

South West Milton Keynes

Updated Environmental Statement Volume 1 - Main Report

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ABBREVIATIONS

AADT	Average Annual Daily Traffic
AAI	Area of Archaeological Importance
AAWT	Average Annual Weekly Traffic
ADMS	Atmospheric Dispersion Modelling System
ALC	Agricultural Land Classification
AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
AMR	Annual Monitoring Report
AQMA	Air Quality Management Area
AQAL	Air Quality Assessment Level
AQS	Air Quality Strategy
ARN	Affected Road Network
ATC	Automatic Traffic Count
AURN	Automatic Urban and Rural Network
AVDC	Aylesbury Vale District Council
AW	Anglian Water
BAP	Biodiversity Action Plan
BBG	Buckinghamshire Badger Group
BC	Buckinghamshire Council
BCC	Buckinghamshire County Council
BGS	British Geological Survey
BMERC	Buckinghamshire and Milton Keynes Environmental Records Centre
BMV	Best and Most Versatile Agricultural Land
BNL	Basic Noise Levels
BNS	Biological Notification Site
BoCC	Birds of Conservation Concern
BPA	British Pipeline Agency

BPEO	Best Practicable Environmental Option
BREEAM	Building Research Establishment Environmental Assessment Method
BRE	Building Research Establishment
BS	British Standard
BT	British Telecommunications
CD&E	Construction, Demolition and Excavation Waste
CEMP	Construction Environmental Management Plan
C&I	Commercial and Industrial Waste
CIEEM	Chartered Institute of Ecology and Environmental Management
CIRIA	Construction Industry Research and Information Association
CLEA	Contaminated Land Exposure Assessment
CNWL	Central and North West London NHS Foundation Trust
CCRA	Climate Change Risk Assessment
CRN	Calculation of Railway Noise
CROW	Countryside & Rights of Way Act 2000
CRTN	Calculation of Road Traffic Noise
CSM	Conceptual Site Model
CWS	County Wildlife Site
dB	Decibel
DCLG	Department for Communities and Local Government
DEFRA	Department for Environment, Food and Rural Affairs
DETR	Department of the Environment, Transport and the Regions
DfT	Department for Transport
DMP	Dust Management Plan
DMRB	Design Manual for Roads and Bridges
DTM	Digital Terrain Model
EA	Environment Agency
EC	European Commission
EclA	Ecological Impact Assessment

ECoW	Ecological Clerk of Works
EEC	European Economic Community
EIA	Environmental Impact Assessment
EFT	Emissions Factors Toolkit
EHO	Environmental Health Officer
EMEMP	Ecological Mitigation, Enhancement and Management Plan
EPA	Environmental Protection Act 1990
EPI	Environmental Performance Indicators
EPS	European Protected Species
EPUK	Environmental Protection UK
EQPAS	Expert Panel on Air Quality Standards
EQS	Environmental Quality Standards
ES	Environmental Statement
ETF	Emissions Factors Toolkit
EU	European Union
EV	Electric Vehicle
FRA	Flood Risk Assessment
FRCA	Farming and Rural Conservation Agency
FTP	Framework Travel Plan
GAC	Generic Assessment Criteria
GCN	Great Crested Newt
GDN	Gas Distribution Network
GEA	Gross External Area
GEART	Guidelines or the Environmental Assessment of Road Traffic
GFA	Gross Floor Area
GI	Green Infrastructure
GIAA	Green Infrastructure Action Areas
GLVIA	Guidelines for Landscape and Visual Impact Assessment
GP	General Practitioner

HCA	Homes and Communities Agency
Ha	Hectares
HDV	Heavy Duty Vehicles
HEGS	Hedgerow Evaluation and Grading System
HER	Historic Environment Record
HGV	Heavy Goods Vehicle
HSE	Health and Safety Executive
HVAC	Heating, Ventilation and Air Conditioning
HWRC	Household Waste Recycling Centre
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Assessment and Management
IOA	Institute of Acoustics
Km	Kilometre
Kv	Kilovolts
LAQM	Local Air Quality Management
LAQM.TG	Local Air Quality Management Technical Guidance
LCT	Landscape Character Type
LDV	Light Duty Vehicle
LEA	Local Education Authority
LEAP	Local Equipped Area of Play
LET	Landscape Effects Table
LGV	Light Goods Vehicle
LLFA	Lead Local Flood Authority
LOAEL	Lowest Observed Adverse Effect Level
l/s	Litres per second
LTP	Local Transport Plan
LWS	Local Wildlife Site
m	Metres
mm	Millimetres

MA&D	Major Accidents and Disasters
MAFF	Ministry of Agriculture, Forestry and Fisheries
MAGIC	Multi Agency Geographic Information for the Countryside
MCTC	Manual Classified Turning Count
MK	Milton Keynes
MKC	Milton Keynes Council
MKCHS	Milton Keynes Community Health Services
MKMMM	Milton Keynes Multi Modal Model
MKTM	Milton Keynes Traffic Model
MUGA	Multi Use Games Area
NBBG	North Buckinghamshire Bat Group
NCA	Natural Character Area
NEAP	Neighbourhood Equipped Area of Play
NEC	Noise Exposure Category
NERC	Natural Environment & Rural Communities Act 2006
NHS	National Health Service
NLPs	New Licencing Policies
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides
NOAEL	No Observed Adverse Effect Level
NOMIS	Official Labour Market Statistics
NPSE	Noise Policy Statement for England
NTS	Non Technical Summary
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance
NRR	National Risk Register
ODPM	Office of the Deputy Prime Minister
ONS	Office for National Statistics
OS	Ordnance Survey

PCM	Pollution Climate Mapping
PCT	Primary Care Trust
PEM	Project Environmental Manager
PIC	Personal Injury Collision
PM ₁₀ /PM _{2.5}	Fine particulate matter
PROW	Public Right of Way
PPE	Personal Protective Equipment
PPG	Pollution Prevention Guidelines
RIBA	The Royal Institute of British Architects
RPE	Respiratory Protective Equipment
S106	Section 106 Agreement
SAC	Special Area of Conservation
SAM	Scheduled Ancient Monument
SDA	Strategic Development Area
SFRA	Strategic Flood Risk Assessment
SINC	Site of Importance for Nature Conservation
SGN	Southern Gas Networks
SOAEL	Significant Observed Adverse Effects Level
SPA	Special Protection Area
SPD	Supplementary Planning Document
sqm	Square metres
SSSI	Site of Special Scientific Interest
SUDS	Sustainable Drainage System
SVALP2017	Submission Vale of Aylesbury Local Plan
SWMK	South West Milton Keynes
SWMP	Site Waste Management Plan
TA	Transport Assessment
TP	Travel Plans
VALP	Vale of Aylesbury Local Plan

WEM	Work Environment Manager
WCA	Wildlife & Countryside Act 1981
WFD	Waste Framework Directive
WHO	World Health Organisation
WPD	Western Power Distribution
WRAP	Waste and Resources Action Programme
ZTV	Zone of Theoretical Visibility
µg/m ³	Micrograms per cubic metre

GLOSSARY

Within this Environmental Statement the following terms are defined as follows:

Above Ordnance Datum	Ordnance Datum is the vertical datum used by ordnance survey as the basis for deriving altitudes on maps. Topography may be described using the level in comparison or 'above' ordnance datum.
ADMS-Roads Model	Dispersion modelling software used to predict the impacts due to emissions arising from road traffic. This model uses detailed information regarding traffic flows on the local road network, surface roughness, and local meteorological conditions to predict pollutant concentrations at specific receptors locations, as determined by the user.
Agricultural Land Classification	Grades of agricultural land. The Application Site contains 16Ha of Grade 3a and 122Ha of Grade 3b.
Air Quality Management Area (AQMA)	A defined area by virtue of Section 82(3) of the Environment Act 1995, where it appears that the air quality objectives prescribed under the UK Air Quality Strategy will not be achieved. In these areas, a Local Authority must designate Air Quality Management Areas, within which an Action Plan can be proposed to secure improvements in air quality so that prescribed air quality objectives can be achieved.
Air Quality Objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air Quality Standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Ambient	Background levels.
Ambient air	Outdoor air in the troposphere, excluding workplace air.
Annual Average Daily Traffic (AADT)	A daily total traffic flow (24 hours), expressed as a mean daily flow across all 365 days of the year.
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year.
Applicant	The South West Milton Keynes Consortium
Application Site	A mixed-use sustainable urban extension on 144.77 Ha of land to the south west of Milton Keynes, and described in Chapter 2 of ES Volume 1 – Main Report and is shown on Drawing No. CSA/4857/111.
B1	<p>B1 (Business) building use is use for all or any of the following purposes:</p> <ul style="list-style-type: none"> (a) as an office other than a use within class A2 (financial and professional services); (b) for research and development of products or processes; or (c) for any industrial process, being a use which can be carried out in any residential area without detriment to the amenity of that area by reason of noise, vibration, smell, fumes, smoke, soot, ash, dust or grit.

B2	B2 (General Industry) building use is for the carrying on of an industrial process other than one falling within class B1 above or within classes B3 to B7.
B8	B8 (Distribution and Storage) building use is for storage or as a distribution centre.
Baseline	Environmental conditions at specific periods of time, present on, or near a site, against which future changes may be measured or predicted.
Biodiversity	Abbreviated form of 'biological diversity'.
CO _{2e}	A carbon dioxide equivalent or CO ₂ equivalent, abbreviated as CO ₂ -e is a metric measure used to compare the emissions from various greenhouse gases on the basis of their global-warming potential (GWP), by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.
Completed Development	Within the ES this phase refers to the Proposed Development when fully built and operational.
Conceptual Site Model	A Conceptual Site Model (CSM) represents the characteristics of the site in diagrammatic or written form that shows the possible relationships between contaminants, pathways and receptors. The development of the CSM supports the identification and assessment of pollution linkages. Development of the CSM forms part of the preliminary risk assessment, and the model is subsequently refined or revised as more information and understanding is obtained throughout the risk assessment process.
Conservation Area	An area of special environmental or historical importance that is protected from changes by law.
Conservative	Tending to over-predict the impact rather than under-predict.
Construction	Within the ES this phrase refers to all construction works associated with the Proposed Development. It is anticipated that construction of the Proposed Development would commence in 2016/17, subject to the grant of planning permission, and that the Proposed Development would be completed by 2023/24.
Contamination	Contamination is the addition, or the result of addition, or presence of a material or materials to, or in, another substance to such a degree that it poses a risk to human health, controlled waters or the environment.
dB(A)	The unit of noise measurement (measured on a logarithmic scale), which expresses the loudness in terms of decibel (dB) scale and the frequency factor (A).
Dust	Solid particles, typically in the size range of 1-75µm in aerodynamic diameter, that are suspended in air, or have settled out onto a surface after having been suspended in air.
Effect	A physical or measurable change to the environment attributable to the project.
EIA Regulations	The Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
Emission rate	The quantity of pollutant released from a source over a given period of time.
Environmental Statement (ES)	Report that presents the findings of the Environmental Impact Assessment.
Emission	A material that is expelled or released to the environment. Usually applied to gaseous or odorous discharges to the atmosphere.

