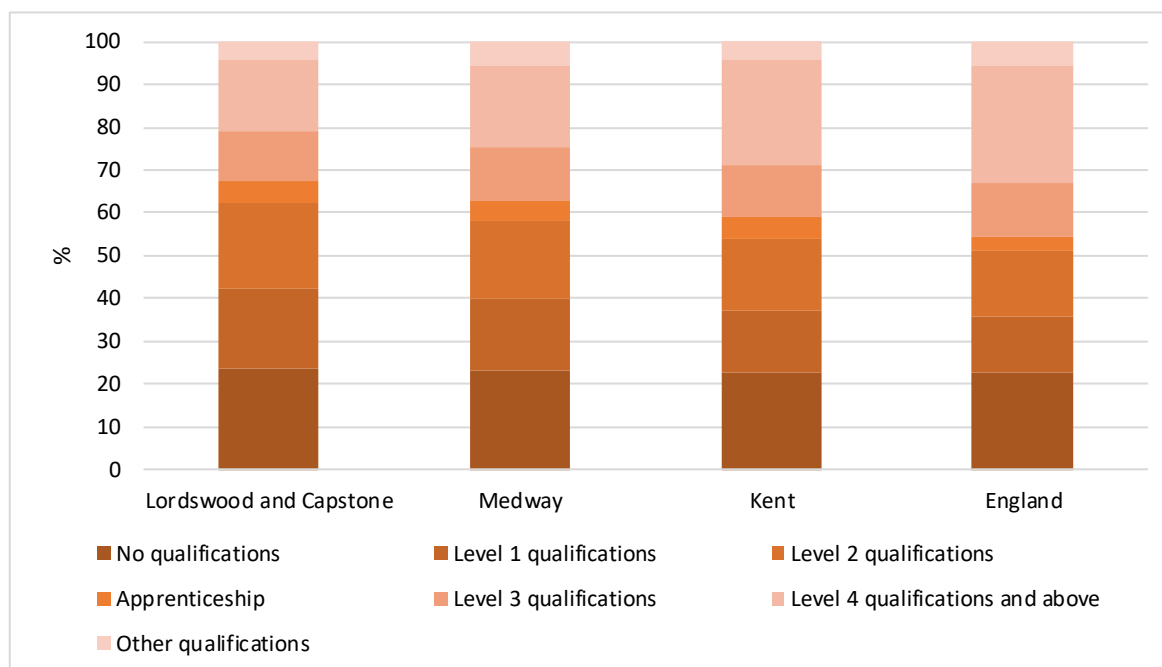
Map Ref.	Dental Practice	Address	Distance (miles)
A	Spire Alexandra Hospital	Impton Lane, Chatham, Kent ME5 9PG	1.5
B	Medway Maritime Hospital	Windmill Road, Gillingham, Kent ME7 5NY	2.8
C	KIMS Hospital	Newnham Court Way, Weaving, Maidstone, Kent ME14 5FT	3.8
D	BMI The Somerfield Hospital	63-77 London Road, Maidstone, Kent ME16 0DU	4.8

Education

Qualifications

15.55 According to the 2011 Census, 19.1% of residents over the age of 16 in Medway have a Level 4 Qualification and above. This is significantly lower when comparing to the Kent average and particularly the England average of 27.4%. However, it is higher than at ward level, in which 16.8% of residents aged 16 or above have a Level 4 Qualification and above. In addition, 22.9% of residents aged 16 and above in Medway have no qualifications which corresponds well to the ward, regional and national averages (**Ref 15.21**). Figure 15.12 demonstrates this comparison.

Figure 15.12 Highest Level Qualification in Lordswood and Capstone Ward, Medway, Kent and England



Source: 2011 Census

Local Education Provision

15.56 The Department of Education states that statutory walking distances are 2 miles for children under 8 years and 3 miles for children aged 8 and over and further elaborates that ‘*Best practice suggests that the maximum each way length of journey for a child of primary school age to be 45 minutes and for secondary school age 75 minutes, but these should be regarded as the maximum.*’ (Ref 15.22) Parents will face additional constraints in transporting very young children to nurseries.

15.57 In order to assess the current state of local education provision for the Proposed Development, this chapter considers an appropriate distance as being 1 mile for nurseries, 2 miles for primary schools and 3 miles for secondary schools, using the postcode ME7 3JJ.

Early years

15.58 In England, all 3 to 4 year olds are entitled to 570 hours of free early education or childcare per year, which amounts to 15 hours of free nursery education for 38 weeks of the year (Ref 15.23).



Therefore as well as paid childcare, it is likely that the policy will create a demand on childcare as a result of the entitlement for free childcare.

15.59 Within a 1 mile radius of the Site, there are 6 nurseries. The data was aggregated from the website childcare.co.uk, daynurseries.co.uk and google maps. The nurseries listed below were also contacted to understand their current capacity. Table 15.5 lists these nurseries along with their associated age ranges and the number of places at each nursery.

Table 15.5 Nurseries within a 1 mile radius of the Proposed Development

Nursery	Address	Distance from Site (miles)	Age Range	Number of Places	Capacity
Prima Montessori Children's Day Care Nursery	Unit C, Elm Court, Capstone Road, Gillingham ME7 3JQ	0.2	3 months – 5 years	150	Spaces available and no waiting lists
Lordswood Under 5s Playgroup	Rear 181 Ballens Road, Chatham ME5 8PG	0.5	2-5 years	26	Few spaces available and no waiting lists
Teeny Feet Day Nursery	118 Dargets Road, Lords Wood, Chatham ME5 8BP	1.0	0-8 years	30	No data available
Busy Bees at Hempstead	197 Hempstead Road, Hempstead, Gillingham ME7 3QG	1.0	3 months – 5 years	76	Spaces available and no waiting lists
Honeypot Day Nursery	136 Princes Avenue, Walderslade, Chatham ME5 8AJ	1.0	0-5 years	36	Recently expanded so are taking on new children and no waiting lists
Hedgehogs Preschool, Gillingham	Hempstead Village Hall, 169 Hempstead Rd, Hempstead, Gillingham ME7 3QG	1.0	2-4 years	No data available	No data available



Primary

15.60 Within a 2 mile radius of the Proposed Development, there are 18 state primary schools. A table summarising these local primary schools using the most recent pupil net capacity data from 2016/2017 from the Department for Education (DFE) (Ref 15.24) can be seen below.

Table 15.6 Primary schools within a 2 mile radius of the Proposed Development

Primary School	Distance (miles)	School Places	Number on Roll	Net Capacity	Surplus Capacity
St Benedict's Catholic Primary School	0.61	209	210	-1	-0.5%
Swingate Primary School	0.7	630	626	4	0.6%
Hempstead Junior School	0.84	360	348	12	3.3%
Lordswood School	0.87	420	374	46	11.0%
Hempstead Infant School	0.88	270	254	16	5.9%
Bredhurst Church of England Voluntary Controlled Primary School	0.99	107	118	-11	-10.3%
Walderslade Primary School	1.29	210	209	1	0.5%
Maudene School	1.33	420	410	10	2.4%
Fairview Community Primary School	1.43	630	611	19	3.0%
St Thomas More Roman Catholic Primary School	1.49	420	423	-3	-0.7%
Deanwood Primary School	1.5	210	189	21	10%
Kingfisher Community Primary School	1.54	210	196	14	6.7%
Tunbury Primary School	1.61	630	618	12	1.9%
Oaklands School	1.62	420	406	14	3.3%
St Augustine of Canterbury Catholic Primary School	1.66	210	198	12	5.7%
Park Wood Infant School	1.91	270	269	1	0.4%
Park Wood Junior School	1.91	359	355	-4	-1.1%
Wayfield Primary School	1.93	210	190	20	9.5%

Source: Department for Education School Capacity: academic year 2016 to 2017

15.61 Table 15.6 demonstrates that there is currently the capacity for 183 primary school pupils between the 18 primary schools. There is an average net surplus capacity of approximately 2.9%.



15.62 The Government recommends that for surplus capacity, in mainly urban areas, a reasonable target is 5%, a figure that both enables accommodation of unanticipated in migration and minimises the expenditure on running oversized premises. Out of these 18 primary schools, 6 of these schools meet this target.

Secondary

15.63 Within a 3 mile radius of the Proposed Development, there are 10 state secondary schools. A table summarising these local primary schools using the most recent pupil net capacity data from 2016/2017 from the Department for Education (DFE) can be seen below.

Table 15.7 Secondary schools within a 3 mile radius of the Proposed Development

Secondary School	Distance (miles)	School Places	Number on Roll	Net Capacity	Surplus Capacity
Greenacre Academy	1.59	956	886	70	7.3%
Walderslade Girls' School	1.61	949	857	92	9.7%
Rainham School for Girls	2.21	1597	1611	-14	-0.9%
The Howard School	2.28	1725	1452	273	15.8%
The Victory Academy	2.36	1500	677	823	54.9%
Chatham Grammar School for Girls	2.54	967	629	338	35.0%
Holcombe Grammar School	2.51	1116	821	295	26.4%
The Robert Napier School	2.69	1361	997	364	26.7%
Rainham Mark Grammar School	2.75	1242	1325	117	9.4%
The Thomas Aveling School	2.95	1140	1113	27	2.4%

Source: Department for Education School Capacity: academic year 2016 to 2017

15.64 Table 15.7 demonstrates that there is currently the capacity for 2,385 secondary school pupils between the 10 secondary schools. There is an average net surplus capacity of approximately 18.7%.

15.65 The Government recommends that for surplus capacity, in mainly urban areas, a reasonable target is 5%, a figure that both enables accommodation of unanticipated in migration and minimises the expenditure on running oversized premises. Out of these 10 secondary schools, 8 of these schools have a surplus capacity of over 5%, with 5 of these schools having a significant



surplus capacity and therefore, could benefit from increased pupil numbers that the Proposed Development is projected to bring forward.

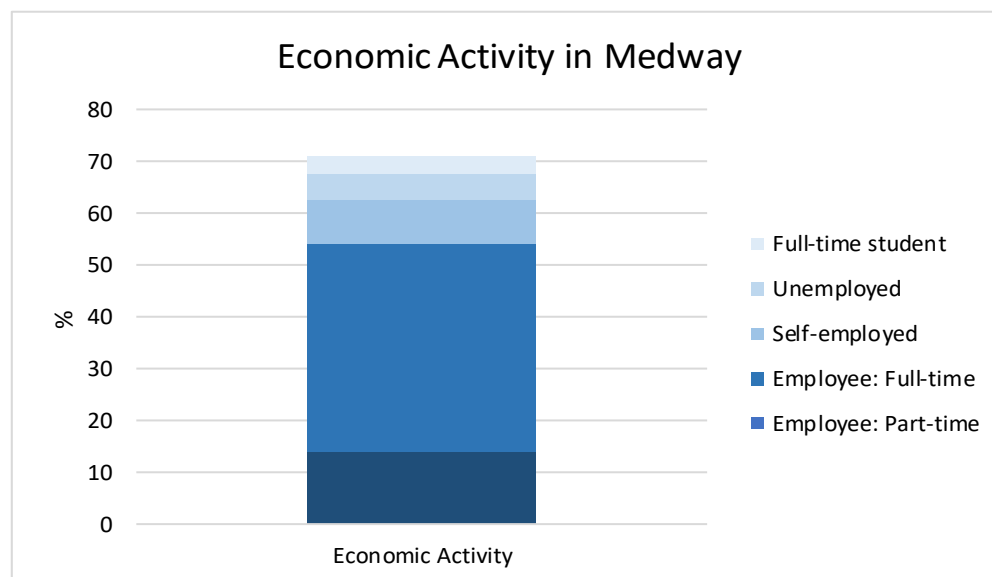
Employment and Economy

Employment

15.66 Economic activity is defined by the Census as whether or not a person was working or looking for work a week before the Census. There are different classifications of economic activity which are derived from the number of hours a person works and their type of employment.

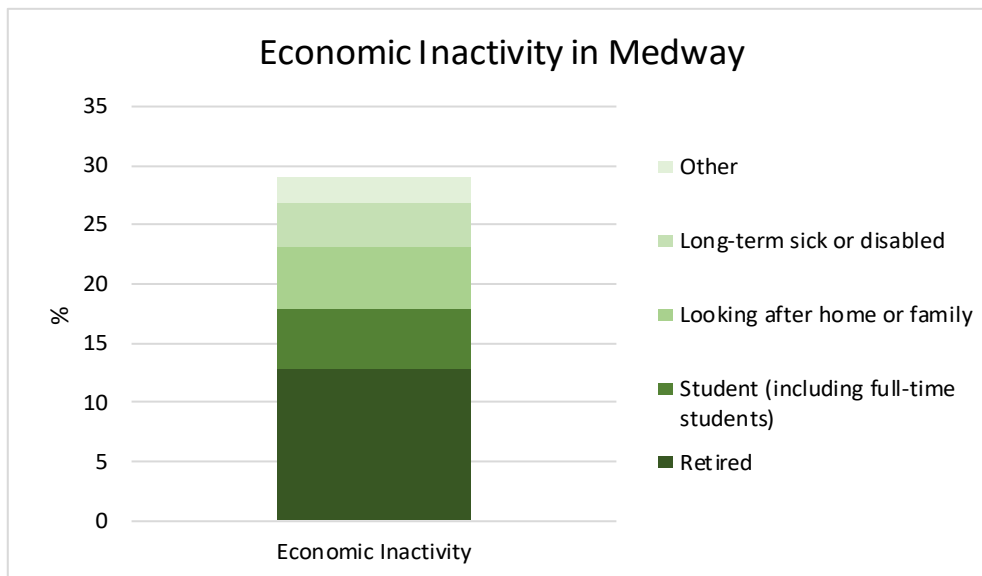
15.67 According to the 2011 Census, there are 137,954 economically active residents in Medway, equating to 71.1% of the population (**Ref 15.25**). This is slightly higher than the England average of 69.9%. Of these economically active residents in Medway, over half of all economically active residents in the Borough are in full-time employment; 40.1% of residents to be exact. The figures below show the breakdown of economic activity and economic in activity in Medway.

Figure 15.13 Economic Activity in Medway



Source: 2011 Census

Figure 15.14 Economic Inactivity in Medway



Source: 2011 Census

15.68 The average Claimant Count Rate in Medway, which measures the number of unemployed people who have registered as Job Seekers and are receiving Job Seeker’s Allowance, is 1.9% (2018) **(Ref 15.26)**. The is only slightly lower than the national average for the United Kingdom of 2.1% (2018).

Local Economy

15.69 The greatest proportion of residents in Medway work in the ‘Wholesale and retail trade; repair of motor vehicles and motor cycles’ industry, employing 17.4% of the population **(Ref 15.27)**. This is followed by ‘Human health and social work activities’, equating to 11.6% of residents, and ‘Construction’, employing 10.9% of residents. These trends are similar to Lordswood and Capstone Ward, within which 18.9% of its residents’ work in the ‘Wholesale and retail trade; repair of motor vehicles and motor cycles’ industry **(Ref 15.28)**. Table 15.8 demonstrates these variations across the different spatial scales.



Table 15.8: Employment Sectors

Industry	Lordswood and Capstone	Medway Council	Kent
Agriculture, forestry and fishing	0.1%	0.4%	0.8%
Mining and quarrying	0.1%	0.1%	9.7%
Manufacturing	8.0%	7.6%	16.3%
Electricity gas, steam and air conditioning supply	0.8%	0.8%	5.5%
Water supply; sewerage, waste management and remediation activities	1.1%	1.2%	4.9%
Construction	13.3%	10.9%	3.1%
Wholesale and retail trade; repair of motor vehicles and motor cycles	18.9%	17.4%	5.0%
Transport and storage	6.7%	6.1%	1.4%
Accommodation and food service activities	3.6%	4.5%	6.4%
Information and communication	2.5%	2.7%	5.1%
Financial and insurance activities	4.7%	5.0%	6.2%
Real estate activities	1.2%	1.3%	10.2%
Professional, scientific and technical activities	4.5%	4.7%	12.3%
Administrative and support service activities	4.6%	5.1%	4.8%
Public administration and defence; compulsory social security	6.7%	7.6%	0.8%
Education	7.7%	8.9%	9.7%
Human health and social work activities	10.6%	11.6%	16.3%
Other	4.7%	4.3%	5.5%

Source: 2011 Census

15.70 According to the 2011 Census, there is little variation in the proportion of residents employed in the different occupations within the Borough. Whilst the greatest proportion of residents in Medway are employed under the 'Skilled trades' occupation, equating to 13.1% of



residents, the least common occupation is 'Process plant and machine operatives', which employs 8.6% of residents. These observations are similar to within Lordswood and Capstone Ward, with 15.3% of the population employed in a 'Skilled trades' occupation. Table 15.9 shows the full breakdown of these occupations.

Table 15.9 Occupations

Occupation	Lordswood and Capstone	Medway Council	Kent
Managers, directors and senior officials	8.6%	9.4%	11.5%
Professional occupations	11.3%	12.9%	16.1%
Associate professional and technical occupations	10.9%	12.0%	12.6%
Administrative and secretarial occupations	13.9%	12.8%	11.7%
Skilled trades occupations	15.3%	13.1%	12.2%
Caring, leisure and other services occupations	9.7%	9.6%	9.8%
Sales and customer service occupations	9.6%	9.2%	8.5%
Process plant and machine operatives	9.2%	8.6%	6.7%
Elementary occupations	11.5%	12.3%	10.8%

Source: 2011 Census

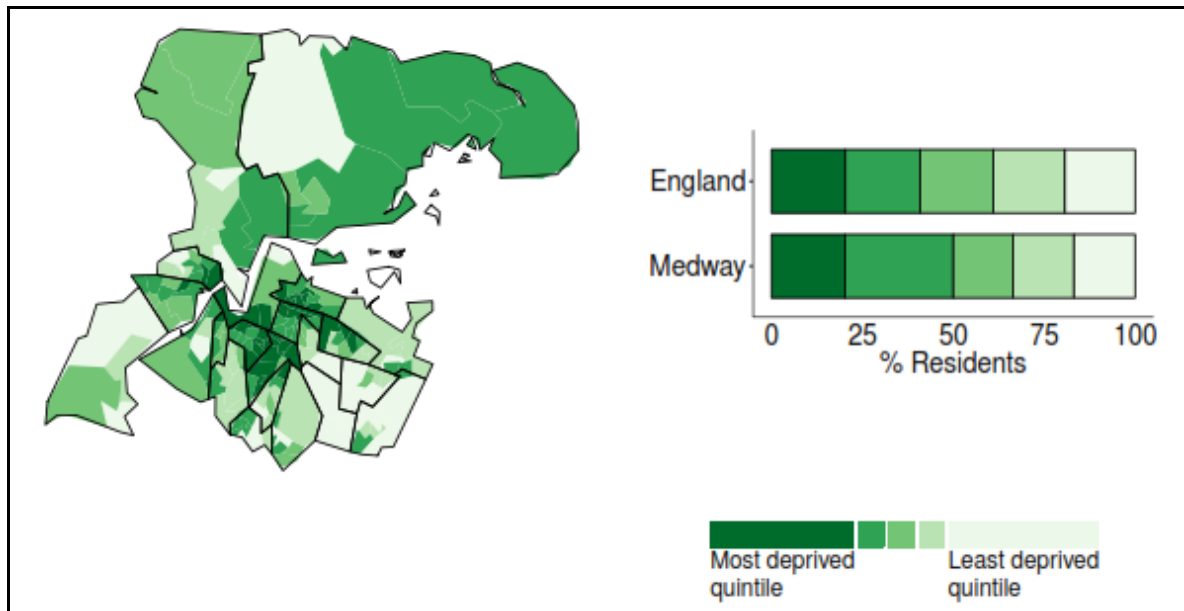
Deprivation

15.71 The Indices of Multiple Deprivation (IMD) (**Ref 15.29**) measure the relative deprivation of small areas of England called Lower Layer Super Output Areas (LSOAs) according to range of variables including wealth, health and quality of life.

15.72 The Public Health Profile (2018) (**Ref 15.30**) of Medway shows that the Borough has a reported deprivation score of 22.3 in 2015, which is slightly greater than the value for England of 21.8. Figure 15.15 shows the deprivation for Medway compared to the national average, using quintiles of the Index of Multiple Deprivation (IMD). The IMD measures the relative deprivation of

small areas of England called Lower Layer Super Output Areas (LSOAs) according to a range of variables including wealth, health and quality of life.