Environmental Impact Assessment (EIA)	A systematic means of assessing a development project's likely significant environmental effects.
Exceedance	A period of time where the concentrations of a pollutant is greater than the appropriate air quality standard.
Floodplain	Land adjacent to a watercourse over which water flows, or would flow but for defences in place, in times of flood.
Flood Risk Assessment (FRA)	A desk based study which considers the contributing factors and predicts / quantifies the risk of flooding and also identifies a water level in the event of flooding.
Flood Zone	<p>There are four classifications for flood zones as defined in Table 1 of Flood Risk and Coastal Change section (Id. 7) of the Planning Practice Guidance:</p> <ul style="list-style-type: none"> • Zone 1 Low Probability; Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown without colour (clear) on the Environment Agency Flood Map for Planning – all land outside Zones 2 and 3). • Zone 2 Medium Probability; Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue area on the Environment Agency Flood Map for Planning): • Zone 3a High Probability; Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue area on the Environment Agency Flood Map for Planning). And • Zone 3b Functional Floodplain; This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency (Land that is also shown within the dark blue area on the Environment Agency Flood Map for Planning. It should be noted that this is not separately distinguished from Zone 3a on public mapping).
Frequency (Sound)	The rate of repetition of a sound wave. The subjective equivalent in music is pitch. The unit of frequency is the Hertz (Hz), which is identical to cycles per second. A thousand hertz is often denoted kHz e.g. 2 kHz = 2000 Hz. Human hearing ranges approximately from 20 Hz to 20 kHz. For design purposes, the octave bands between 63 Hz to 8 kHz are generally used. The most commonly used frequency bands are octave bands, in which the mid frequency of each band is twice that of the band below it. For more detailed analysis, each octave band may be split into three one-third octave bands or in some cases, narrow frequency bands.
GHG	Greenhouse Gases. A greenhouse gas is a gas that absorbs and emits radiant energy within the thermal infrared range. Greenhouse gases cause the greenhouse effect on planets. The primary greenhouse gases in Earth's atmosphere are water vapor, carbon dioxide, methane, nitrous oxide, and ozone
Habitat	The environment in which populations or individual species live or grow.
LA ₁₀	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the

	level exceeded for n% of the time. Hence LA10 is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'.
LA ₉₀	The ambient noise level in the absence of the source, which is exceeded for 90% of the time.
LA _{eq}	The Equivalent Continuous A-weighted Sound Pressure Level. The sound pressure level of a steady sound that, over the same time as the measurement period, contains the same total acoustic energy as the sound field being measured. This takes into account the level and duration of noise events and is considered the indicator of the Ambient Noise Level.
LA _{eq, T}	The continuous equivalent sound level over period T. It is a widely used noise parameter that calculates a constant level of noise with the same energy content as the varying acoustic noise signal being measured. The letter "A" denotes that the Aweighting has been included and "eq" indicates that an equivalent level has been calculated. Hence, LAeq is the Aweighted equivalent continuous noise level. A-weighting is a filter incorporated into a sound level meter which, when measuring noise, replicates the sensitivity of human hearing.
LAF _{max}	The maximum noise level.
Landscape Character	The distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects particular combinations of geology, landform, soils, vegetation, land use and human settlement. It creates the particular sense of place of different areas of the landscape.
Landscape Effects	Change in the elements, characteristics, character and qualities of the landscape as a result of development.
Landscape Sensitivity	The extent to which a landscape can accept change of a particular type and scale without unacceptable adverse effects on its character.
Listed Building	Buildings placed on statutory lists of buildings of 'special architectural or historic interest' compiled by the Secretary of State for Culture, Media and Sport under the Planning (Listed Buildings and Conservation Areas) Act 1990, on advice from English Heritage. There are three classes of listed building: <ul style="list-style-type: none"> • Grade I buildings are considered to be of exceptional interest and are sometimes internationally important; • Grade II* buildings are particularly important and of more than special interest; • Grade II Listed Building are considered to be of national importance and special interest.
Main River	Main Rivers are watercourses designated as such on Main River maps (held by the Environment Agency) and are generally the larger arterial watercourses. Main Rivers are also indicated with a red line as part of the Flood Zones held by the Local Planning Authority.
Mitigation Measures	Actions proposed to moderate adverse effects arising from the whole or specific elements of a development.
Model adjustment	Following model verification, the process by which modelled results are amended. This corrects for systematic error.
Monin-Obukhov length	This provides a measure of the stability of the atmosphere. The Monin-Obukhov length should be between 1 and 200m.

Noise	Noise is defined as unwanted sound. The range of audible sound is from 0 dB to 140 dB. The frequency response of the ear is usually taken to be about 18 Hertz (Hz) (number of oscillations per second) to 18000 Hz. The ear does not respond equally to different frequencies at the same level. It is more sensitive in the mid-frequency range than the lower and higher frequencies and because of this, the low and high frequency components of a sound are reduced in importance by applying a weighting (filtering) circuit to the noise measuring instrument. The weighting that is most widely used and that correlates best with subjective response to noise is the dB(A) weighting. This is an internationally accepted standard for noise measurements. For variable noise sources such as traffic, a difference of 3 dB(A) is just distinguishable. In addition, a doubling of a noise source would increase the overall noise by 3 dB(A). For example, if one item of machinery results in noise levels of 30 dB(A) at 10 m, then two identical items of machinery adjacent to one another would result in noise levels of 33 dB(A) at 10 m. The 'loudness' of a noise is a purely subjective parameter but it is generally accepted that an increase/decrease of 10 dB(A) corresponds to a doubling/halving in perceived loudness.
Non Technical Summary	A report which briefly describes the main points discussed in the Environmental Statement in a clear manner, without the use of technical jargon and phraseology.
Phase 1 Habitat Survey	An ecological survey technique that provides a standardised system to record vegetation and wildlife habitats. It enables a basic assessment of habitat type and its potential importance for nature conservation. Each habitat type or feature is identified and presented on a map.
PM _{2.5}	Particulate matter with a mean aerodynamic diameter of less than 2.5 micrometres (µm).
PM ₁₀	Particulate matter with a mean aerodynamic diameter of less than 10 micrometres (µm).
Public Right of Way	Public rights of way are public highways that are legally protected in the same way as roads.
Proposed Development	The proposed development as described in Chapter 2 of ES Volume 1 – Main Report.
Receptor	A component of the natural, created or built environment such as human being, water, air, a building, or a plant that has the potential to be affected by the Proposed Development.
Residual Effects	Those effects of a development that cannot be mitigated following implementation of mitigation proposals.
Ridge and Furrow	Ridge and Furrow is an archaeological pattern of ridges and troughs created by a system of ploughing used in Europe during the Middle Ages, typical of the open field system.
Road link	A length of road which is considered to have the same flow of traffic along it. Usually, a link is the road from one junction to the next.
Scheduled Monument	A nationally important archaeological site or historic building, given protection against unauthorised change.
Scoping	An exercise undertaken to determine the topics to be addressed within the Environmental Statement.
Section 106 Agreement	Section 106 (S106) of the Town and Country Planning Act 1990 allows a local planning authority (LPA) to enter into a legally binding agreement or planning obligation with a

	landowner in association with the granting of planning permission. The obligation is termed a Section 106 Agreement.
Sustainable Drainage System (SUDS)	Sustainable management practices designed to control the rate and quality of surface water runoff into receiving waters, for example the use of swales and wetlands as buffers, as opposed to conventional drainage practices.
Topography	The natural or artificial features, level and surface form of the ground surface.
Transport Assessment	A quantitative assessment of transport effects of construction and operational phases of the proposed development.
Uncertainty	A measure, associated with the result of a measurement, which characterises the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.
Visual Effect	Change in the appearance of the landscape from available viewpoints as a result of development.

1. INTRODUCTION

- 1.01 This updated Environmental Statement (ES) has been prepared on behalf of the South West Milton Keynes Consortium (SWMK Consortium) in support of the outline planning application submitted to AVDC in 2015 - AVDC Ref. 15/00314/AOP (the Planning Application). The Planning Application is for a mixed use development (The Proposed Development) at South West Milton Keynes (SWMK).
- 1.02 A new ES has been prepared to address minor amendments that have been made to the Planning Application to Buckinghamshire Council (formerly AVDC) and to take account of regulation, policy and guidance changes that have occurred since the Planning Application was first submitted in 2015. In order to assist consultees and the decision-maker a complete, updated ES has been prepared, rather than a series of addendums to the original ES. This ES supersedes the version prepared in January 2015 and revised in August 2016. It should be noted at the outset that the likely significant impacts of the Proposed Development, as identified and assessed in this updated Environmental Statement, are not materially different from those identified in the original ES.

Application Revisions

- 1.03 This updated ES has been prepared to address a number of minor amendments that have been made to the Proposed Development and to address changes in regulation, policy and guidance since the original application was submitted. The amendments to the Planning Application, and the reasons for those amendments are set out below:
- The alignment of the oil pipeline crossing the Application Site was not identified correctly in the original Planning Application drawings, and as a result needs to be amended to show the correct alignment. It should be noted that the oil pipeline was and continues to be, located within an area identified as a green infrastructure corridor in the Proposed Development;
 - The standards required for climate change mitigation have been enhanced since the Planning Application was submitted. As a result, larger surface water attenuation ponds need to be included within the Proposed Development, which has required changes in the size and disposition of the proposed development parcels;
 - The housing needs of older people is identified as a specific issue in the emerging Vale of Aylesbury Local Plan, and this type of housing is supported by policy (Policy H6b as modified) on those sites identified by AVDC as suitable in the Housing and Economic Land Availability Assessment. The Application Site is identified as a suitable housing site and is a draft housing allocation. As a result, the Applicant has decided that an element of elderly persons' accommodation (within use class C3) should be included in the Proposed Development within the total quantum of housing.
- 1.04 These changes are not substantial. The oil pipeline remains in an area identified for a green infrastructure corridor within the Proposed Development. The surface water attenuation ponds have increased in size but are located within similar areas of the Proposed Development. The proposed extra care housing will be within use class C3 and is located within an area previously identified as a residential development parcel.
- 1.05 In light of these minor amendments, certain revisions need to be made to the submitted Planning Application, including the consequential amendment of the description of development and the submitted plans and drawings. These revisions will need to be subject to consultation with statutory consultees and local residents.
- 1.06 As mentioned above, there have also been a number of changes in regulation, policy and guidance since the original application was submitted. These include the Town and Country Planning (Environmental Impact

Assessment) Regulations which were revised in 2017. There have also been changes to relevant adopted and emerging development plan documents and policies since the Planning Application was submitted; Plan:MK was adopted in 2019 and the emerging Vale of Aylesbury Local Plan (VALP) was prepared and submitted for examination in 2017, with consultation on proposed modifications in late 2019. The Application Site is now identified as an allocation in the Submission Vale of Aylesbury Local Plan (SVALP2017) for a mixed use sustainable urban extension – Site Ref. NVL001: Land at South West Milton Keynes. This updated ES reflects the requirements of the 2017 Regulations and addresses the up-to-date policy and regulatory framework.

Application Site

- 1.07 The Application Site is unchanged. The SWMK Consortium control land to the south west of Milton Keynes, south of the A421 and north of the disused former Oxford to Bletchley railway line (due to be reopened as part of the East West Rail project) – the Application Site. The Application Site is shown on Drawing No. CSA/4857/111 – see **Appendix 1.1**.
- 1.08 The Proposed Development area is located within the area of Buckinghamshire Council (formerly AVDC), but the principal access points to the A421 are within the area of Milton Keynes Council (MKC). Duplicate planning applications were submitted to both AVDC and MKC, so that each planning authority could determine the elements of the Proposed Development that fall within their respective administrative areas.

Revised Description of Development

- 1.09 The revised description of development for Planning Application (AVDC Ref. 15/00314/AOP), and as assessed in this updated ES, is as follows:

Outline planning application with all matters reserved except for access for a mixed-use sustainable urban extension on land to the south west of Milton Keynes to provide up to 1,855 mixed tenure dwellings, including 60 extra care units (C3); an employment area (B1) including provision for a 6GP surgery (D1); a neighbourhood centre including retail (A1/A2/A3/A4/A5), community (D1/D2) and residential (C3) uses; a primary school; a grid road reserve; multi-functional green space; a sustainable drainage system; and associated access, drainage and public transport infrastructure.

Planning Application Background

- 1.10 The Planning Application was submitted in 2015. The Application has been subject to consultation and detailed discussions since then, and has been reported to committees.
- 1.11 The Application (AVDC Ref. 15/00314/AOP) was reported to AVDC's Strategic Development Management Committee on 7th June 2017 for a decision. The Committee resolved to grant planning permission for that proposal. The resolution stated:
- "That application 15/00314/AOP be Supported and Deferred and Delegated to officers subject to the completion of a legal agreement (with Bucks County Council, Aylesbury Vale District Council and if appropriate Milton Keynes Council) as outlined in the officer's report and subject to conditions as considered appropriate by officers. If this cannot be achieved then the application will be refused for reasons as considered appropriate by officers."*
- 1.12 Draft conditions have been discussed with AVDC, and are agreed subject to minor amendments; the issues that are covered by conditions are identified in Section 4. The final conditions will need to relate to the updated Planning Application documents.