Figure 15.15 Index of Multiple Deprivation in Medway



15.73 A comparison between Medway and England shows that the proportion of their populations categorised within the most deprived quintile are relatively similar, in which approximately 25% of both of their populations fall within this quintile. However, within the second most deprived quintile, approximately 25% of the population of Medway fall into this quintile and about 15% of England's population are within this quintile.

15.74 The LSOA in which Lordswood and Capstone Ward falls within is among the 40% least deprived neighbourhoods in the country (IMD, 2015). In addition, this LSOA is also within the 40% least deprived neighbourhoods in the country within the Health Deprivation and Disability Domain. This domain combines four indicators about a range of health issues. These indicators are Years of Potential Life Lost (YPLL); Comparative Illness and Disability Ratio; Measures of acute morbidity, derived from Hospital Episode Statistics; and the proportion of adults under 60 suffering from mood or anxiety disorders based on prescribing suicide mortality rate and health benefits data (Ref 15.31). The following figures illustrate these rankings.

Figure 15.16 Indices of Multiple Deprivation, Lordswood and Capstone Ward

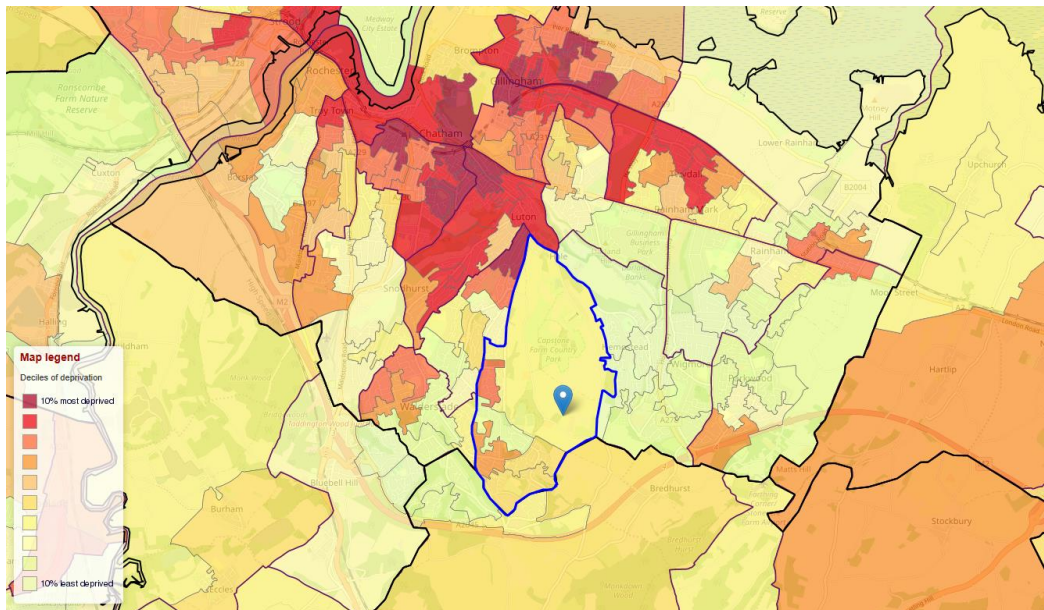
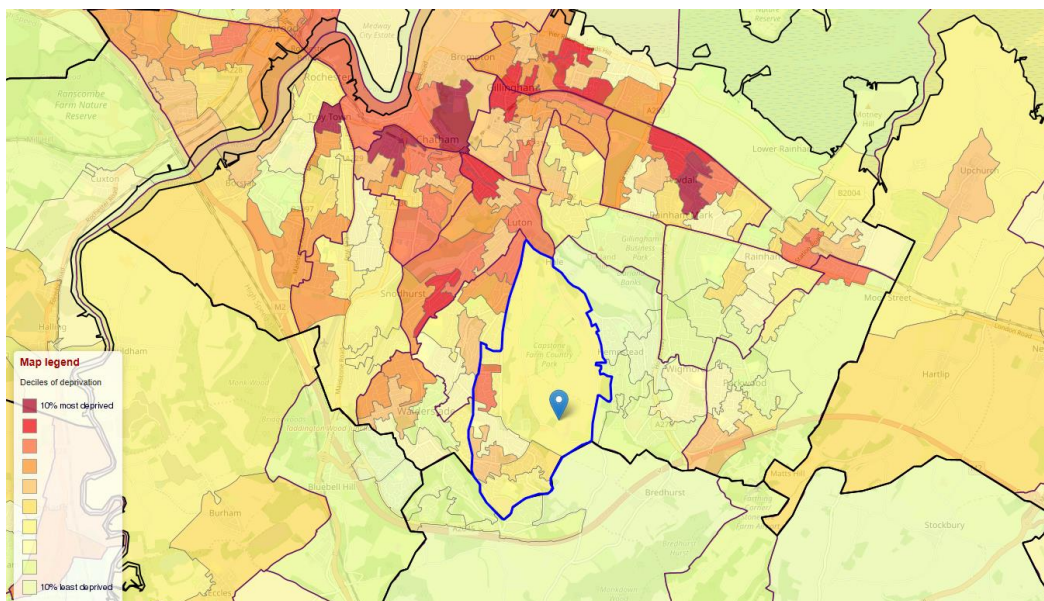


Figure 15.17 Health Deprivation and Disability Domain, Indices of Multiple Deprivation, Lordswood and Capstone Ward



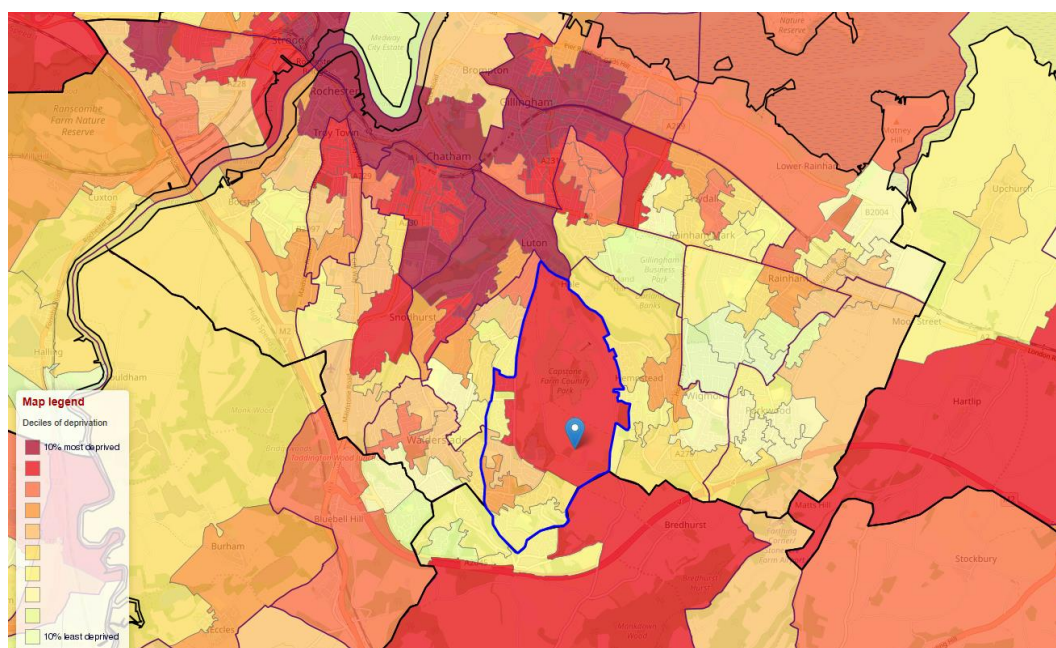
Crime

15.75 Crime imposes economic costs, reinforces social exclusion and can hasten the environmental decline of neighbourhoods. Fear of crime can make people reluctant to walk, use public transport, or go out after dark. It can also be a cause of mental distress and social exclusion.

In particular women and older people tend to worry more about becoming victims and this may prevent them from engaging in social activities.

15.76 Within the LSOA in which Lordswood and Capstone Ward falls ranks in the top 20th percentile of most deprived neighbourhoods in the country for the Crime Domain. The crime domain combines four indicators of crime to give an overall score for the level of crime deprivation experienced in a small area. The indicators used are Burglaries, constrained to Crime and Disorder Reduction Partnership (CDRP) level; Thefts for April 2004-March 2005, constrained to CDRP level); Criminal damage from April 2004-March 2005, constrained to CDRP level); and Violence from April 2004-March 2005, constrained to CDRP level) (**Ref 15.32**). Figure 15.18 demonstrates this.

Figure 15.18 Crime Domain, Indices of Multiple Deprivation, Lordswood and Capstone Ward



15.77 In addition, the Public Health profile for Medway states that the Borough has a count of 11,863 for Violent crime (Violent offences) for the period 2017/18 which equates to a value of (crude rate of violence against the person offences per 1,000 population) of 42.8. This is better than the regional average of 23.2 as well as the national average of 23.7.

15.78 According to UKCrimeStats, in Medway, there was a total of 3,440 acts of crime in October 2018 (**Ref 15.33**). This equates to a crime rate of 0.013 per layperson. This is only minimally higher than the average in England and Wales of 0.010 per layperson (**Ref 15.34**). The breakdown of the acts of crime in Medway is in Table 15.10.



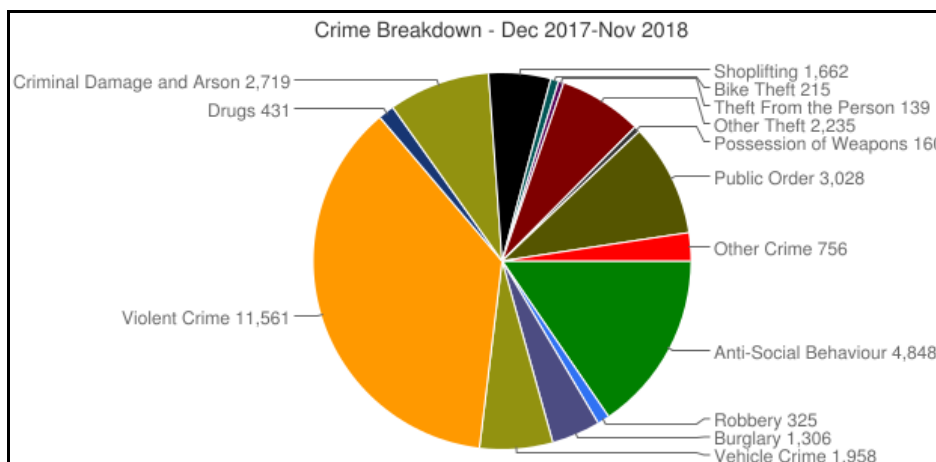
Table 15.10 Acts of Crime in Medway October 2018

Act of Crime	Medway Council
Anti-social behaviour	473
Burglary	131
Robbery	40
Vehicle crime	191
Violent crime	1,455
Shoplifting	160
CD&A	328
Other theft	212
Drugs	34
Bike theft	21
Theft from the person	15
Weapons possession	14
Public order	296
Other	70
Total	3,440

Source: UK CrimeStats

15.79 Between December 2017 and November 2018 there was a total of 31,343 acts of crime in Medway. Of this total, the most prevalent was Violent Crime, equating to 11,561 of these acts, followed by anti-social behaviour (4,848 acts) and public order (3,028 acts). Figure 15.19 demonstrates the breakdown of these acts of crime over this period.

Figure 15.19 Acts of Crime in Medway December 2017 – November 2018



Source: UK CrimeStats

Open, Amenity and Play Space

15.80 According to Medway Council's Wildlife Countryside and Open Space Strategy 2008-2016, the current provision of open space in Medway is 7.6 hectare (ha) per thousand of the population. The Borough has a significant amount of open space, equating to a size of just under 1,110 ha, which consists of the following typologies:

- Parks and gardens;
- Natural and semi-natural urban greenspaces;
- Green corridors;
- Outdoor sports facilities;
- Amenity greenspace; and
- Provision for children and teenagers.

15.81 Furthermore, Medway Council recognises the important of play space for their community. Currently, the Borough has 11.36 ha of play space and their Open Space Strategy states that the current play space provision in Medway is 0.046 ha per 1,000 people. This falls short of the National Playing Fields Association (NPFA) guide which states that best practice of equipped play space is 0.2-0.3 ha per 1,000 people, thus equating to a shortfall of 37.92 ha of total play space



provision in the Borough. This led to the Council adopting the local standard of play quantity of 0.15 ha of equipped play space per 1,000 population.

15.82 There are a number of parks and play areas in close proximity to the Proposed Development. Bredhurst Village Park is closest to the Site which is on the same Site as its Village Hall and includes a play area. Capstone Farm Country Park is located about 1 mile north of the Site of the Proposed Development which covers 114 ha of former farmland and offers opportunities for walking, running and cycling. It also has a play area. In addition to these parks, other Sites within 2 miles of the Site include Hempstead Park and Tunbury Park and Playground which both provide playgrounds and open space areas.

Community Facilities

15.83 The closest sports centre to the Proposed Development is Lordswood Leisure Centre which is situated approximately 0.7 miles northwest of the Site. The centre provides a multi-functional gym that offers a wide range of classes. Other nearby sports facilities include The Park Club Chatham Gym & Leisure Centre (2.3 miles northwest), The Splashes Leisure Pool (3 miles northeast) and Kings Rochester Sports Centre (3 miles northwest). Among these centres, there is the provision for gyms, indoor multi-purpose halls and a swimming pool.

15.84 Within a 2 mile radius of the Site of the Proposed Development, there are 5 community halls. These are Bredhurst Village Hall (0.8 miles south), Hempstead Village Hall (1.2 miles northeast), Parkwood Community Centre (1.8 miles northeast), Hook Meadow Community Centre (1.8 miles northwest) and the Davis Estate Community Centre (2 miles northwest). The closest of these halls, Hempstead Village Halls, offers a number of activities for community members. This includes yoga, dance and Stars Drama School for children aged 4 to 16 years.

15.85 Within a 2 mile radius of the Proposed Development, there are 5 libraries. These are:

- Kestrel Library (0.6 miles west);
- Hempstead Library (1.1 miles north);
- Walderslade Library (1.4 miles northwest);
- Wigmore Library (1.4 miles northeast); and
- Walderslade Hook Meadow Library (1.8 miles northwest).



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

15.86 The following sections focus on potential impacts thematically in terms of population and demography, housing, employment, impact on health, education, community facilities, crime and open space.

Housing

15.87 The Proposed Development is for the construction of up to 450 dwellings. An indicative layout has been produced indicating 441 units. This would be a mix of flats and houses of varying sizes and tenure. A full breakdown of the dwellings shown on the indicative layout can be seen in the table below.

Table 15.11 Indicative layout of the Proposed Development

Flats			
Type	Market	Affordable	Total
1 bed	31	10	41
2 bed	39	13	52
Houses			
Type	Market	Affordable	Total
2 bed	61	20	81
3 bed	143	48	191
4 bed	49	16	65
5 bed	8	3	11
TOTAL	331	110	441

15.88 It has been agreed that 25% of the maximum 450 dwellings will be allocated as affordable housing and the remaining 75% will be for market sale. There are policies within both Medway Local Plan and Maidstone Local Plan that require affordable housing within developments of a certain size. Although the policies do not specify the exact proportion of affordable housing required per proposal, it suggests that the proposed 25% affordable housing with this scheme satisfies the policy. The Proposed Development will therefore result in an increase in the provision of housing in the local area. This is considered to be a permanent, long-term **Major Beneficial** impact.



Population

Total Population

15.89 The Proposed Development will bring forward up to 450 residential units. To calculate the population, the occupancy of the units within the indicative layout, demonstrated in Table 15.11, was applied. To predict a population based on 450 residential units, the split of the remaining 9 units to total 450 units was assumed based on this indicative mix. The population is therefore estimated to be 2,022 individuals and is demonstrated in Table 15.12.

Table 15.12 Anticipated Population of the Proposed Development

Unit Type	Total Units	Population
Houses		
2B4P	83	332
3B4P	109	436
3B5P	86	430
4B6P	27	162
4B7P	40	280
5B8P	11	88
Flats		
1B2P	41	82
2B4P	53	212
TOTAL	450	2,022

Child Yield

15.90 Child yield for developments is based on multipliers applied to the proposed numbers of units adjusted according to the unit type (flat/house), size (number of beds) and tenure (market/intermediate and social rented/affordable).

15.91 The child yield of the Proposed Development has been extracted from the approved 2018 application (Ref: MC/18/0556) and applied for this Environmental Statement (ES). Table 15.13 shows the breakdown of the child yield.



Table 15.13 Child Yield

Age	Child Yield
0 to 4	50
5 to 10	122
11 to 15	86
16 to 18	23
Total	281

15.92 It is projected that the Proposed Development will bring forward a total of 281 children of which 18% will be of nursery age, 43% will be of primary school age and 39% will be of secondary school age (11 to 18 years).

Employment and Economy

15.93 Economic growth and increased employment are endorsed in planning policy at national, regional and local levels. This section focuses on the additional employment that will be generated by the Proposed Development.

15.94 Additional economic activity, that is activity over and above what would be generated if there were no project, derives from a number of sources:

- The construction of the Proposed Development; and
- The expenditure of the residents.

During Construction

Direct Construction Employment Generation

15.95 Construction activity is important as it represents part of the continual supply of work that construction firms and local tradesmen rely upon. Without such schemes, construction and related employment opportunities are significantly reduced.



15.96 The volume of employment is a direct function of the scale and type of construction project being undertaken, which in turn is reflected in the overall capital construction costs. A calculation based upon Annual Business Survey (ABS) construction sector data (**Ref 15.35**) has been made to estimate the likely amount of construction employment.

15.97 The average amount of construction expenditure required to support a construction job for a year has been derived from the ABS' data, on the turnover of construction businesses in Great Britain for 2015 (£242.1 billion) (**Ref 15.36**), divided by the number of construction workers for the same year (2,110,000) (**Ref 15.37**).

15.98 The resulting figure of £114,739 is the approximate amount of capital construction expenditure that supports one-person year of employment. Based upon a ratio of the capital construction cost of the build provided by the applicant for the Site to the above figure, it is estimated that approximately 533 gross person years of employment (PYE) will be generated. This is considered equivalent to 53.3 permanent jobs in the economy.

15.99 It is important to note, however, that this is a conservative estimate of overall additional jobs to the economy over the long-term.

Additionality Assessment of Construction Employment Generation

15.100 Further to the direct employment generated from the construction of the Proposed Development, other effects and additional benefits will result from the construction phase. These secondary impacts will arise from the need to purchase supplies for the Proposed Development (indirect employment), and from the increased expenditure in the locality by the construction workers (induced employment). Together this beneficial economic multiplier effect will sustain and generate further economic activity in the area, boosting the local economy.

15.101 The concept of 'additionality' combines the direct and indirect employment impacts of a proposal against the reference baseline position (known as the 'deadweight') to identify the overall net impact.

15.102 By undertaking an appraisal of the additional benefits using the adjustment factors from the Additionality Guide (**Ref 15.38**), estimations of indirect and induced employment levels can be calculated (for full calculations see **Appendix 15.1**). Three adjustment factors will be applied to understand the employment arising from the construction stage. These three adjustment factors



of: leakage, multipliers and displacement are significantly affected by the scale and significance of the project and by the composition of the local and wider economies.

Leakage

15.103 First, a leakage factor will be applied; this estimates the proportion of outputs that benefit those outside the target area, which can be considered to extend to Medway. In addition, the Site is well connected to various public transport methods which means that construction labour can travel relatively easily from outside the target area.

15.104 In accordance with Additionality Guide provided by Homes and Communities Agency, the level of leakage has been assumed at 25%, i.e. 75% of benefits (jobs) will be retained within target area, with leakage of 25% occurring due to reasons previously stated.

Displacement

15.105 The second adjustment factor is for displacement. Displacement takes into account the proportion of development outputs (jobs) offset by reduced outputs elsewhere in the Borough. In respect to construction employment, this may result from competition for construction staff that could result in delays and increased costs etc. There is a surfeit of construction workers within the region currently and there is therefore unlikely to be a shortage of construction labour. Therefore, for the purpose of this assessment a low level of displacement has been accounted for at 25% in accordance with the Homes and Communities Agency guidance where there is anticipated to be 'some displacement effects, although only to a limited extent' (**Ref 15.39**).

Multiplier

15.106 The next adjustment factor is a multiplier; this calculates the secondary (indirect and induced) benefits as a result of the construction phase, as discussed above. The multiplier adjustment factor varies according to the project size and geographic area. The larger the project and geographic area under consideration, the greater the multiplier. Medway is a relatively small market from which to source supplies and there is a much wider market in the rest of Kent and beyond. Thus, using the composite multipliers developed by the Homes and Communities Agency for the neighbourhood level, a medium composite multiplier of 1.1 at the neighbourhood level has been applied (**Ref 15.35**).