- 1.13 The S106 Agreement for the application is being discussed with AVDC, MKC and Buckinghamshire County Council. The Agreement document is at an advanced stage but has not yet been completed and signed.
- 1.14 It is anticipated that once the updated Application documents have been subject to consultation, the Planning Application will be reported back to AVDC's Strategic Development Management Committee for a decision.
- 1.15 On 19th November 2019 MKC issued a decision notice on the elements of the application (MKC Ref. 15/00619/AOP) that fall within its administrative area i.e. the access points onto the A421. The application was refused for a single reason, which was as follows:
- That in the opinion of the Local Planning Authority there is insufficient evidence to mitigate the harm of this development in terms of increased traffic flow and impact on the highway and Grid Road network, with specific reference to Standing Way and Buckingham Road, thus this will be in contravention of Policies CT1 and CT2 (A1) of Plan:MK.*
- 1.16 The SWMK Consortium are currently preparing an appeal against this decision, to be submitted by 14 May 2020.

Updated Delivery Timetable

- 1.17 Approximately 5 years have elapsed since the Application was submitted, and as a result the delivery timetable needs to be updated. It is now anticipated that construction of the Proposed Development will commence in 2021/22, subject to the grant of planning permission, and that the Proposed Development would be completed by 2030/31. The key dates which have been used to assess the environmental impacts of the Proposed Development in this updated ES, are as follows:
- Planning Application submitted Q1 2015
 - Revision to Planning Application submitted Q2 2020
 - Outline Planning Permission granted Q3 2020
 - Reserved Matters approval (one year from outline permission) – Q3 2021
 - Start Date – 2021/22
 - Infrastructure delivery (two years from outline permission) – 2021/22
 - Housing delivery (ten years from reserved matters) – 2021/22 to 2030/31
 - Completion – 2031

Environmental Impact Assessment

- 1.18 Environmental Impact Assessment (EIA) was established in the UK in 1988 in response to an EU Directive on the assessment of the effects of certain public and private projects on the environment (85/337/EEC). The 1985 EIA Directive has since been amended three times; in 1997 (97/11/EC), 2003 (2003/35/EC), 2009 (2009/31/EC). In 2011 the 1985 EU Directive and its three amendments were codified by Directive 2011/92/EU, which itself was amended in 2014 by Directive 2014/52/EU.
- 1.19 The requirements of the Directives were transposed into UK law through Statutory Instruments, the latest of which comprises The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 (hereon referred to as the "EIA Regulations") which came into force on 16 May 2017 and replaced the previous 2011 Regulations, subject to transitional arrangements.

- 1.20 The purpose of the Environmental Impact Assessment is summarised in Planning Policy Guidance (paragraph: 002 Reference ID: 4-002-20140306) which advises that the aim of the EIA is to protect the environment by ensuring that decision-makers have sufficient knowledge of the likely significant effects of development on the environment so that the impacts can be taken into account in the decision making process.
- 1.21 Only certain types of development are defined as “EIA development”. This includes:
- Development falling within Schedule 1 of the EIA Regulations
 - Development falling within Schedule 2 of the EIA Regulations where the development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location
- (EIA Regulation 2(1))
- 1.22 The Proposed Development falls within Part 10b (Infrastructure Projects - Urban Development Projects) of Schedule 2 of the EIA Regulations 2017. It exceeds the identified threshold as it includes more than 1 hectare of urban development which is not dwellinghouse development; more than 150 dwellings; and the overall area of the development exceeds 5 hectares. The Proposed Development is also likely to have significant effects on the environment. The Proposed Development is therefore considered to be EIA Development.
- 1.23 The likely significant environmental effects of the Proposed Development are identified and assessed in this ES, both during the construction phase and once completed. Mitigation measures are proposed to prevent, reduce and offset any significant adverse effects on the environment arising from the Proposed Development. The ES provides sufficient information to enable the decision makers to understand and take into account the likely significant environmental effects arising from the Proposed Development.

Updated ES Structure

- 1.24 This Environmental Statement has been prepared in accordance with The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 and comprises three separate volumes:
- **Volume 1 - ES Main Report:** providing the full text of the ES
 - **Volume 2 - ES Technical Appendices:** comprising the technical and supporting documents referred to in the relevant chapters of the ES
 - **Volume 3 - Non-Technical Summary:** providing a concise summary of the Proposed Development, its likely significant environmental effects and the measures proposed to mitigate or to avoid these effects.
- 1.25 This document comprises Volume 1: ES Main Report and is structured as follows:
1. Introduction
 2. Application Site & Project Description
 3. Policy Context & Alternatives
 4. EIA Methodology
 5. Archaeology & Heritage
 6. Agriculture
 7. Ecology
 8. Drainage
 9. Landscape & Visual
 10. Traffic & Transport
 11. Air Quality

12. Noise & Vibration
13. Socio-Economics
14. Services & Utilities
15. Waste
16. Ground Conditions
17. Climate Change
18. Major Accidents and Disasters
19. Assessment of Significant Effects
20. Conclusions

- 1.26 Regulation 18(3) of the EIA Regulations 2017 outlines the minimum information required in an Environmental Statement. For avoidance of doubt, the minimum requirement has been set out within Table 1.1 below, along with a description of where it can be found within this ES.

Table 1.1 Required information and location within ES

REQUIRED INFORMATION	LOCATION WITHIN THE ES
a) a description of the proposed development comprising information on the site, design, size and other relevant features of the development	Volume 1 - Chapter 2. Application Site and Project Description
b) a description of the likely significant effects of the proposed development on the environment	Volume 1 – Technical Chapters (Chapters 5 to 18)
c) 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	Volume 1 – Technical Chapters (Chapters 5 to 18)
d) 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	Volume 1 - Chapter 3. Policy Context and Alternatives
e) a non-technical summary of the information referred to in sub-paragraphs (a) to (d)	Volume 3 - Non-Technical Summary
f) any additional information specified in Schedule 4 relevant to the specific characteristics of the particular development or type of development and to the environmental features likely to be significantly affected	Volume 1 – Chapter 4 EIA Methodology and Technical Chapters (Chapters 5 to 18) and Volume 2 - Appendices

ES Project Team

- 1.27 The ES has been prepared by suitably qualified experts at Carter Jonas LLP together with CSA Environmental, Kernon Countryside Consultants Ltd, Orion Heritage and WSP. Further details of the project team, including details of EIA experience and qualifications, is provided within **Appendix 1.2**.

Other Documents

- 1.28 The Planning Application is supported by other updated documents as set out in Table 1.2 below.

Table 1.2 Planning Application Supporting Documents

SUPPORTING DOCUMENTS	PRODUCED BY
Application Forms & Certificate(s) of Ownership	Carter Jonas LLP
Planning Statement	Carter Jonas LLP
Design and Access Statement	CSA
Masterplan and Parameters Plans	CSA
Landscape Strategy Plan	CSA
Landscape and Visual Impact Assessment	CSA
Sustainability Strategy	WSP
Flood Risk Assessment	WSP
Retail Assessment	Carter Jonas LLP
Employment Assessment	Carter Jonas LLP
Statement of Community Involvement	Athene
Arboricultural Assessment	CSA
Transport Assessment and Framework Travel Plan	WSP
Energy Statement	WSP
Construction Environmental Management Plan	WSP
S106 draft Heads of Terms	Eversheds

ES Availability and Comments

- 1.29 The ES and Technical Appendices can be purchased at a cost of £150 for printed copies and £15 for a CD. All documents are available from:

Mark Hyde
Carter Jonas LLP
One Station Square
Cambridge
CB1 2GA

Tel: 01223 326825

Email: mark.hyde@carterjonas.co.uk

- 1.30 The ES and the Technical Appendices will also be available to view at the Planning Department at AVDC and MKC, and on the planning applications database on the Councils' websites. All comments on the planning application should be sent to:

Buckinghamshire Council

Head of Development Management
Buckinghamshire Council
Aylesbury Vale Area Office
The Gateway
Gatehouse Road
Aylesbury
HP19 8FF

Tel: 01296 585679

Email: devcontrol.av@buckinghamshire.gov.uk

Milton Keynes Council

Director of Planning & Transport
Department of Planning and Transport
Milton Keynes Council
Civic Offices
1 Saxon Gate East
Central Milton Keynes
MK9 3EJ

Tel: 01908 252358

Email: dcadmin@milton-keynes.gov.uk

2. APPLICATION SITE AND PROJECT DESCRIPTION

Application Site

- 2.01 The Application Site covers an area of 144.85 Ha and is located to the west of Far Bletchley, at the south western edge of Milton Keynes. The boundary of the Site is formed by the A421 (H8 Standing Way) and Buckingham Road (A4034) to the north, the disused former Oxford to Bletchley rail line to the south (due to be reopened as part of the East West Rail project), Whaddon Road to the west, and a field to the east with the existing residential area of Far Bletchley beyond. Weasel Lane – an existing bridleway and cycle route – cuts through the site from Whaddon Road to Buckingham Road. There are other public rights of way across the site, including the Milton Keynes Boundary Walk.
- 2.02 The Site currently comprises agricultural land. There are hedgerows and trees at some of the field boundaries. There are a few existing buildings on the site, which are farm buildings. There are also a number of adjoining buildings that are in residential use.
- 2.03 An oil pipeline crosses the middle of the site in a north south direction; a 30m wide exclusion zone for the pipeline is incorporated into the layout of the Proposed Development. There are high voltage overhead power lines crossing the north western part of the site; the power lines will be placed underground as part of the Proposed Development. An intermediate pressure gas main passes through the eastern part of the site in a north south direction; the gas main will fall within land set aside for the grid road reserve.

The Surrounding Area

- 2.04 The Application Site straddles the boundary between the rural hinterland of Aylesbury Vale and the urban area of Milton Keynes. To the north is the industrial area of Snelshall West and to the east is the established residential area of Far Bletchley. To the west and south of the site is farmland and open countryside. The village of Newton Longville is located to the south of the site.
- 2.05 The Application Site is located adjacent to Milton Keynes, which is a main centre in the region providing significant employment opportunities and containing a broad range of services and facilities. The Proposed Development includes walking, cycling and public transport infrastructure and facilities, which would connect to the existing networks in the surrounding area.
- 2.06 The surrounding area possesses an undulating land form characterised by a ridge running across the central length of the site from east to west. The predominant topographic features are shallow ridges and valleys sloping away from this focal ridge line, which run broadly on a south west alignment.
- 2.07 The Application Site is well connected on a local, sub-regional and regional scale. The A421 immediately north of the site enables connections to the established Milton Keynes grid road network, also linking to the A5 and M1 which provide connections to the wider city and region respectively and form part of the Strategic Road Network. To the west, the A421 links to the A43 which connects the M40 to the south with Northampton, Kettering, Corby and Stamford to the north. Via the A43, the A421 also connects the site to the M40 corridor between London and Birmingham.
- 2.08 The surrounding area possesses an undulating land form which is characterised by a ridge that runs across the central length of the Application Site from east to west. The predominant topographic features of the

surrounding area are shallow ridges and valleys sloping away from this focal ridge line, which runs broadly on a south west alignment.

Sensitive Receptors

- 2.09 The likely significant effects of the Proposed Development, both during construction and once completed, have been considered in the various ES technical studies. The potential sensitive receptors are identified in **Table 2.1** below.