15.107 Further to the 'leakage', 'displacement' and 'multiplier' adjustment factors from the Additionality Guide, it is also necessary to take account of 'deadweight'. Deadweight can be defined as the output that would have occurred in the event that the Proposed Development is not brought forward. Consequently, it is necessary to subtract the deadweight additional benefits from the Proposed Development's additional benefits to leave the net additional benefits that the Proposed Development will bring forward over and above those of any other scenarios.

Deadweight

15.108 Alternate proposals for the Site are considered to be limited to a 'Do Nothing' scenario where by development is not brought forward and the Site is sold on. Further alternate proposals for the Site could be varied in nature and it is not considered reasonable or beneficial to the assessment to seek to estimate what these could constitute. In the absence of the Proposed Development the present vacant use of the Site would continue and there would be no construction project. Therefore, it is considered that the deadweight with regard to construction employment is zero.

15.109 The construction of the Proposed Development will generate 533 net operational construction person years employment in the target area. Using a standard ratio of 10-person years of construction work being equivalent to one permanent job in the economy, this is equivalent to some 53.3 permanent jobs in the economy. Considering the leakage, displacement, and multiplier factors this would have a net additional impact of 31.5 full time equivalent (FTE) jobs in the local economy. This is set out in Table 15.14 below. This is considered to be a temporary, short-term **Moderate Beneficial** impact in the long term.

Table 15.14 Construction Employment Additionality Assessment

Additionality Steps	Additionality Application
Gross Person Years of Employment over Construction Period	533
Permanent Jobs in the Economy	53.3
Estimated leakage	13.3
Gross direct construction employment to target area	40.0
Less displacement	10.0



Additionality Steps	Additionality Application
Net direct construction employment to target area	30.0
Plus multiplier effects	1.5
Net operational construction PYE to target area	31.5

During Operation

Generation of Direct Employment

15.110 The Proposed Development will include approximately 150 sqm of shops/cafes/takeaways which will be located in the centre of the Site. This facility will provide employment opportunities for residents in the local area.

15.111 In the absence of the wider operational employment details, the scale of the opportunities arising from the commercial space can be forecast through the application of 'employment densities'. The term 'employment density' refers to the average floorspace per person in an occupied building. It is a measure of intensity of use and indicates how much space each person occupies within the workplace. The Homes and Communities Agency (HCA) have produced the third edition of the Employment Densities Guide (**Ref 15.40**), which provides advice to appraisers of regeneration and economic development projects on the employment densities associated with different types of property use.

15.112 To forecast the number of 'workspaces' associated with the Proposed Development and quantify the benefits, the recommended employment densities have been applied. To calculate the operational employment, the employment density figure for Use Classes A1 (Retail) and A3 (Restaurants and Cafes) was applied. For both Use Classes, the employment density figure is 15-20 sqm per employee. An average of this was taken and thus the figure of 17.5 sqm per employee was applied which generates 9 FTE jobs. Table 15.15 shows this.



Table 15.15 Operational employment generation within the shops

Area	Use Class	Area (m2) per FTE	No. FTE Employees
Shops/cafes/takeaways	A1-A3	150	9

15.113 In addition, there is a nursery proposed at the Site of the Proposed Development which is proposed to have a capacity for up to 52 children. To calculate the anticipated number of jobs generated, the net internal area (NIA) of the classrooms within the nursery and the ratio of staff to children was applied.

15.114 The design of the Proposed Development includes a classroom for those aged 2-3 years with an NIA of 65 sqm and a classroom for those aged 3-5 years of 60 sqm. To project the anticipated number of children that the nursery is expected to accommodate, the indoor space ratio set out by the Department for Education's 'Statutory framework for the early years foundation stage' (**Ref 15.41**) was applied for both of those age ranges.

15.115 In addition, the ratio of staff to children for children aged 2 years and children aged 3 years is required to calculate the number of staff required for the number of children that the nursery is expected to accommodate. Ratios provided by the Department for Education's 'More great childcare' (2013) (**Ref 15.42**) was utilised in this instance. Table 15.16 shows this calculation.

Table 15.16 Operational employment generation within the nursery

Age	Size of classroom (sqm)	Ratio of classroom size per child (sqm/child)	Expected number of children	Staff ratio per child	Number of staff (rounded up)
2-3 years	65	2.5	26	1:4	7
3-5 years	60	2.3	26	1:8	4

15.116 Based on the above calculation, 7 members of staff are required for the 2-3 year age range and 4 members of staff are required for the 3-5 years age range. Therefore, in total, the nursery will generate 11 FTE employees.

15.117 Therefore, the overall number of FTE jobs that the Proposed Development will provide during the operational phase is 20.



Additionality Assessment of Operational Employment Generation

15.118 Further to the direct employment generated during the operation of the Proposed Development, additional benefits will result. These secondary impacts will arise from the need to purchase supplies for the businesses operating within the Proposed Development (indirect employment), and, for example, from the increased expenditure in the locality by the workers (induced employment). Together this beneficial economic multiplier effect will sustain and generate further economic activity in the area, boosting the local economy.

15.119 As explained in detail in the section on 'Additionality Assessment of Construction Employment Generation' above, the concept of 'additionality' combines the direct and indirect employment impacts of a proposal against the baseline position or reference case to identify the overall 'net' impact. The three adjustment factors applied here are described below.

Leakage

15.120 The levels of unemployment in the area suggest that labour in the operational phase could be primarily sourced in the local area. Thus, a medium leakage factor of 25% has been applied for the local level and low leakage factor 10% on the regional level.

Displacement

15.121 Displacement takes into account the proportion of the Proposed Development's outputs accounted for by reduced outputs elsewhere in the local area. With respect to the additional operational employment created as a result of the Proposed Development there are expected to be very limited displacement effects. Therefore, a low displacement factor of 25% has been applied for both local and regional level.

Multiplier

15.122 The multiplier for secondary (indirect and induced) benefits relates to two aspects:

15.123 A supply linkage multiplier: purchases made as a result of the Proposed Development and further purchases associated with linked firms further along the supply chain; and

15.124 An income multiplier: associated with local expenditure as a result of those who derive incomes from the direct and supply chain linkages.



15.125 Therefore, the multiplier effect is considerably influenced by how local in nature the businesses are, as this will affect the number of linkages both supply and income related, which are likely to take place. As this cannot be assessed at this stage of the development, a medium multiplier effect for the local level of 1.1 was applied. For the regional level, a low composite multiplier of 1.3 has been assumed.

Reference Case

15.126 Further to the 'leakage', 'multiplier' and 'displacement' adjustment factors, it is also necessary to take account of the reference case. The reference case can be defined as the output that would have occurred in the event that the Proposed Development was not brought forward. Consequently, it is necessary to subtract the reference case additional benefits from the Proposed Development's additional benefits to leave the net additional benefits the Proposed Development would bring forward over and above those of any other scenarios. As discussed in the construction employment section, an alternate scheme is not considered an appropriate reference case position.

15.127 As the Proposed Development site sits is vacant, it is assumed that the reference case is zero.

Table 15.17 Operational Employment (FTE) Additionality Assessment

Additionality Steps	Additionality Application
Gross direct operational employment	19.57
Estimated leakage	1.96
Gross direct operational employment to target area	17.61
Less displacement	4.40
Net direct operational employment to target area	13.21
Plus multiplier effects	0.66
Net operational employment to target area	13.87



15.128 The additionality analysis summarised in Table 15.17 shows that the net overall operational employment following displacement, leakage and multiplier effects is estimated to be 14 FTE jobs.

15.129 Therefore, the operational phase employment benefits are considered to be a permanent, long-term **Minor Beneficial** impact over the long-term.

Additional Local Expenditure

The Expenditure of the Additional Residents

15.130 The Proposed Development will bring forward up to 450 residential units, which are estimated to be occupied by some 2,022 residents. The houses, their residents and their spending can be regarded as additional within the Borough; even if residents previously lived in the Borough, it can reasonably be assumed that their previous accommodation will be readily re-occupied.

15.131 According to the ONS statistics on family spending in the financial year ending March 2016, the average weekly household spending was £528.90. Considering the maximum number of 450 units, it is estimated that the gross weekly expenditure of the residential development will be £238,005 resulting in a gross annual expenditure of £12.4 million. It can be assumed that 50% of the is spent within the LIA on goods and services such as supermarkets, cafes and restaurants, this would be an additional £6.2 million. The operational phase residents spend is considered to have a permanent, long-term **Major Beneficial** impact on the local economy over the long-term.

Local Education Provision

Early years

15.132 The Proposed Development is projected to bring forward 50 children aged 0 to 4 years. The baseline assessment identified 6 nurseries within a 1 mile radius of the Proposed Development. 5 of these nurseries offer a total of 318 places (data for the capacity of Hedgehogs Preschool, Gillingham was not available).

15.133 According to the Department of Education's Childcare and Early Years Survey of Parents in England (2017) (**Ref 15.43**), a total of 53% of pre-school children (aged 0 to 4) were most likely to receive formal child care. This includes day nurseries, nursery schools, nursery classes and playgroups or pre-schools. If this figure is applied to the projected 50 children aged 0 to 4 years



brought forward by the Proposed Development, it suggests that approximately 27 children will require a nursery place.

15.134 To gain an understanding of the existing capacity within the nurseries identified, each nursery was contacted in order to assess whether they could accommodate the proposed child yield brought forward by the Proposed Development. 4 out of the 6 nurseries responded and each stated that they were accepting new children into the nursery, thus do not have waiting lists.

15.135 It is anticipated that the 6 nurseries identified within a 1 mile radius of the Site would have the capacity for the child yield of the Proposed Development. Therefore, a permanent, long-term **Neutral** impact is anticipated.

Primary

15.136 The Proposed Development is anticipated to bring forward a population of 122 children aged 5 to 10 years.

15.137 The baseline assessment identified 18 primary schools within a 2 mile radius of the Site and there is currently a capacity for 183 primary school aged pupils. It is considered that, based on the current capacity figures, the 18 primary schools identified have the capacity to absorb the child yield of the Proposed Development which would require approximately 67% of the available primary school places. Therefore, a permanent, long-term **Neutral** impact is anticipated.

Secondary

15.138 The Proposed Development is projected to bring forward 86 children aged 11 to 15 and 23 children aged 16 to 18, equating to a total of 109 secondary school aged children.

15.139 Within a 3 mile radius of the Site, there are 10 secondary schools. Amongst these 10 schools, there is a capacity for 2,853 secondary school pupils. Based on these capacity figures, it is considered that the 10 secondary schools have the capacity to absorb the child yield of the Proposed Development which would require approximately 4% of the available secondary school places. Therefore, a permanent, long-term **Neutral** impact is anticipated.



Crime

15.140 The design of the Proposed Development has incorporated various measures in order to improve its safety and reduce the likelihood of crime. The design of the development will reflect the principles of Secured by Design through the design of its streets and spaces in order to promote good surveillance throughout and a clearly defined public realm. Furthermore, in places where the rear and sides of properties unavoidably address the public realm, suitable defensive planting and security fencing/walling will be included.

15.141 By incorporating these design principles to enhance safety and security for the resident population, the impact of the Proposed Development on crime will be permanent, long-term **Neutral**.

Open, Amenity and Play Space

15.142 The Proposed Development is set to bring forward approximately 6.9ha of open space alongside 2.8 ha of new woodland planting which will all be distributed throughout the outer edges surrounding the residential area. As part of this delivery of open space, new Community Parks are to be provided within the central areas of the Site. The design of these parks is set to be relatively formal with paths, benches and trees and provide space for a variety of functions, including a locally equipped play area of 400 sqm. Its location ensures its status as Local Equipped Area of Play (LEAP) as the residential elements of the development are within a 400m radius of the play area (**Ref 15.44**).

15.143 Furthermore, linked with the Community Park, a central green will be provided as another area of open space which would bring about a variety of opportunities for local community members, such as public art, walking and cycling.

15.144 As well as this provision creating social benefit, it will have a positive impact on the health and wellbeing of the community. The provision of large areas of open space may encourage community members to be more active, through walking and cycling, which would be beneficial to their health and happiness. It may also create new spaces, such as the Community Park, for community members to interact and be sociable in, thus further enhancing their wellbeing.

15.145 The extensive area of open space and elements included in the space, such as formal play areas, is anticipated to have a permanent, long-term **Moderate Beneficial** impact on the local community.



Health and Wellbeing

Encouraging healthy lifestyles

15.146 The design of the Proposed Development includes footways and cycle ways that will be provided onsite. These are to be designed to integrate with existing facilities in order to ensure that the future population of the development can walk and cycle conveniently and safely to local destinations. This would encourage residents to cycle and walk more as it would be very accessible for them.

15.147 In addition to these designated walking and cycling paths, wildflower margins will be established between the Proposed Development and the perimeter woodlands to provide attractive corridors for new informal footpaths. This would assist in promoting walking to local residents, thus improving residents' health.

15.148 The Proposed Development will bring forward 6.9ha of open space, including a central green and new Community Park. These areas of open space would encourage activity among the residents and make a positive contribution to their wellbeing.

15.149 The provision of opportunities for walking, cycling and outdoor activity as a result of the Proposed Development is anticipated to have a permanent, long-term **Minor Beneficial** impact.

Healthcare Facilities

GP Surgeries

15.150 The Proposed Development is anticipated to bring forward a residential population of 2,022 persons. If all of the new population registers with the GP surgeries, this would total 112,972 patients and therefore, the average ratio of patient per GP of these 15 practices would increase to 2,354. This is above the best practice of 1,800 people per GP and would create a deficit of 554 patients per GP. This suggests that the estimated 2,022 residents of the Proposed Development would create an additional demand on the surgeries based on this best practice ratio.

15.151 Despite the population increasing the GP to patient ratio above the recommended number, all 15 of the GP surgeries identified within a 2 mile radius of the Proposed Development are accepting new patients.



Dentists

15.152 An estimated population of 2,022 residents is predicted to be brought forward by the Proposed Development. It is considered that the 6 dentists identified within a 2 mile radius of the Site have the capacity for the projected additional population.

Hospitals

15.153 An estimated population of 2,022 residents is predicted to be brought forward by the Proposed Development. It is considered that the provision of 4 hospitals within a 5 mile radius of the Site is sufficient for the projected additional population.

Impact on Healthcare Facilities Summary

15.154 The Proposed Development will have a permanent, long-term **Minor Adverse** impact on GP surgeries due to the additional population demand further increasing the deficit of the ratio of patients to GP.

15.155 The projected population brought forward by the Proposed Development will have a permanent, long-term **Neutral** impact on dentists in the area due to the acceptance of new patients by some of the surgeries.

15.156 The population of the Proposed Development will have a permanent, long-term **Neutral** impact on the provision of hospitals due to the existing provision of acute and secondary services in the area.

Community Facilities

15.157 The baseline assessment found that there are a number of existing community halls in close proximity to the development as well as a number of libraries. Additionally, the baseline identified that there are 4 leisure centres within approximately 3 miles of the Proposed Development that offer a range of facilities and activities.

15.158 Table 15.18 below demonstrates the additional demand that the proposed development's population of 2,022 persons will create.



Table 15.18 Community Facility Requirements of the Proposed Development

Community Facility	Requirement per 1,000 population	Thresholds	Proposed Development Demand
Swimming Pool Lane	0.187	Min. 4 lanes	0.38
Sports Hall Courts	0.279	Min. 2 courts	0.56
Community Space	61 sqm	Min. 300 sqm	123.34 sqm
Library Space	26.5 sqm	198 sqm	53.58 sqm

15.159 The additional demand on community facilities is below the threshold requirement for each facility. Therefore, the Proposed Development is not anticipated to place additional demand on existing facilities.

15.160 The development will bring forward up to 4 new shops and cafes on Site which further enhances the facilities provision of the scheme.

15.161 In the central part of the Site, there will be fenced community garden that could include allotments for residents to utilise as well as a community orchard in which the planting of publicly accessible fruit trees will be available.

15.162 As a result of the provision of a range of community facilities, it is anticipated that this will have a permanent, long-term **Minor Beneficial** impact.

ASSESSMENT OF CUMULATIVE EFFECTS

15.163 With regard to cumulative impacts, it is considered unlikely that the Proposed Development would generate any cumulative impacts that would warrant mitigation with regard to those aspects identified above that result in a Beneficial impact. As such, only those areas where the potential residual impacts were considered to be of Adverse or Neutral significance, is there potential for a cumulative effect to occur that could result in an Adverse impact.

15.164 Further, certain aspects are considered unlikely to result in cumulative effects, such as housing. Therefore, the following aspects have been initially considered with regard to cumulative effects:

- Healthcare facilities (local GP facilities, secondary and acute services); and



- Local education provision (early years', primary and secondary).

15.165 Of the schemes identified for consideration with regard to cumulative effects, those developments that are permitted are typically considered by local authorities and other public service providers as part of their population forecasting.

15.166 The following schemes have been considered as having potential for socio-economic cumulative impacts:

- **Land East of Gleamingwood Drive, Lordswood, Kent (Ref: 15/503359/OUT)** – Residential development (approximately 89 dwellings) plus open space, biomass plant and access road (plus emergency access);
- **Land at North Dane Way (East Hill), Chatham, Medway** – Erection of up to 975 dwellings (C3) including a mix of sizes, types and tenures including affordable housing; a two-form entry primary school; potential for local community centre; open space; and road infrastructure; and
- **Land at Brickfield Darland Farm, Pear Tree Lane, Hempstead, Gillingham ME7 3PP** – Residential development of up to 44 dwellings with associated garaging, access, landscaping and open space.

Healthcare Facilities

15.167 The cumulative schemes are anticipated to have a cumulative impact on the provision of health and education facilities as they bring forward residential units. In total, the schemes will bring forward 1,108 units. According to the Office of National Statistics, the average household size in the UK was 2.4 people in 2016 (**Ref 15.45**). Considering an average sized household in each residential unit, the development will generate a residential population of 2,660 individuals. Together with the estimated 2,022 residents brought forward by the Proposed Development, this is a total of 4,682 new residents in the area. Table 15.19 shows the breakdown of these calculated populations per scheme.



Table 15.19 Population of Cumulative Schemes

Scheme	Population
Land East of Gleamingwood Drive	214
Land at North Dane Way (East Hill)	2,340
Land at Brickfield Darland Farm	106
TOTAL	2,660

Healthcare Facilities

15.168 The baseline assessment identified 15 surgeries within a 2 mile radius of the Site of the Proposed Development.

15.169 An additional 2,660 persons from the cumulative schemes, combined with the current number of registered patients and the population to be brought forward by the Proposed Development will total 115,632. This would create an additional demand on GP surgeries and increase the average GP to patient ratio to 2,409 which is greater 609 than the best practice figure of 1 GP to 1,800 patients. The baseline assessment, however, identified that all of the GP surgeries are accepting new patients. This suggests that there is the capacity for some of this additional population. Therefore, the cumulative impact remains permanent, long-term **Minor Adverse** to **Neutral**.

Local Education Provision

15.170 Using the unit schedules of the Land East of Gleamingwood Drive and Land at Brickfield Darland Farm as cumulative schemes and applying the Wandsworth child yield multipliers, it can be estimated that these two developments will bring forward a total of 156 children. Full methodology can be seen in **Appendix 15.1**.

15.171 A unit schedule is not available for the Land at North Dane Way (East Hill) cumulative scheme. Therefore, to estimate child yield, the average household size by number of bedrooms for Medway Council was utilised based on the 2011 Census (**Ref 15.46**). This demonstrated that the majority of homes within the local authority have 3 bedrooms. In addition, this cumulative scheme is anticipated to include affordable housing. Therefore, to project this, 25% of the total 975 dwellings have been assumed to be affordable housing, similarly to the Proposed Development. Full methodology can also be seen in **Appendix 15.1**.