Table 2.1 Potential Sensitive Receptors

CATEGORY	SENSITIVE RECEPTOR / LAND USE
	Properties within the Application Site and in neighbouring residential areas including:
Land Use	<ul style="list-style-type: none"> Residents at Chase Farm, Lower Salden Farm, The Leys Farmhouse, and Bletchley Leys Farmhouse; and Residents on the edge of Bletchley, Far Bletchley, and Newton Longville.
Cultural Heritage	<ul style="list-style-type: none"> Newton Longville Conservation Area; Listed Buildings; Areas of Archaeological Interest including late prehistoric/Roman settlements within the Application Site; and Areas of ridge and furrow.
Agricultural Land	<ul style="list-style-type: none"> Agricultural land quality comprising Grade 3a and sub-Grade 3b; and Three existing farm businesses (two full-time and one part-time).
Ecology	<ul style="list-style-type: none"> Milton Keynes Wildlife Corridor Wetland and Woodland within the Application Site Railway Sidings east of Salden Wood/83F08 Semi-natural woodland Mature trees Hedgerows Great Crested Newts Bats Reptiles Breeding and Overwintering Birds Badgers
Landscape and Visual	<ul style="list-style-type: none"> Newton Longville Conservation Area; Landscape Character Areas of Newton Longville – Stoke Hammond Claylands, Whaddon Chase, and Horwood Claylands; Users of footpaths on Midshires and Swan's Way, Weasel Lane, Milton Keynes Boundary Walk, and at Cowpasture Farm and around Newton Longville; Residents at Chase Farm, Lower Salden Farm, The Leys Farmhouse, and Bletchley Leys Farmhouse; and Residents on edge of Bletchley, Far Bletchley, and Newton Longville.
Transport, Movement and Access	<ul style="list-style-type: none"> Vehicles, pedestrians and cyclists using the local highway network, including at: A421 (Standing Way);

	<ul style="list-style-type: none"> • Whaddon Road; • Weasel Lane; • Milton Keynes Boundary Walk; and • Other Rights of Way.
Water	<ul style="list-style-type: none"> • Existing watercourses at the Application Site and in the vicinity; • Tattenhoe Brook; • Tributary of River Ouzel; and, • Field drains

Project Description

2.10 The ES relates to an Application for planning permission for the following:

Outline planning application with all matters reserved except for access for a mixed-use sustainable urban extension on land to the south west of Milton Keynes to provide up to 1,855 mixed tenure dwellings, including 60 extra care units (C3); an employment area (B1) including provision for a 6GP surgery (D1); a neighbourhood centre including retail (A1/A2/A3/A4/A5), community (D1/D2) and residential (C3) uses; a primary school; a grid road reserve; multi-functional green space; a sustainable drainage system; and associated access, drainage and public transport infrastructure.

Updated Development Parameters

2.11 The Development Parameters are defined on the following plans are submitted for approval:

- Site Location Plan (Drawing No. CSA/4857/111);
- Illustrative Masterplan (Drawing No. CSA/4857/121 RevE);
- Development Framework Parameter Plan (Drawing No. CSA/4857/100 RevK);
- Proposed Access Designs (see Appendix G within the Transport Assessment – ES **Appendix 10.1**).

2.12 The following updated Application drawings are submitted for information:

- Open Space Parameters Plan (Drawing No. CSA/4857/113 RevC);
- Residential Density Plan (Drawing No. CSA/3857/119 RevC);
- Proposed Building Heights Plan (Drawing No. CSA/4857/114 RevC);
- Landscape Character Areas Plan (Drawing No. CSA/4587/121 RevD);
- Landscape Strategy Plan (Drawing No. CSA/4587/105 RevE);
- Key Structural Elements Plan (Drawing No. CSA/4587/120 RevE); and
- Public Transport Plan (Drawing No. CSA/4857/117 RevC)

2.13 A summary of the Development Parameters is provided below.

Overall Development Concept

2.14 The rationale for the design and layout of the Proposed Development is described in more detail in the **Design & Access Statement**. In summary, the form and layout of the Proposed Development is strongly influenced by the principles that have governed the planned expansion of Milton Keynes. The Proposed Development has been designed to be a new standalone neighbourhood, which follows the place-shaping principles identified in Policy SD15 of adopted Plan:MK.

2.15 The proposed land uses are shown in **Table 2.2** below

Table 2.2 Proposed Land Uses

LAND USE	AREA (HA)
Allotments	1.18
Employment inc. GP Surgery (D1)	2.07
Green Infrastructure	53.97
Grid Road Reserve	7.28
Infrastructure	2.20
Neighbourhood Centre inc. Community Uses and Retail Uses	0.67
Primary School	3.00
Secondary School	5.12
Secondary School Open Space	1.69
Water Attenuation	7.74
Residential (C3) (1,795 dwellings)	53.00
Extra Care Housing (C3) (60 dwellings)	0.90
Sub-Total	138.82
Highway Improvements	6.03
Total	144.85

2.16 The Development Framework Parameter Plan (Drawing No. CSA/4857/100 RevK) shows the proposed distribution of uses across the Site. The proposed distribution of uses is as follows:

- Residential on southern part of site and in north western quadrant
- Mixed-use in north eastern part of site, comprising employment, neighbourhood centre and residential uses including the extra care housing.
- Employment uses in north eastern part of site, opposite Snelshall West employment area, in a visible location and providing good access to the A421 and the wider strategic highway network.
- Land for a Primary School located towards the centre of the site, making it accessible to all future residents of the Proposed Development.
- Land for a Secondary School on the eastern boundary of the site, providing good access to and from existing and proposed residential areas and also good connections to the highway network and walking, cycling and public transport networks.
- The main areas of open space, sport and recreation are located in the centre of the site, making them accessible to all future residents of the Proposed Development, and with good connections to existing cycling and pedestrian routes. The formal sport and recreation areas comprise a local park and district park, football pitches, a cricket pitch, tennis courts, a Multi-Use Games Area (MUGA), and a skateboard park.
- A number of children's play areas have been provided throughout the site, within and close to the proposed residential areas.
- Allotment land is provided in the north eastern corner of the site.
- New highway access points at two locations on the A421 comprising an 'at grade' roundabout located on Buckingham Road that would cater for all traffic movements and a left turn 'access only' slip further west along Standing Way.
- A new 'Ghosted Right Turn' access that would cater for all traffic movements off Whaddon Road to the south east of Bottledump roundabout.
- Public Rights of Way that traverse the Application Site, comprising Weasel Lane; the Milton Keynes boundary walk; and a north/south route (Footpath 19) that continues south under the disused railway towards Newton Longville.

- Land within the Application Site for a Grid Road Reserve located towards the eastern part of the site, which would enable a continuation of V1 Snelshall Street to the north west of Tattenhoe roundabout.

Employment

- 2.17 The Proposed Development includes 2.07 hectares of land for employment uses, comprising small scale starter business units. There is a need and demand for these types of units in Milton Keynes, and they are not typically provided within the established employment areas or in Central Milton Keynes at rental levels that suit small businesses. It is appropriate to include small scale employment uses within the mix of uses provided at a sustainable urban extension. The employment provided within the Proposed Development would represent a marginal employment location which would not divert jobs or businesses from the main industrial and employment areas, as explained in the updated Employment Assessment submitted with this Planning Application.

Retail

- 2.18 The proposed neighbourhood centre would include a small convenience store, intended to meet the day to day needs of future residents. The convenience store would be part of a local centre alongside other retail, service and community uses; all neighbourhoods within Milton Keynes include a neighbourhood centre. The proposed convenience store would not be a supermarket attracting customers from elsewhere in Milton Keynes or the surrounding area. It is anticipated that most future residents of the Proposed Development would continue to shop at the existing supermarkets for their main weekly food shopping, as explained in the updated Retail Assessment.

Grid Road Reserve

- 2.19 The adopted development plan for AVDC and MKC includes a requirement for a link road between the A4146 and A421. It is understood that both Councils have an aspiration for the link road to be delivered, and it is also desirable politically. The link road would remove through traffic from the surrounding villages, which would be a benefit for the existing residents of those villages. The Proposed Development reserves sufficient land to accommodate a dual carriageway grid road, providing a link between Snelshall Street (V1) under the proposed East West railway line and connecting to the A4146 Stoke Hammond By-pass. The land has been reserved within the Application Site, but the link road would in due course be designed and delivered by third parties and not the SWMK Consortium.

Density

- 2.20 The Proposed Development includes a variety of residential densities, as shown on the Residential Density Parameter Plan (Drawing No. CSA/4857/119 RevC). The average density is 36 dwellings per hectare (dph). Lower densities are proposed at the more sensitive boundaries, and higher densities close to the primary routes and at the neighbourhood centre. The variety of densities across the site is as follows:
- 25 to 30 dph – southern, western and eastern edges in more visually sensitive locations
 - 30 to 35 dph – within less visible locations at the Site
 - 35 to 40 dph – towards centre and north of Site adjacent to primary routes
 - 40 to 45 dph - close to neighbourhood centre
 - 66 dph – for extra care housing

Building Heights

2.21 The height of buildings within the Proposed Development is shown on the Building Heights Parameter Plan (Drawing No. CSA/4857/114 RevC). The plan shows the maximum building heights within the Proposed Development. The proposed building heights for the different uses are as follows:

- Residential Areas: 2 to 2.5 storeys (up to 10m) for most of Site, with 3 storeys (up to 11m) along primary routes and at key entrances or intersections in order to provide landmark or gateway buildings.
- Extra Care Housing: up to 13m.
- Employment Area: up to 12m, which is similar to other employment sites opposite and adjacent to A421.
- Neighbourhood Centre: up to 13m, with retail and community uses at ground floor and residential above.
- Primary School: up to 10m and two storeys for efficient use of site.
- Secondary School: up to 12m
- Changing Pavilion: up to 5.5m.

Access

2.22 The Proposed Development includes proposals to create new access points and improvements to the wider highway network, comprising the following: new highways access points to Whaddon Road, Buckingham Road, and a 'left in' only junction from A421; junction improvements to specific junctions on A421 and other key routes; financial contribution towards other highway improvements along A421 further west towards Buckingham and in the east through Milton Keynes; traffic calming on all the approach roads leading towards Newton Longville to discourage 'rat-running' and reduce vehicle speeds; speed management proposals for other local villages; and; funding to either extend an existing bus service or implement a new 'start up' service to connect the Proposed Development with Central Milton Keynes and social infrastructure. The Transport Assessment (in ES **Appendix 10.1**) includes drawings of proposed access arrangements with the public highway. Weasel Lane – an existing bridleway and Sustrans Route 51 – cuts through the Application Site from Whaddon Road to Buckingham Road. There are other public 'rights of way' across the site, including the Milton Keynes Boundary Walk. These 'rights of way' will be retained and incorporated into the Proposed Development. The Proposed Development includes walking, cycling and public transport infrastructure and facilities, which would connect to the existing networks in the surrounding area thus providing future residents with the opportunity to travel by non-car modes of transport. A Public Transport Plan (Drawing No. CSA/4857/117 RevC) is submitted with the Planning Application to indicate a bus route and the location of bus stops within the Proposed Development.

Open Space & Recreation

2.23 The open space within the Proposed Development is shown on the Open Space Parameters Plan (Drawing No. CSA/4857/113 RevC). The Proposed Development includes open space and recreation facilities within the site, including a local park and play area, formal sports pitches, tennis courts and two Multi-Use Games Area (MUGA), a skateboard park, children's play areas comprising two Neighbourhood Equipped Area of Play (NEAP) and nine Local Equipped Area of Play (LEAP), and allotments. These facilities are located where they are easily accessible to future residents within the Proposed Development and also existing residents from neighbouring areas.

Sustainability

2.24 The Proposed Development is sustainable in terms of the following: energy efficiency and carbon reduction; sustainable transport; water resource management; information and communications technology; business and employment; healthy community; social well-being and governance; landscape and biodiversity; materials,

waste and recycling; and, housing. The Sustainability Statement explains how the Proposed Development is sustainable.

Drainage

- 2.25 The majority of the site lies within Flood Zone 1 and therefore is at low risk of flooding. The north western corner of the site is within Flood Zone 3 and as such is at high risk of flooding. However the Environment Agency has no records of flooding at the site. All buildings will be located within Flood Zone 1. The Proposed Development will include sustainable drainage systems comprising green roofs, rainwater harvesting and permeable paving, and attenuation basins will be included to attenuate surface water run-off to green field rates. The Proposed Development incorporates drainage infrastructure, foul water pumping stations and statutory undertakers equipment.

Waste Management

- 2.26 The Proposed Development would generate construction, household, commercial, and organic waste. The appointed contractor will prepare a Site Waste Management Plan (SWMP). The SWMP will include measures to minimise the amount of waste generated and disposed of during the site clearance and construction phase of the Proposed Development.
- 2.27 The Proposed Development will include both internal and external waste and recycling storage facilities. These facilities will be located within the curtilage of each house and in suitably designed enclosures on ground level for flats. These facilities will be design to be convenient and easily accessible for future residents and waste collection crews. Sufficient exterior storage space will be provided to enable the installation by future residents of a home composting bin/food digester in the gardens of private houses and community composting facilities may also be an option.
- 2.28 Bring Sites will be required within the Proposed Development to provide additional recycling opportunities. Bring Sites are generally located within publicly accessible areas such as supermarkets and public car parks and typically comprise a number of containers allowing separate collection of materials for recycling.

Utilities & Infrastructure

- 2.29 The site contains a variety of utilities infrastructure. Exclusion zones are required for the oil pipeline and intermediate pressure gas main, and these areas are kept free of development within green infrastructure and highway corridors. The high voltage overhead power lines which cross the site would be placed underground as part of the Proposed Development. The relevant utility companies and statutory undertakers were contacted during the preparation of the Services & Utilities Chapter of the ES. The Application Site does not currently have utility supplies, but water, electricity, gas and telecommunications services exist in the neighbouring areas, so it would be possible for utilities connections to be made to the Proposed Development. The Proposed Development would incorporate drainage infrastructure, foul water pumping stations, statutory undertakers' equipment and surface water attenuation measures

3. POLICY CONTEXT AND ALTERNATIVES

Introduction

- 3.01 This Chapter of the ES sets out the relevant policy context for the Proposed Development, before examining the alternative sites and layout options considered. It explains how the scheme has evolved into the Proposed Development.
- 3.02 A comprehensive assessment of the Proposed Development against national and local planning policy, guidance, and legislation has been provided within the Planning Statement which accompanies the Planning Application. A summary of this assessment, insofar as it relates to the EIA and the consideration of alternative sites and layouts, is provided below.
- 3.03 This Chapter has been prepared to accord with Schedule 4, Paragraph 2, of the EIA Regulations 2017 which requires that Environmental Statements include:

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

Strategic Background and Policy Context

- 3.04 The planning background to the Application Site provides the context for the Proposed Development. The south western edge of Milton Keynes, including the Application Site, has been identified as a suitable and sustainable location for an urban extension since the early 1990s, through a series of technical studies and in former development plan documents. An urban extension to the south west of Milton Keynes was considered at a strategic level through the former Milton Keynes South Midlands Sub Regional Strategy (adopted 2005), the South East Plan (adopted 2009), the Vale of Aylesbury Proposed Submission Core Strategy (published for consultation 2009) and the Consultation Draft Salden Chase Masterplan & Delivery SPD (published for consultation 2010) processes. In all cases, the south western edge of Milton Keynes, including the Application Site, has been assessed as a suitable and sustainable location for development. The Application Site has historically been comprehensively considered for mixed use development at a strategic level, and it has been compared with realistic alternatives during those processes.

Consideration of Alternative Sites

- 3.05 The Application Site has been assessed through the site assessment and examination processes for SVALP2017, and it is proposed to be allocated as a residential-led mixed use development – Ref. D-NLV001. As part of those processes, alternative locations for an urban extension to the south and west of Milton Keynes have been considered and assessed. A summary of the outcome of the site assessment and examination processes relevant to the Proposed Development and this ES is provided below.
- 3.06 The decision to allocate the land at South West Milton Keynes in the SVALP2017 was informed by the Housing Economic Land Availability Assessment (HELAA) (January 2017), and the Sustainability Assessment Report (SA) and Technical Annex (SATA) (September 2017). As part of the site selection process, alternative locations for an urban extension to the south and west of Milton Keynes were considered and assessed, including two strategic sites.

- 3.07 The HELAA was prepared to provide a strategic overview of the availability and suitability of land for development to inform the SVALP2017. Key stakeholders were consulted in the preparation of the HELAA including landowners, developers, agents, the local community, County Council, technical experts and neighbouring authorities. The HELAA assessed 915 sites across the district for their suitability for housing and employment development. This included an assessment of 27 sites on the south and west of Milton Keynes / Bletchley. The locations of the assessed sites are shown on the South and West of Milton Keynes/Bletchley HELAA map provided in **Appendix 3.1**.
- 3.08 It was concluded in the HELAA that the Application Site was suitable. The assessment stated (at pg.249 to 250) that:
- “Suitable – Site could provide for housing and employment and other economic development uses. The site is adjacent Bletchley’s housing areas and well connected by the strategic road network. Need to achieve a satisfactory landscape/visual impact and the Council retains a concern on the need to keep land south of the railway line (different HELAA sites) open to avoid coalescence with Newton Longville village.”*
- 3.09 Another site to the south and west of Milton Keynes – Ref. WHA001: Land at Shenley Park – was also identified as suitable location for an urban extension but was not initially allocated in SVALP2017; however, following the examination hearing sessions and the Inspector’s interim findings, the Council has proposed a main modification which also allocates Land at Shenley Park for 1,150 dwellings.
- 3.10 Therefore, as part of the site assessment process for the HELAA the Application Site was assessed alongside a number of alternatives and found to be suitable for allocation as a mixed use urban extension.
- 3.11 A Sustainability Appraisal was carried out to assess the likely effects of the emerging SVALP2017 against sustainability objectives, and the Technical Annex assessed alternative options for site allocations to meet identified development needs. The Application Site was assessed alongside other sites as part of strategic development within the Milton Keynes Edge. The sites assessed were as follows: WHA001, MUR001, MUR002, NLV020, GRB002 and NLV001. The assessment of the Application Site in the SA identified positive sustainability outcomes associated with development at the Site – see pg. 20 to 30 of the SA Technical Annex (extract provided in **Appendix 3.2**).
- 3.12 Therefore, as part of the assessment against sustainability objectives for the SA the Application Site was assessed against alternative sites and found to be suitable for residential-led mixed use development.
- 3.13 Policy D-NLV001 was subject to a site specific hearing session at the VALP examination – Matter 15o. The Inspector published interim findings on 29th August 2018, to identify those issues that he considered may require modifications in order to address soundness concerns. The site allocation at South West Milton Keynes (Ref. NLV001) was not identified as a concern in the Inspector’s interim findings, which indicates that in his view, the proposed allocation is sound and should be retained. AVDC has prepared a list of suggested main modifications, which were subject to consultation during November and December 2019. Those main modifications that relate to the site allocation at South West Milton Keynes (Policy D-NLV001) are relatively minor and are associated with the detail of the Proposed Development e.g. delivery timetable, green infrastructure, noise, and flood mitigation and drainage, but do not affect the principle of the allocation or development at the site.
- 3.14 Therefore, the Application Site has been considered against a range of alternative sites, through the site assessment processes and examination process for SVALP2017 and found to be a suitable location for development. In these circumstances, alternative sites to meet development needs have been assessed and

the Application Site has been identified as a proposed allocation, suitable to accommodate a mixed use urban extension.

Consideration of Alternative Site Layouts

- 3.15 The process to establish the design and layout of the Proposed Development is described in detail in the updated Design & Access Statement, including the site context and the opportunities and influences. The design and layout evolved from an iterative design process alongside an appraisal of the physical characteristics of the Application Site and the surrounding area, site constraints and an extensive series of workshops and consultations.
- 3.16 The site analysis demonstrates that the Proposed Development area has clearly defined boundaries. The northern boundary of the site is formed by the A421 and Buckingham Road, the southern boundary by the disused former Oxford to Bletchley rail line, the western boundary by Whaddon Road, and the eastern boundary by a hedgerow, beyond which lies a public footpath followed by a rectangular field and the western built up edge of Far Bletchley. A defensible boundary would be required to the west where the site fronts open countryside, which has been addressed by strategic landscaping on the western boundary. The significant ridge line across the site provides opportunities to create views into and out of the site. The site has a varied topography, and the undulating land form creates three discrete land parcels with different characteristics. The land form also influences the drainage strategy for the site and the location of surface water attenuation within the Proposed Development. There is an existing public right of way and a bridleway/cycle route through the site, and a further public footpath adjacent to the sites eastern boundary. There is also an established road network in the surrounding area, and the Proposed Development must connect to all these existing links. The site contains existing landscape, ecological habitats, and archaeological features which would be retained within the Proposed Development. The areas of archaeological interest – two areas of late prehistoric/Roman settlement - will be preserved within the green space within the Proposed Development. The site also contains a variety of utilities infrastructure. Exclusion zones are required for a pair of existing high pressure oil pipelines which run north-south through the centre of the Application Site. These areas are kept free of development, within the green infrastructure. The high voltage overhead power lines which cross the site can be placed underground as part of the Proposed Development. The proximity of the rail line at the southern boundary requires a buffer to be retained and careful design in order to avoid any adverse noise or visual impacts. The existing features of the site have influenced the design and layout of the Proposed Development.
- 3.17 In addition to the existing physical characteristics and the various constraints and opportunities that the site presents, the development concept has also been influenced by the intrinsic functional character and structure of Milton Keynes. The Proposed Development would be a part of Milton Keynes. It would include some of the characteristic features of the City, such as self-contained residential neighbourhoods surrounded by substantial areas of open space and strategic landscaping, and it would connect to the existing grid road network. It has been designed to be a standalone new neighbourhood which follows the place-shaping principles identified in Policy SD15 of adopted Plan:MK. The design approach has been discussed with both AVDC and MKC before the Planning Application was submitted and in post-submission discussions. Therefore, there are adopted place-shaping principles for sustainable urban extensions on the edge of Milton Keynes with which the design and layout of development must comply.
- 3.18 The Illustrative Masterplan for the Planning Application has been developed through a series of pre-application discussions and workshops, through consultation as part of the current Planning Application, and most recently to accommodate amendments. Through these processes, alternative designs and layouts for the Proposed Development have been considered, which included alternatives to the distribution of uses across the site, alternatives to the location and extent of the green infrastructure and open space areas, and additional land uses. It should be noted that the evolution of the Illustrative Masterplan was described in the

original Design & Access Statement (David Lock Associates, December 2014), and the different versions of the Illustrative Masterplan were provided in the original ES.

3.19 As set out in Chapter 1, the latest version of the Illustrative Masterplan (Drawing No. CSA/4857/121 RevE) has been amended to correct the alignment of the oil pipeline, to accommodate larger surface water attenuation ponds, and to provide a care home (within Use Class C3) as part of the overall quantum of housing.

3.20 A detailed summary of how the Illustrative Masterplan has evolved is set out in Table 3.1 below. The different versions of the Illustrative Masterplan are provided in **Appendices 3.3 to 3.9**.

Table 3.1 Evolution of the Illustrative Masterplan

Masterplan Version	Date	Illustrative Masterplan Amendments
Masterplan: first draft (see Appendix 3.3)	June 2012	N/A
Masterplan: first revision (see Appendix 3.4)	April 2013	<ul style="list-style-type: none"> Community and education facilities e.g. sports hall/meeting rooms co-located. Community facilities included in neighbourhood centre Public open space amended to be consistent with policy requirements. Surface water drainage amended within open space areas.
Masterplan: second revision (see Appendix 3.5)	May 2013	<ul style="list-style-type: none"> New access provided off Whaddon Road. Indicative locations for pedestrian underpasses along grid road identified. Landscape buffer increased on southern and western edge of site. Density of development varied across the site to reflect character of adjoining areas e.g. rural area and urban edge of Milton Keynes. Ecological corridor created on the eastern edge of the site. Community facilities within school sites amended. Surface water drainage amended.
Masterplan: third revision (see Appendix 3.6)	September 2013	<ul style="list-style-type: none"> Employment area amended to accommodate small business units. Employment area relocated closer to A421 and proposed grid road, and adjacent to neighbourhood centre. Layout amended to provide views into site from key locations on the A421. Connections with Tattenhoe Park and Snelshall linear park systems improved. Secondary school included on eastern edge of site. Land safeguarded for high pressure pipelines amended.
Masterplan: final for submission (see Appendix 3.7)	September 2014	<ul style="list-style-type: none"> Neighbourhood centre relocated adjacent to employment area and on proposed main access route. Northern gateway area improved to create an attractive site entrance. Allotments relocated to be part of green infrastructure corridor through site. Additional secondary street provided to connect neighbourhood centre and primary school.
Masterplan and Parameter Plan:	June 2016	<ul style="list-style-type: none"> Site access arrangements amended.

Masterplan Version	Date	Illustrative Masterplan Amendments
revised post submission (see Appendix 3.8)		<ul style="list-style-type: none"> • Areas of green space amended on eastern edge of site adjacent to Far Bletchley. • Landscape corridor increased and bunding removed on western edge of site. • Green infrastructure e.g. woodland planting and drainage areas on southern boundary of site amended to create an east west corridor. • Number of LEAPs increased. • Size of LEAPs and NEAPs increased to meet good practice guidance. • Neighbourhood centre site amended to include land for a GP practice..
Masterplan: latest revised version (see Appendix 3.9)	March 2020	<ul style="list-style-type: none"> • 60 extra care units included in site. • Exclusion zone for the oil pipeline realigned and relocated to the west. • Green infrastructure and landscape buffer on western edge of the site amended. • Surface water attenuation ponds relocated and sizes amended. • LEAPs and NEAPs relocated; • Primary and secondary routes amended and site layout reconfigured to accommodate amendments.