Table 15.20 Child Yield for the Cumulative Schemes

Age (years)	Land East of Gleamingwood Drive	Land at North Dane Way (East Hill)	Land at Brickfield Darland Farm	Total
	Yield (number of children)	Yield (number of children)	Yield (number of children)	
0 to 4	40	363	20	423
5 to 10	30	254	22	305
11 to 15	22	210	9	241
16 to 18	8	71	6	84
TOTAL	100	897	56	1,053

15.172 The cumulative schemes will bring forward 423 children under the nursery school age. Together with the 50 children aged 0 to 4 years brought forward by the Proposed Development, there will be a cumulative demand on 483 early years education places. The baseline assessment identified 6 nurseries within a 1 mile radius of the Proposed Development. As stated previously, approximately 53% of pre-school children are most likely to receive formal child care (**Ref 15.40**)^{xl}. Based on this figure, the combined cumulative schemes and Proposed Development will require 256 nursery places. 4 out of the 6 nurseries identified have stated that they are accepting new children to their nurseries and do not have waitlists. It is anticipated that there will be spaces for some of these 256 children. Thus, a permanent, long-term **Minor Adverse** impact is assumed

15.173 The cumulative schemes will bring forward 305 children at primary school age, in addition to the 122 children arising from the Proposed Development aged 5 to 10 years. This totals 427 children of primary school age. The 18 primary schools within a 2 mile radius of the Proposed Development have a surplus capacity of 183 school places. It is considered that based on the total number of primary school places available, there is the capacity for some of the children that are anticipated to be brought forward by the Proposed Development and the cumulative schemes. Therefore, a permanent, long-term **Minor Adverse** impact is assumed. However, as part of the Land at North Dane Way (East Hill) cumulative scheme, a two-entry primary school is proposed. This would assist with the generation of this combined child yield of the Proposed Development and cumulative schemes.

15.174 The cumulative scheme will bring forward 325 children at secondary school age in addition to the 86 children aged 11 to 15 years and 23 children aged 16-18 years brought forward by the Proposed Development. The baseline assessment has identified a total of 2,385 places between the 10 secondary schools within a 3 mile radius of the Site. Therefore, it is considered that there is the capacity to accommodate for the combined child yield of the cumulative schemes and that



of the Proposed Development, totally 434 children of secondary school age. Therefore, a permanent, long-term **Neutral** impact is assumed.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Housing

15.175 The Proposed Development will bring forward up to 450 residential units which will be a mix of houses and flats of varying sizes and tenure. Of these units, 25% will be affordable. This will be a permanent, long-term **Major Beneficial** impact on housing provision in the LIA. Therefore, no mitigation is required.

Employment and Economy

During Construction

15.176 The Proposed Development will generate a net additional 31.5 FTE jobs during the construction phase of the development. This is anticipated to have a temporary, short-term **Moderate Beneficial** impact and thus, no mitigation is required.

During Operation

15.177 The Proposed Development will generate 11 FTE jobs as a result of the nursery as well as 9 FTE jobs as a result of the shops/cafes/takeaways onsite. Following leakage, displacement and multiplier effects, there will be a net additional employment of 14 FTE jobs. As this is anticipated to have a permanent, long-term **Minor Positive**, no mitigation is required.

15.178 As a result of the maximum 450 residential units being brought forward by the Proposed Development, it has been calculated that there will be a gross annual expenditure of £12.4 million. Of this, £6.2 million will be spent in the local economy. This will have a permanent, long-term **Major Beneficial** impact and therefore, no mitigation is required.

Local Education Provision

15.179 The Proposed Development will bring forward 50 children aged 0 to 4 years. The baseline assessment identified 6 nurseries within a 1 mile radius of the Site and 4 of these nurseries have confirmed that they are accepting new children to their nursery and do not have waitlists. In



addition, if a total of 53% of pre school children (aged 0 to 4) required formal child care, as previously stated, only 27 children would need a nursery place.

15.180 To accommodate for this anticipated child yield, a nursery will be brought forward as part of the Proposed Development which will have the capacity for up to 52 children, thus would have sufficient capacity for the 27 children aged 0 to 4 years that are anticipated to require formal child care. As the nursery provided by the Proposed Development would be able to accommodate for a total of 50 children, it would have capacity for children outside of the Proposed Development who require a nursery school place. Therefore, there will be a permanent, long-term **Minor Beneficial** residual impact on nurseries.

15.181 The Proposed Development is projected to bring forward 122 children aged 5 to 10 years and 109 children aged 11 to 18 years. The baseline assessment identified that there was capacity at the primary schools within a 2 mile radius of the Site and the secondary schools within a 3 mile radius to accommodate for this number of children.

15.182 However, as part of the approved 2018 application (Ref: MC/18/0556), a contribution in the form of a Section 106 payment was agreed. This totals £2,714,400 and will go towards mitigating the impact of the additional pupils produced by the Proposed Development.

15.183 Therefore, the residual impact will remain permanent, long-term **Neutral** impact on both primary and secondary school provision.

Crime

15.184 The design of the Proposed Development will incorporate a number of security and surveillance measures that align with the principles of Secured by Design. As a result, this will have a permanent, long-term **Neutral** impact and no mitigation measures are recommended.

Open, Amenity and Play Space

15.185 As part of the Proposed Development, 6.9ha of public open space will be provided, alongside a play area of 400 sqm and 2.8ha of new woodland planting surrounding the residential elements. This significant provision will have a permanent, long-term **Moderate Beneficial** impact and so, no mitigation is required.



Health and Wellbeing

15.186 There will be new cycle paths and footways integrated into the scheme design and these will be provided throughout the Site. In addition, informal footways will be provided through wildflower planting as well as 6.9ha of public open space for residents to enjoy. These design elements will encourage activity, thus having positive impacts on residents' health and wellbeing. Therefore, this will have a permanent, long-term **Minor Beneficial** impact and no mitigation is necessary.

15.187 The Proposed Development will have an impact on GP surgeries within a 2 mile radius of the Site through the residential population that will be brought forward. This will further increase the patient to GP ratio above the best practice guidance. Mitigation measures will take the form of a Section 106 Agreement which was signed as part of the 2018 permission which secures out of the total contribution a sum of £221,312.60 towards improving facilities at the following GP surgeries:

- Lords Wood Community Healthy Living Centre; and/or
- Matrix Medical Practice; and/or
- Hempstead Medical Centre; and/or
- Princes Park Medical Centre; and/or
- Walderslade Medical Centre; and/or
- Walderslade Village Surgery; and/or
- DMC Walderslade Surgery (this is believed to have been closed in October 2016); and/or
- Tunbury Avenue Surgery.

15.188 Following the implementation of this mitigation, the Proposed Development will have a permanent, long-term **Neutral** impact on GP surgeries.

15.189 The provision of dentists within a 2 mile radius of the Site is determined to have the capacity to accommodate the residential population being brought forward by the Proposed Development, thus will have a permanent, long-term **Neutral** impact. Therefore, no mitigation measures are required.



15.190 The hospital provision within a 5 mile radius of the Site is determined to have the capacity to accommodate the residential population being brought forward by the Proposed Development, thus will have a permanent, long-term **Neutral** impact. Therefore, no mitigation measures are required.

Community Facilities

15.191 The Proposed Development is bringing forward a number of facilities for residents to utilise as well as the wider community. A nursery will be provided in the central part of the Site and have the capacity for up to 52 children. Up to 4 cafes/shops/takeaways will be provided. Additionally, a community garden will be incorporated into the design for residents' to use if they so wish. This will have a permanent, long-term **Minor Beneficial** impact and therefore, no mitigation measures are recommended.



SUMMARY

15.192 The Proposed Development has been assessed across all relevant aspects of socioeconomic consideration as identified in national, regional and local policy. This Chapter has considered and assessed the following:

- Housing with regard to unit numbers, types, size and tenure;
- Employment & Economy at both the construction and operational phase and in terms of employment, and residents' spend;
- Health, including the health benefits of the Proposed Development and the provision of primary healthcare facilities;
- Local Education Provision: including early years' care provision, primary school places and secondary school places;
- Community Facilities: including consideration of the Council provided services of halls and libraries;
- Crime, with regard to the potential impacts on crime rates and potential for fear of crime; and
- Open Space in terms of both publicly accessible open and play space.

15.193 The assessment identified that during the construction phase, job opportunities will be generated for local people and have a positive impact on the population within the LIA.

15.194 During the operational phase, there was a range of impacts identified, from minor adverse to major beneficial. The creation of employment opportunities during operation and the anticipated additional expenditure of a new population brought forward by the Proposed Development would have positive impacts on the LIA. Furthermore, the provision of open space and play space as part of the development, along with community facilities, including a nursery and allotments, would be beneficial to the local community and future resident population by providing spaces for social interaction as well as opportunities for people to be more active, thus improving their health.

15.195 Neutral impacts were anticipated on local education provision. The Proposed Development is anticipated to bring forward a total child yield of 281 children. Following an assessment of the existing capacities at the local nurseries, primary schools and secondary schools, it was determined that there is an existing capacity to accommodate for the anticipated child yield. However, as part of the approved 2018 application (Ref: MC/18/0556), a Section 106 payment of



approximately £2.7 million was agreed that would contribute towards mitigating the impact of the additional pupils produced.

15.196 However, it was identified that the Proposed Development would place additional pressures on GP surgeries which already have little capacity, despite them accepting new patients. To mitigate against this, a Section 106 payment of £221,312.60 will be provided to GP surgeries to contribute towards them improving their facilities.

15.197 Table 15.21 summaries the impacts identified in this ES Chapter.

Table 15.21 Socio-economic Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Housing provision	Permanent	Major Beneficial	None	Major Beneficial
Construction employment	Temporary	Moderate Beneficial	None	Moderate Beneficial
Operational employment	Permanent	Minor Beneficial	None	Minor Beneficial
Local expenditure during operation	Permanent	Major Beneficial	None	Major Beneficial
Early years provision	Permanent	Neutral	Provision of an on-site nursery with a capacity for 52 children.	Minor Beneficial
Primary and secondary school provision	Permanent	Neutral	Section 106 Agreement for the total contribution of approximately £2.7 million towards improving the capacity of existing primary/secondary provision within the local area	Neutral
Crime	Permanent	Neutral	None	Neutral
Open, amenity and play space	Permanent	Moderate Beneficial	None	Moderate Beneficial
Encouraging healthy lifestyles	Permanent	Minor Beneficial	None	Minor Beneficial



Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Local healthcare provision – GP surgeries	Permanent	Minor Adverse	Section 106 Agreement for a total contribution of £221,312.60 towards improving facilities at 7 GP surgeries	Neutral
Local healthcare provision – dentists	Permanent	Neutral	None	Neutral
Local healthcare provision – hospitals	Permanent	Neutral	None	Neutral
Community facilities	Permanent	Minor Beneficial	None	Minor Beneficial



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16 CONCLUSIONS

16.1 This chapter contains the conclusions of the Environmental Statement (ES). The ES has examined the potential impacts associated with the Proposed Development during both the construction and operational phases.