- 3.21 The Application Site has been comprehensively considered for mixed use development at a strategic level, and it has been compared with realistic alternatives during that process. Alternative layouts have been considered, and the design of the Proposed Development has evolved in response to on-site constraints, feedback from consultation, necessary corrections, and changes in circumstances since the Planning Application was originally submitted.

4. ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

Introduction

- 4.01 This Chapter of the ES explains the EIA methodology and describes the ES structure and content. It provides details of the process of identifying and assessing the significance of likely environmental effects of the Proposed Development.
- 4.02 The context and conclusions of the ES are based on an assessment of the Proposed Development identified in Chapter 2, the baseline surveys, and a series of technical studies. Any cumulative and interactive effects have also been taken into account as part of this assessment process, as noted in Paragraphs 4.26 to 4.30 below and in Technical Chapters 5 to 18.

General Approach

- 4.03 The ES has been prepared in accordance with the EIA Regulations 2017 which implement European Council Directive No. 97/11/EEC (as amended). Practice guidance on EIA has also been followed, including:
- Planning Practice Guidance (PPG)
 - Guidelines for Environmental Impact Assessments, Institute of Environmental Management and Assessment (IEMA) 2004
- 4.04 The different stages of EIA are set out within Paragraph 003 (Id. 4) of the PPG, and are as follows:
- Screening
 - Scoping
 - Preparing an Environmental Statement
 - Making a planning application and consultation
 - Decision making
- 4.05 The Proposed Development was subject to screening and scoping in 2013. As set out below, the topics that were subject to assessment in the previous ES have been reassessed. However, the EIA Regulations 2017 have identified additional environmental topics that should be assessed i.e. climate change, human health and disaster management, and these topics are also included and assessed in this updated ES.

Scoping

- 4.06 The purpose of requesting a Scoping Opinion is to obtain a formal opinion from the LPA on what should be included in the ES.
- 4.07 In January 2013 a formal EIA Scoping Opinion request was submitted to AVDC – the letter and supporting documents are provided in **Appendix 4.1**. This included a Scoping Report prepared on behalf of the Applicant which set out initial thoughts on the proposed content of the ES.
- 4.08 The Scoping Report concluded that the topics that require consideration as part of the ES assessment process for the Proposed Development were as follows:
- Archaeology and Cultural Heritage;

- Agricultural Land;
- Ecology (flora and fauna);
- Landscape Character and Visual Resources;
- Hydrology and Drainage;
- Traffic, Movement and Access;
- Air Quality;
- Noise;
- Socio-Economic Issues;
- Services and Utilities; and
- Interactive and Cumulative Impacts.

- 4.09 AVDC consulted MKC, Buckinghamshire County Council and other statutory advisors on the Scoping Report. Consultation responses to the Scoping Report were provided on the following matters: waste, noise and vibration, odour, green infrastructure, historic environment, rights of way, flood risk, contaminated land and transport. With the exception of green infrastructure, waste and contaminated land, all of these matters had been identified for assessment in the Scoping Report. Green infrastructure provision is not considered to be a matter for assessment within an ES.
- 4.10 On 16th September 2013, AVDC adopted a scoping opinion which confirmed that the matters identified in the Scoping Report were those that needed to be addressed in the ES for the previous application. This letter is provided within **Appendix 4.2**. The SWMK Consortium subsequently decided to address waste and contaminated land matters; and relevant chapters have been included within this ES. Chapter 15 deals with waste and contaminated land is addressed in Chapter 16: Soil and Ground Conditions.
- 4.11 Schedule 4 of the EIA Regulations 2017 identifies the topics that should be addressed in an ES. There are three environmental topics that were not assessed in the original ES but are included in this updated ES, which are as follows: human health, climate change and disaster management. Chapter 13 of this updated ES assesses the impact of the Proposed Development on socio-economic issues including health, and a Health Impact Assessment has been prepared (see **Appendix 13.2**), to consider impacts on human health. This ES includes additional chapters on Climate Change (Chapter 17) and Disaster Management (Chapter 18) so that significant impacts on these environmental topics are assessed in accordance with the EIA Regulations 2017.

Assessment Methodology

- 4.12 The EIA Regulations 2017 stipulate that the EIA process should identify, describe and assess in an appropriate manner the direct and indirect significant effects of the proposed development on the environment, both during construction and operation. This includes the direct and indirect effects of the proposed development on:
- a) *population and human health;*
 - b) *biodiversity, with particular attention to species and habitats protected under Directive 92/43/EEC(1) and Directive 2009/147/EC(2);*
 - c) *land, soil, water, air and climate;*
 - d) *material assets, cultural heritage and the landscape;*
 - e) *the interaction between the factors referred to in sub-paragraphs (a) to (d)*
- (EIA Regulation 4(2)(e))
- 4.13 The EIA Regulations use the term “development” in place of the term “project” which is used throughout the EIA Directive. For the purposes of the EIA, the “Project” or “Development” to be assessed constitutes the

totality of the development proposed by the SWMK Consortium, parts of which fall within the administrative boundary of Buckinghamshire Council and parts of which fall within the administrative boundary of MKC. While separate aspects of the development fall to be determined by different local planning authorities, for EIA purposes they constitute a single Project or Development because those elements within Buckinghamshire Council and within MKC are functionally interdependent, in the sense that one could not (or would not) proceed without the other.

- 4.14 This Environmental Statement identifies and assesses the significance of likely environmental effects of the proposed development. The ES provides the information that may reasonably be required to enable the local planning authority or Secretary of State to come to a reasoned conclusion on the significant effects of the proposed development on the environment (NPPG, Paragraph: 038 Reference ID: 4-038-20170728).
- 4.15 Paragraph 040 (Id.4) of the PPG advises that an ES should include the information specified in Regulation 18 of the EIA Regulations 2017, and any additional information specified in Schedule 4 which is relevant to the specific characteristics of the development and to the environmental features likely to be affected.
- 4.16 The environmental effects have been evaluated against definitive standards and legislation where available. Where it has not been possible to quantify effects, qualitative assessments have been undertaken, based on available knowledge and professional judgement. Where uncertainty exists, this has been noted in the relevant assessment chapter.

Determining Significance

- 4.17 The significance of effects reflects the relationship between two factors:
- The actual change taking place to the environment i.e. the magnitude or severity of an impact; and
 - The sensitivity, importance or value of the affected resource or receptor.
- 4.18 The magnitude of an impact is often quantifiable in terms of, for example, extent of land take, or predicted change in noise levels. The sensitivity, importance or value of the resource or receptor is normally derived from:
- Legislative controls;
 - Designated status within the land use planning system;
 - The number of individual receptors such as residents;
 - An empirical assessment on the basis of characteristics such as rarity or condition; and/or
 - The ability of the receptor to absorb change.
- 4.19 Significance will generally be classified as major, moderate or minor (although each discipline uses slightly different terminology). Impacts of 'major' or 'moderate' significance are considered to equate to significant impacts in the context of the EIA Regulations.
- 4.20 The effects are also described as:
- Adverse – detrimental or negative effects to an environmental resource or receptor; or
 - Beneficial – advantageous or positive effect to an environmental resource or receptor.
- 4.21 Where an effect is considered to be not significant this is classified as 'not significant' or 'negligible'.

- 4.22 Each of the technical chapters or accompanying technical appendices provides the criteria, including sources and justifications, for quantifying the different levels of effect. Where possible, this has been based upon quantitative and accepted criteria, together with the use of value judgements and expert interpretations to establish the extent to which an effect is likely to be environmentally significant.
- 4.23 For the Proposed Development, the short to medium term effects would be those associated with the site clearance and construction phase, and principally comprise potential effects on the following: agricultural land, farm buildings, ecology, landscape, transport, air quality, noise, utilities, waste, soil and ground conditions, and socio-economic matters. The medium to long term effects would be those associated with the operational phase, and comprise potential effects on the following: ecology, landscape, transport, air quality, waste and socio-economic matters. As set out in this ES some of the effects are positive.

Baseline Conditions

- 4.24 The updated ES includes a description of the 'baseline' environmental conditions against which the significance of likely environmental effects of the Proposed Development have been assessed. The 'baseline' conditions are those that existed at or shortly before the revised Planning Application documents and updated ES were submitted, and take account of reasonably foreseeable future development including committed development and allocations or proposed allocations.

Cumulative and Interactive Effects

Cumulative Effects

- 4.25 The EIA Regulations 2017 stipulate that the likely significant effects of the proposed development on the environment must take into account the cumulative impact with other existing and/or approved development, as well as any existing environmental problems relating to areas of particular importance likely to be affected (Schedules 3 and 4).

- 4.26 While definitions of cumulative impacts vary, they are defined in this ES as:

“the impacts on the environment which result from incremental impacts of the action when added to other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time”

(United States Council on Environmental Quality, 1978, cited in IEMA, 2004).

- 4.27 Cumulative effects can arise from:

- Interactions between different effects at the same location
- Interactions of different effects over time
- Additive or multiple impacts over time or space
- Effects of a number of developments

(Carroll and Turpin, 2002)

- 4.28 In summary, cumulative impacts arising from existing, planned or committed development, as well as existing environmental problems relating to areas of particular importance, must be considered as part of the EIA process. For this ES, those cumulative impacts which collectively with the Proposed Development are likely to give rise to significant effects are as follows:

- Ecology: the remainder of development at Tattenhoe Park, the allocated development at Shenley Park, and the East West Rail project.
- Landscape: the remainder of developments at Tattenhoe Park and Newton Leys, the allocated development at Shenley Park, and the East West Rail project.
- Air Quality: the remainder of developments at Tattenhoe Park and Kingsmead South, and the allocated development at Shenley Park.
- Waste: other committed developments within and on the edge of Milton Keynes.

Interactive Effects

- 4.29 Interactive effects arise where the effects of development on one environmental topic bring about changes in another topic. These interactive effects are reviewed in each of the technical chapters of this ES. The interactive effects identified for the Proposed Development relate to water and transport. Surface water run-off, hydrocarbon pollution of groundwater and controlled water are addressed in Chapter 8: Drainage. Transport and traffic are assessed in Chapter 10, and the effects of traffic on air quality and noise are assessed in Chapter 11: Air Quality and Chapter 12: Noise and Vibration respectively.

Structure of Technical Chapters

- 4.30 Through the EIA process, the likely significant environmental effects, together with any cumulative and interactive effects, of the Proposed Development are assessed. Each key environmental topic has been assigned a separate chapter in the ES (Chapter 5 to 18), and within each of these chapters the information that will inform the EIA process has been set out in the following way:
- Introduction – a brief summary of what is considered in the chapter.
 - Planning Policy Context – a review of national and development plan policies that are relevant to the environmental topic;
 - Assessment Methodology – an outline of the methods used to undertake the technical studies with reference to legislation, published standards, guidelines, best practice and any relevant significance criteria;
 - Baseline Conditions – a description of the environmental conditions against which the likely significant environmental effects of the Proposed Development have been assessed;
 - Likely Significant Effects – the identification and assessment of the likely significant environmental effects of the Proposed Development during the construction and operational phases;
 - Mitigation Measures – the development of mitigation measures to avoid, offset or reduce the significant adverse effects of a project during the design, construction or operational phases;
 - Residual Effects – the identification of the remaining effects of the Proposed Development, after the implementation of available mitigation measures, and an assessment of the significance of those residual effects;
 - Cumulative Effects – the identification of effects which arise from the combination of effects from the Proposed Development and from other planned or committed schemes in the vicinity;
 - Interactive Effects – the identification of effects which arise from changes in one environmental receptor on another environmental receptor; and
 - Summary – a summary of the key finding of the ES chapter.

Assumptions and Limitations

- 4.31 The assumptions that have been made when preparing this updated ES are as follows:

- That the principal existing land uses adjoining the Application Site remain unchanged.
- The outline planning permission will include appropriate conditions that are sufficient to limit the Proposed Development to that which has been assessed; a list of draft conditions have been discussed and agreed.
- The planning conditions will be sufficient to control of those activities associated with the construction phase of the Proposed Development e.g. noise and disturbance.
- The S106 Agreement will include a range of planning obligations to address the impacts of the Proposed Development; a draft S106 Agreement is at an advanced stage of discussion.
- Construction will commence in 2021/22 (subject to obtaining planning permission) and the Proposed Development will be completed in by 2031.
- The Proposed Development will be constructed in accordance with the identified Development Parameters.
- The necessary off-site services infrastructure for the Proposed Development will be provided by statutory undertakers.

References

Carroll, B. and Turpin, T., 2002. Environmental Impact Assessment Handbook: A Practical Guide for Planners, Developers and Communities. London: Thomas Telford Publishing.

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Institute of Environmental Management and Assessment (IEMA), 2004. Guidelines for Environmental Impact Assessment. Lincoln: IEMA.

5. ARCHAEOLOGY AND CULTURAL HERITAGE

Introduction

- 5.01 This chapter evaluates the impacts of the proposed development on the historic environment. The historic environment includes a wide range of features resulting from human intervention in the landscape, varying in scope from buried archaeological remains up to late 20th century industrial structures. It can be divided into the following two categories:

Archaeology

- Scheduled Ancient Monuments (SMs).
- Archaeological finds and sites.
- Historic Battlefields, Shipwrecks and World Heritage Sites are not considered within this chapter because there are no such designations within the study area.

Built Heritage

- Listed Buildings (Grades I, II*, and II).
- Registered Parks and Gardens (Grades I, II* and II).
- Conservation Areas.

- 5.02 The key objectives of the historic environment assessment are to:

- Assess the likely significant effects arising from the construction of the Project on known and potential archaeological heritage assets and to evaluate the significance of the impact;
- Assess the likely significant effects of the operation of the Project on designated heritage assets including their settings; and
- Identify measures for avoiding or mitigating potential impacts; and any residual impacts following mitigation.

Legislative and Planning Policy Context

Legislation and Regulation

- 5.03 Legislation relating to archaeology and scheduled ancient monuments is contained in the Ancient Monuments and Archaeological Areas Act 1979. Legislation regarding buildings of special architectural or historic interest is contained in s.66 of the Planning (Listed Buildings and Conservation Areas) Act 1990. Section 72 of the 1990 Act provides protection for the character and appearance of conservation areas.

Local Policy

- 5.04 The 'saved' policies of the Aylesbury Vale District Local Plan (September 2007) are as follows:

GP53 – Conservation Areas

In Conservation Areas the Council will seek to preserve or enhance the special characteristics that led to the designation of the area. Proposals for development will not be permitted if they cause harm to the character or appearance of Conservation Areas, their settings or any associated views of or from the Conservation Area. Proposals for development or redevelopment must respect the historic layout, scale and form of buildings,

street patterns, open spaces and natural features in the Conservation Area that contribute to its character and appearance. Proposals for alterations, extensions and changes of use must respect and complement the character, materials and design details of the structure and site concerned and its neighbours.

GP59 – Archaeology and Ancient Monuments

In dealing with development proposals affecting a site of archaeological importance the Council will protect, enhance and preserve the historic interest and its setting. Where research suggests that historic remains may be present on a development site planning applications should be supported by details of an archaeological field evaluation. In such cases the Council will expect proposals to preserve the historic interest without substantial change. Where permission is granted for development involving sites containing archaeological remains the Council will impose conditions or seek planning obligations to secure the excavation and recording of the remains and publication of the results.

GP60 – Historic Parks and Gardens

Development proposals within or affecting a Park or Garden of Special Historic Interest should take full account of the area's historic and landscape significance. The Council will resist proposals that do not protect the distinctive characteristics of such Parks and Gardens.

- 5.05 The Proposed Submission Vale of Aylesbury Local Plan 2013-2033 (November 2017) has the following heritage policy:

BE1: Heritage Assets

The historic environment, unique in its character, quality and diversity across the Vale is important and will be preserved or enhanced. All development, including new buildings, alterations, extensions, changes of use and demolitions, should seek to conserve heritage assets in a manner appropriate to their significance, including their setting, and seek enhancement wherever possible.

Proposals for development shall contribute to heritage values and local distinctiveness. Where a development proposal is likely to negatively affect a designated heritage asset and or its setting, the significance of the heritage asset and the impact of the proposal must be fully assessed and supported in the submission of an application. Heritage statements and/or archaeological evaluations will be required for any proposals related to or impacting on a heritage asset and/or known possible archaeological site.

Proposals which affect the significance of a non-designated heritage asset should be properly considered, weighing the direct and indirect impacts upon the asset and its setting. There will be a presumption in favour of retaining heritage assets wherever practical, including archaeological remains in situ, unless it can be demonstrated that the harm will be outweighed by the benefits of the development.

The Council will:

- a) Support development proposals that would not cause harm to, or which better reveal the significance of heritage assets,*
- b) Require development proposals that cause substantial harm to, or loss of a designated heritage asset and its significance, including its setting, to provide a thorough heritage assessment setting out a clear and convincing justification as to why that harm is considered acceptable on the basis of public benefits that outweigh that harm or the four circumstance in paragraph 133 of the NPPF all apply. Where that justification cannot be demonstrated proposals will not be supported, and*

- c) *Require development proposals that cause less than substantial harm to a designated heritage asset to weigh the level of harm against the public benefits that may be gained by the proposal, including securing its optimum viable use.*

Developments affecting a heritage asset should achieve a high quality design in accordance with the District Design SPD and the Council will encourage modern, innovative design which respects and complements the heritage context in terms of scale, massing, design, detailing and use.

5.06 Milton Keynes Council Plan:MK 2016-2031(adopted March 2019) policy HE1 covers the historic environment:

Policy HE1 – Heritage and Development

A. Proposals will be supported where they sustain and, where possible, enhance the significance of heritage assets which are recognised as being of historic, archaeological, architectural, artistic, landscape or townscape significance. These heritage assets include:

- Listed Buildings;
- Conservation Areas;
- Scheduled Ancient Monuments and non-designated Archaeological sites;
- Registered Parks and Gardens;
- Assets on the MK New-Town Heritage Register; and
- Other places, spaces, structures and features which may not be formally designated but considered to meet the definition of 'heritage assets' as defined in the Annex 2 of the NPPF.

B. Where appropriate, development proposals must provide an impartial and objective Heritage Assessment. Where necessary, the Council will require suitably qualified specialists to undertake the Heritage Assessment. The Heritage assessment shall:

- i. Assess and describe the significance of the heritage assets affected, identifying those elements that contribute to that significance and, where appropriate, those that do not. The level of detail shall be proportionate to the asset's importance and no more than is sufficient to understand the potential impact of proposals on their significance. Limited and localised alterations to an unlisted building in a conservation area need not be supported by the level of detail required to convey the impact on significance caused by development in the setting of a listed building or by proposed alterations to the built fabric of a listed building.*
- ii. Be of an analytical and interpretive nature rather than simply provide a description of the assets and the proposed works.*
- iii. Provide a sound justification for the works, based on the economic, social and environmental benefits delivered by the scheme, for example, promoting the long term care for a heritage asset and/or its setting.*
- iv. Explain how the scheme has taken account of the significance of the assets in its scope, design and detail, in order to minimise or avoid harm to the heritage assets affected.*
- v. Assess the nature and extent of any harm or public benefit arising from the scheme.*
- vi. Where harm is caused by the proposal, the assessment shall explain why such harm is unavoidable or required to deliver public benefits that outweigh the harm caused.*

C. Where applications seek to change the use of a listed building, evidence should be submitted to demonstrate that the proposal includes the full scope of works required to achieve that use (such as those that will be required by Building Regulations, The Fire Authority, Environmental Health etc.). Where a change of use requires a significant alteration or structural works, an engineer's report shall be submitted to demonstrate

that the building is capable of conversion, set out the full extent of works and show how they have taken account of 2 a) above.

D. Granting of permission for proposals that result in substantial harm to or total loss of the significance of a designated heritage asset will only be exceptional or wholly exceptional in accordance with national policy and guidance.

E. Permission for proposals that cause less than substantial harm to a designated heritage asset will only be granted where the harm is demonstrably outweighed by public benefits delivered by the scheme.

F. Proposals that result in harm to the significance of non-designated heritage assets will be resisted unless the need for, and benefits of the development clearly outweigh the harm, taking into account the asset's significance and importance, and only once all feasible solutions to avoid and mitigate that harm have been fully implemented.

G. In assessing any potential harm or enhancement to the significance of a heritage asset(s) the following will be considered:

- 1. Avoiding successive small scale changes that lead to a cumulative loss or harm to the significance of the asset or historic environment;*
- 2. Respecting the character, appearance, special interest and setting of the asset and historic environment;*
- 3. Retaining architectural or historic features which are important to the character and appearance of the asset (including internal features) in an unaltered state; and*
- 4. Retaining the historic form and structural integrity of the asset.*

H. Where 'enabling development' is proposed, the Council will expect the proposal to accord with Historic England's published guidance. The applicant will provide accurate evidence to establish that a 'heritage deficit' exists. It is not the role of 'enabling development' to reimburse owners or applicants who have paid above the market value of asset, that value being based on the current condition of the asset.

I. Proposals will be accompanied by an appropriate desk-based assessment and field evaluation where development is proposed affecting an unscheduled site of known archaeological interest or with the potential to include heritage assets with archaeological interest (General requirement for applications affecting heritage assets).

J. The ability to record evidence of our past should not be a factor in deciding whether the loss of significance should be permitted. Where harm to or loss of heritage assets occurs as a consequence of development it will be necessary for developers to record and advance understanding of the significance of the affected assets in a manner proportionate to their importance and the impact (NPPF paragraph 141). Recording techniques should keep in step with current best practice and in particular the use of photogrammetry and fine grain LIDAR ground scans where unavoidable loss will occur. In the case of heritage assets of greater than local importance the results of this recording work should be published in the relevant local or period journal or in book form according to the scale and significance of the assets affected. Where significant archaeological remains are found, provision shall be made for public open days, exhibitions and/or popular publications/booklets. Where archaeological remains are within public open space appropriate on-site interpretation and a strategy for long term care (and funding thereof) shall be produced as part of a holistic approach to the long term stewardship of the open space in question and agreed with the body responsible for the same. Where recording or assessment results in a physical archive for deposition at an appropriate

museum or archive facilities, consideration of resources for its storage, interpretation and public access should be made in order to capture the heritage significance of that asset for future generations.

National Policy and Guidance

- 5.07 Government policy in relation to the historic environment is outlined in Section 16 of the National Planning Policy Framework (NPPF) (2019), entitled Conserving and Enhancing the Historic Environment. This provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 16 of the NPPF can be summarised as seeking the:
- Delivery of sustainable development;
 - Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
 - Conservation of England's heritage assets in a manner appropriate to their significance; and
 - Recognition of the contribution that heritage assets make to our knowledge and understanding of the past.
- 5.08 Section 16 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term.
- 5.09 Paragraph 189 states that planning decisions should be based on the significance of the heritage asset and that level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to understand the potential impact of the proposal upon the significance of that asset.
- 5.010 Paragraph 190 states that local planning authorities should take account of the particular significance of any heritage asset which may be affected by a proposal, and take this into account with considering any impact to avoid or minimise any conflict between the heritage asset's conservation and any aspect of the proposal.
- 5.011 The key test in NPPF Paragraphs 193-196 is whether a proposed development will result in substantial harm or less than substantial harm to the significance of a designated heritage asset. Paragraph 194 states that:
- “Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification. Substantial harm to or loss of:*
- grade II listed buildings, or grade II registered parks or gardens, should be exceptional; assets of the highest significance, notably scheduled monuments, protected wreck sites, registered battlefields, grade I and II* listed buildings, grade I and II* registered parks and gardens, and World Heritage Sites, should be wholly exceptional.”*
- 5.012 Paragraph 195 identifies the test where there would be substantial harm, and states:
- “Where a proposed development will lead to substantial harm to (or total loss of significance of) a designated heritage asset, local planning authorities should refuse consent, unless it can be demonstrated that the substantial harm or total loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:*
- a) the nature of the heritage asset prevents all reasonable uses of the site; and*

b) no viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and

c) conservation by grant-funding or some form of not for profit, charitable or public ownership is demonstrably not possible; and

d) the harm or loss is outweighed by the benefit of bringing the site back into use.”

5.013 Paragraph 196 states that:

“Where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal including, where appropriate, securing its optimum viable use.”