16.2 The conclusions from each topic assessed in the ES are provided below.

Development Programme and Construction

16.3 This chapter identifies that the construction period would be approximately seven years and the effects of the Proposed Development would be managed through the development of a project and site-specific Construction Environmental Management Plan (CEMP). The CEMP would outline methods for contractor and general public liaison, hours of work, methods to deal with complaints, and outline management practices to control dust, traffic and access, waste, water resources, ecological and archaeological effects, ensuring a high level of control throughout the construction works.

16.4 The procedures within the CEMP would ensure the delivery of a high level of environmental control throughout the construction phase, thereby minimising the potential for adverse effects.

Transport and Access

16.5 The Site is well connected to the local and national highway network with access onto Hoath Way and thereafter the M2 via J4.

16.6 During construction of the Proposed Development there will be a temporary moderate adverse cumulative effect relating to driver delay for all receptors on all roads while there will be neutral to slight adverse cumulative effect to severance, pedestrian delay, and pedestrian amenity for all pedestrian receptors on all roads. There will also be a neutral cumulative effect on fear and intimidation for pedestrians crossing all roads, and accidents and safety for all receptors on all roads.

16.7 During operation of the Proposed Development there will be permanent moderate adverse cumulative effects and permanent moderate beneficial cumulative effects (for pedestrians crossing relating to severance; all pedestrian receptors relating to pedestrian delay and amenity; and people driving relating to driver delay. There will also be moderate to major beneficial cumulative effects



(depending on the road considered), and neutral cumulative effects for all receptors in relation to accidents and safety.

Air Quality

16.8 An air quality impact assessment has been carried out to assess both construction and operational impacts of the Proposed Development.

16.9 An assessment of the potential impacts during the construction phase has been carried out in accordance with the latest Institute of Air Quality Management Guidance. This has shown that for the Proposed Development, limited releases of dust and particulate matter are likely to be generated from on-site activities. However, through good site practice and the implementation of suitable mitigation measures, the impact of dust and particulate matter releases may be effectively mitigated and the resultant impacts are considered to be negligible.

16.10 ADMS Roads dispersion modelling has been carried out to assess both the impact of the operation of the Proposed Development on local pollutant concentrations and the suitability of the Proposed Development site for its proposed end use with regards to local air quality. The results indicate that predicted concentrations of relevant pollutants (NO₂, PM₁₀ and PM_{2.5}) concentrations are below the relevant objectives within the Proposed Development and at nearby sensitive receptors.

16.11 Emissions arising from traffic generated by the operation of the Proposed Development would result in a negligible impact on local pollutant concentrations, predicted concentrations remain below the objective levels at all the selected receptors. In accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance, the impact of the emissions arising from traffic associated with the operation of the Proposed Development is considered to be *medium to low / imperceptible*.

16.12 It should be noted that in accordance with the EPUK & IAQM significance criteria, the impact of the operation of the Proposed Development on NO₂, PM₁₀ and PM_{2.5} concentrations is considered to be negligible.

16.13 Future occupants of the Proposed Development would not be exposed to pollutant concentrations above the relevant objective levels, therefore the impact of the Proposed Development with regards new exposure to air quality is considered to be negligible.



16.14 It is concluded that air quality does not pose a constraint to the Proposed Development, either during construction or once operational.

Noise and Vibration

16.15 This chapter has considered the likely effects of the proposed development with respect to noise and vibration. These include the effects of existing conditions on the proposed development and the effects of noise and vibration generated by the Proposed Development on surrounding properties, during both construction and operational phases.

16.16 The assessment has been based on a series of environmental noise measurements undertaken at the application site and noise predictions.

16.17 The impact of noise and vibration during construction of the Proposed Development has been predicted and assessed in accordance with BS 5228. Generic mitigation measures have been recommended, which when implemented are capable of ensuring that the impact of noise and vibration during the construction of the Proposed Development is adequately controlled.

16.18 An assessment has been carried out in accordance with the adopted criteria to determine the suitability of the application site for residential accommodation. Proposed units will require appropriate glazing and ventilation specification, in order to achieve the required internal noise levels.

16.19 The impact of development associated traffic has been assessed. It is predicted that on this basis, no significant increase in road traffic noise will be experienced at existing receptors adjacent to the surrounding roads.

16.20 There are no identified commercial noise sources that would be likely to cause any significant impact at the Proposed Development.

Landscape and Visual Amenity

16.21 Whilst there are some significant adverse effects identified at both the construction and operational phases, they are primarily landscape and visual impacts that, in many cases are unavoidable by virtue of the fact that the Site is currently greenfield and will become developed as a result of the Proposed Development. The significance of the construction phase effects is only temporary for the duration of the construction stage of each phase. Also, they will not affect all



residents / viewpoints to the same degree at the same time as the construction will be phased across the Site and by the time that later phases commence, the mitigation built into earlier phases will become more established, thereby minimising effects on certain receptors.

16.22 The operational effects in landscape and visual terms have been minimised as far as possible and through the design of the scheme which ensures that the development is as sensitive as possible on the existing landscape and views.

Ecology and Biodiversity

16.23 This chapter provides an assessment of the significance and consequences of likely significant effects upon identified Important Ecological Features (IEFs) arising from the Proposed Development.

16.24 Avoidance, mitigation and compensation measures have been prepared as part of a holistic ecology strategy for the Proposed Development to address any potential significant effects that may arise during construction and after completion (operation) of the Proposed Development. Additional measures to further ensure all residual effects are avoided, mitigated and compensated for, in addition to further enhancements recommended to enable the Proposed Development to deliver positive ecological gain are also discussed.

16.25 Further baseline information in support of this chapter is included within the Baseline Ecology Report (**Appendix 11.1**), Ecological Appraisal (**Appendix 11.2**) and Ecology Addendum Report (**Appendix 11.3**), and are referred to throughout the assessment. The approach taken in this assessment is made with reference to the guidelines published in 2018 by the Chartered Institute of Ecology and Environmental Management (CIEEM).

16.26 In addition, further details of the Arboricultural Assessment are provided within **Appendix 11.4**.

16.27 The baseline survey work has identified the following IEFs pertinent to the development proposals:

- Statutory Designations – North Downs Woodlands SAC, Queendown Warren SAC, Medway Estuary & Marshes SPA and Ramsar, Wouldham to Detling Escarpment SSSI and Purple Hill SSSI (International to National-level value);



-
- Non-statutory Designations – Hook Wood LWS (includes Hall Wood), South Wood LWS / LNR and RNR (RO11) (Local to County-level value);
 - Bat assemblage (Local-level value);
 - Dormouse (District-level value); and
 - Stag beetle (Local-level value).

16.28 The impact assessment has identified that certain actions could result in significant adverse effects on these IEFs in the absence of mitigation. Inherent avoidance, mitigation and compensation measures and the implementation of an Ecological Construction Method Statement (ECMS), Ecology Management Plan (EMP) and Woodland Management Plan (WMP) are considered to ameliorate those significant effects identified to a residual level where no significant adverse effects are likely. Furthermore, such measures can deliver significant beneficial effects with respect to biodiversity gain.

16.29 Based on the impact assessment and consideration of the IEFs, it is concluded that the proposals will conform to the legislative protection afforded to these IEFs and with national, regional and local planning policy requirements.

Water Quality, Hydrology and Flood Risk

16.30 All significant effects on the water environment, local water infrastructure and flood risk during the construction period will be mitigated by the development and implementation of appropriate construction methods, and implementation of a CEMP. These effects will be controlled by discharge consents which will regulate construction drainage discharges. The effects have therefore been assessed as neutral.

16.31 The Proposed Development will contribute to an increase in wastewater discharge to the local sewer infrastructure and therefore, additional sewer upgrades will be necessary to accommodate any additional wastewater flows. With the additional sewer upgrades, but also the additional increase on infrastructure, the effects have therefore been assessed as neutral.

16.32 The Proposed Development will result in a reduction to the peak rate at which surface water is discharged from the Site when compared to the current greenfield runoff rates. The Proposed Development has also been designed to manage surface water runoff for events up to and including the 1 in 100 year return period, including a 30% increase to account for climate change. The additional water will be contained onsite, and therefore the Proposed Development will have a beneficial effect on local flooding.



Soils, Geology and Contaminated Land

16.33 A desk-based research of the baseline conditions of the Site has been conducted with respect to soils geology and contaminated land. The effect of the Proposed Development on these baseline conditions has been considered with the significance of the potential effects assessed.

16.34 Potential remediation and mitigation measure have been proposed to reduce the effects of the Proposed Development.

16.35 Overall, the effects of the Proposed Development on soils, geology and contaminated land are expected to be negligible to minor beneficial with the exception of chalk dissolution which has been given a rating of minor adverse as the risks cannot be entirely ruled out.

Archaeology and Cultural Heritage

16.36 None of the buried features identified, or those which may potentially survive within the Site are considered to be of any greater value than local or low significance. Should these be present, following on from a programme of site investigation, and where they will be affected by the Proposed Development, a programme of archaeological excavation and recording is proposed as set out within an Outline Mitigation Strategy which will ensure that they are recorded in line with the requirement of the NPPF and local planning policy.

Socio-Economics

16.37 The Proposed Development has been assessed across all relevant aspects of socio-economic consideration as identified in national, regional and local policy. This Chapter has considered and assessed the following:

- Housing;
- Employment and economy;
- Local education provision;
- Community facilities;
- Crime;
- Healthcare provision;
- Health and wellbeing; and
- Open space.



16.38 The assessment identified that during the construction phase, job opportunities will be generated for local people and have a positive impact on the population within the LIA.

16.39 During operation, the creation of employment opportunities and the anticipated additional expenditure of a new population brought forward by the Proposed Development would have positive impacts on the LIA. The provision of open and play space as part of the development along with community facilities would be beneficial to the local community by providing spaces for social interaction and opportunities for people to be more active, thus improving their health.

16.40 Neutral impacts were anticipated on local education provision. The Proposed Development is anticipated to bring forward a total child yield of 281 children, based upon Medway Council's Children's Services department's own calculations. Medway Council has established that additional capacity can be created at primary and secondary schools within the local catchment, and financial contributions on the agreed per-dwelling tariff for Medway will be secured from the Proposed Development to allow for education investment.

16.41 However, it was identified that the Proposed Development would place additional pressures on GP surgeries which already have little capacity, despite them accepting new patients. To mitigate against this, a Section 106 payment of £221,312.60 will be provided to GP surgeries to contribute towards them improving their facilities.