5.014 Paragraph 197 requires the decision-maker to take into account the effect on the significance of non-designated heritage assets and to take a balanced judgement having regard to the scale of harm or loss and the significance of the asset(s) potentially affected.

5.015 Heritage Assets are defined in Annex 2 of the NPPF as: a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage assets include designated heritage assets and assets identified by the local planning authority (including local listing).

5.016 Archaeological Interest is defined as: a heritage asset which holds or potentially could hold evidence of past human activity worthy of expert investigation at some point.

5.017 Designated Heritage Assets comprise: World Heritage Sites, Scheduled Monuments, Listed Buildings, Protected Wreck Sites, Registered Park and Gardens, Registered Battlefields and Conservation Areas designated under the relevant legislation.

5.018 Significance is defined as: The value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

5.019 Setting is defined as: the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

5.020 The NPPF is supported by the PPG (July 2019). Paragraph 18a-001 (001 Reference ID: 18a-001-20190723) makes a clear statement that any decisions relating to listed buildings and their settings and conservation areas must address the statutory considerations of the Planning (Listed Buildings and Conservation Areas) Act 1990 as well as satisfying the relevant policies within the development plan and the National Planning Policy Framework.

5.021 In relation to the historic environment, paragraph 002 (002 Reference ID: 18a-002-20190723) states that:

“Where changes are proposed, the National Planning Policy Framework sets out a clear framework for both plan-making and decision-making in respect of applications for planning permission and listed building consent to ensure that heritage assets are conserved, and where appropriate enhanced, in a manner that is consistent

with their significance and thereby achieving sustainable development. Heritage assets are either designated heritage assets or non-designated heritage assets.”

5.022 Paragraph 18a-013 (Paragraph: 013 Reference ID: 18a-013-20190723) outlines that although the extent and importance of setting is often expressed in visual terms, it can also be influenced by other factors such as noise, dust and vibration. Historic relationships between places can also be an important factor stressing ties between places that may have limited or no intervisibility with each other. This may be historic as well as aesthetic connections that contribute or enhance the significance of one or more of the heritage assets.

5.023 Paragraph 18a-013 concludes:

“The contribution that setting makes to the significance of the heritage asset does not depend on there being public rights or an ability to access or experience that setting. This will vary over time and according to circumstance. When assessing any application for development which may affect the setting of a heritage asset, local planning authorities may need to consider the implications of cumulative change. They may also need to consider the fact that developments which materially detract from the asset’s significance may also damage its economic viability now, or in the future, thereby threatening its on-going conservation.”

5.024 Paragraph 18a-017 (Paragraph: 018 Reference ID: 18a-018-20190723) of the PPG provides additional guidance on substantial harm. It states:

“What matters in assessing whether a proposal might cause harm is the impact on the significance of the heritage asset”. As the National Planning Policy Framework makes clear, significance derives not only from a heritage asset’s physical presence, but also from its setting.

“Proposed development affecting a heritage asset may have no impact on its significance or may enhance its significance and therefore cause no harm to the heritage asset. Where potential harm to designated heritage assets is identified, it needs to be categorised as either less than substantial harm or substantial harm (which includes total loss) in order to identify which policies in the National Planning Policy Framework (paragraphs 194-196) apply.

Within each category of harm (which category applies should be explicitly identified), the extent of the harm may vary and should be clearly articulated.

Whether a proposal causes substantial harm will be a judgment for the decision-maker, having regard to the circumstances of the case and the policy in the National Planning Policy Framework. In general terms, substantial harm is a high test, so it may not arise in many cases. For example, in determining whether works to a listed building constitute substantial harm, an important consideration would be whether the adverse impact seriously affects a key element of its special architectural or historic interest. It is the degree of harm to the asset’s significance rather than the scale of the development that is to be assessed. The harm may arise from works to the asset or from development within its setting.

While the impact of total destruction is obvious, partial destruction is likely to have a considerable impact but, depending on the circumstances, it may still be less than substantial harm or conceivably not harmful at all, for example, when removing later additions to historic buildings where those additions are inappropriate and harm the buildings’ significance. Similarly, works that are moderate or minor in scale are likely to cause less than substantial harm or no harm at all. However, even minor works have the potential to cause substantial harm, depending on the nature of their impact on the asset and its setting.”

5.025 Paragraph 18a-020 of the PPG (Paragraph: 020 Reference ID: 18a-020-20190723) outlines what is meant by public benefits, which is relevant to the paragraph 196 test which requires less than substantial harm to the significance of a heritage asset to be weighed against public benefits, as follows:

“Public benefits may follow from many developments and could be anything that delivers economic, social or environmental objectives as described in the National Planning Policy Framework (paragraph 8). Public benefits should flow from the proposed development. They should be of a nature or scale to be of benefit to the public at large and not just be a private benefit. However, benefits do not always have to be visible or accessible to the public in order to be genuine public benefits, for example, works to a listed private dwelling which secure its future as a designated heritage asset could be a public benefit.

Examples of heritage benefits may include:

- sustaining or enhancing the significance of a heritage asset and the contribution of its setting;
- reducing or removing risks to a heritage asset; and
- securing the optimum viable use of a heritage asset in support of its long-term conservation.”

5.026 In short, Government policy provides a framework which:

- Protects nationally important designated heritage assets;
- Protects the settings of such designations;
- In appropriate circumstances seeks adequate information (from desk-based assessment and field evaluation where necessary) to enable informed decisions; and
- Provides for the excavation and investigation of heritage assets to be lost (wholly or in part) in a manner proportionate to their importance and the impact from the development, and to make this evidence publicly accessible.

Historic Environment Good Practice Advice in Planning Note, Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015)

5.027 The purpose of this document is to provide information to assist local authorities, planning and other consultants, owners, applicants and other interested parties in implementing historic environment policy in the NPPF and NPPG. It outlines a six-stage process to the assembly and analysis of relevant information relating to heritage assets potentially affected by a proposed development:

- Understand the significance of the affected assets;
- Understand the impact of the proposal on that significance;
- Avoid, minimise and mitigate impact in a way that meets the objectives of the NPPF;
- Look for opportunities to better reveal or enhance significance;
- Justify any harmful impacts in terms of the sustainable development objective of conserving significance and the need for change; and
- Offset negative impacts on aspects of significance by enhancing others through recording, disseminating and archiving archaeological and historical interest of the important elements of the heritage assets affected.

Historic Environment Good Practice Advice in Planning Note 3 The Setting of Heritage Assets (Second Edition) (Historic England 2017)

- 5.028 Historic England's Historic Environment Good Practice Advice in Planning Note 3 (Second Edition) provides guidance on the management of change within the setting of heritage assets.
- 5.029 The document restates the definition of setting as outlined in Annex 2 of the NPPF. Setting is also described as being a separate term to curtilage, character and context; while it is largely a visual term, setting, and thus the way in which an asset is experienced, can also be affected by noise, vibration, odour and other factors. The document makes it clear that setting is not a heritage asset, nor is it a heritage designation, though land within a setting may itself be designated. Its importance lies in what the setting contributes to the significance of a heritage asset.
- 5.030 The Good Practice Advice Note sets out a five-stage process for assessing the implications of proposed developments on setting:
- Identification of heritage assets which are likely to be affected by proposals;
 - Assessment of whether and what contribution the setting makes to the significance of a heritage asset;
 - Assessing the effects of proposed development on the significance of a heritage asset;
 - Maximising enhancement and reduction of harm on the setting of heritage assets; and
 - Making and documenting the decision and monitoring outcomes.

Assessment Methodology

- 5.031 The assessment involved the following key tasks:
- A 1km search radius was carried out from the proposed development site boundary for non-designated and designated archaeological remains.
 - An archaeological desk-based assessment was produced in 2014 in support of the previous planning application in accordance with the ClfA Standards and Guidance for Archaeological Desk-based Assessments (2014). Sources reviewed included: Buckinghamshire Historic Environment Record (HER), National Monuments Record, historic cartographic and documentary sources at the Buckingham Record Office and the British Library, and unpublished material from recent nearby archaeological investigations (Appendix 5.1). This document has not been updated as the results of the subsequent geophysical survey and evaluation trenching of the site has superseded the conclusions of the original desk-based assessment;
 - Archaeological geophysical survey (Appendix 5.2). This survey included an area wider than the application site both to the east and west of the proposed development. The full report has been included to aid the results being placed in their wider context;
 - Archaeological evaluation trenching (Appendix 5.3). This survey included an area wider than the application site both to the east and west of the proposed development. The full report has been included to aid the results being placed in their wider context;
 - A 1km search radius of search from the proposed development boundary for all listed buildings (grade I, grade II* and grade II);
 - A 1km of radius search the proposed development boundary for all conservation areas;
 - A 500m of radius search the proposed development boundary for all registered parks and gardens (grades I, II* and II); and
 - World Heritage Sites, registered battlefields and protected wrecks were not included as there are no such designated heritage assets within the search area.

Assessing the Magnitude of Impact

5.032 The criteria for assessing the magnitude of the predicted impact is given in Table 5.1 below.

Table 5.1 Criteria for Assessing Magnitude of Impact on Historic Environment Receptors

MAGNITUDE	IMPACT
Major	<ul style="list-style-type: none"> • Total or substantial loss of the significance of a heritage asset. • Substantial harm to a heritage asset's setting such that the significance of the asset would be totally lost or substantially reduced (e.g. the significance of a designated heritage asset would be reduced to such a degree that its designation would be questionable; the significance of an undesignated heritage asset would be reduced to such a degree that its categorisation as a heritage asset would be questionable).
Moderate	<ul style="list-style-type: none"> • Partial loss or alteration of the significance of a heritage asset. • Considerable harm to a heritage asset's setting, such that the asset's significance would be materially affected/considerably devalued, but not totally or substantially lost.
Minor	<ul style="list-style-type: none"> • Slight loss of the significance of a heritage asset. This can include the removal of fabric that forms part of the heritage asset, but that is not integral to its significance (e.g. the demolition of later extensions/additions of little intrinsic value). • Some harm to the heritage asset's setting, but not to the degree that it would materially compromise the significance of the heritage asset. • Level of harm perceivable, but insubstantial relative to the overall interest of the heritage asset.
Negligible	<ul style="list-style-type: none"> • A very slight change to a heritage asset. This can include a change to a part of a heritage asset that does not materially contribute to its significance. • Very minor change to a heritage asset's setting such that there is a slight impact not materially affecting the heritage asset's significance.
No Impact	<ul style="list-style-type: none"> • No change to a heritage asset or its setting.

5.033 The sensitivity of the heritage asset will depend on factors such as the condition of the asset and its perceived heritage value and significance. The sensitivity of the heritage asset is defined by its significance in terms of national, regional or local statutory or non-statutory protection and grading of the asset. Table 5.2 sets out the criteria for assessing sensitivity.

Assessing the Sensitivity of Receptors

5.034 The criteria for assessing the sensitivity of receptors is given in Table 5.2 below.

Table 5.2 Criteria for Assessing Sensitivity of Receptors

SENSITIVITY	RECEPTORS
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Very High	<ul style="list-style-type: none"> • World Heritage Sites
High	<ul style="list-style-type: none"> • Scheduled Monuments & Areas of Archaeological Importance • Archaeological sites of schedulable quality & significance • Listed buildings (all grades) • Registered Historic Parks and Gardens (all grades) • Historic Battlefields
Medium	<ul style="list-style-type: none"> • Local Authority designated sites e.g. Conservation Areas and their settings • Undesignated sites of demonstrable regional importance
Low	<ul style="list-style-type: none"> • Sites with significance to local interest groups. • Sites of which the significance is limited by poor preservation and poor survival of contextual associations.

5.035 The sensitivity of the receiving environment, together with the magnitude of change, defines the significance of the effect (table 5.3). Impacts of 'major' or 'moderate' significance are considered to equate to significant impacts in the context of the EIA Regulations.

Determining the Significance of Effect

5.036 The criteria for assessing significance of effect is given in Table 5.3 below.

Table 5.3 Matrix for Determining the Significance of Effect

SENSITIVITY	Very High	Major	Major	Moderate	Minor	No impact
	High	Major	Moderate	Minor	Negligible	
	Medium	Moderate	Minor	Negligible	Negligible	
	Low	Minor	Negligible	Negligible	Negligible	
		Major	Moderate	Minor	Negligible	No Impact
MAGNITUDE OF IMPACT						

Baseline Conditions

5.037 At the time the archaeological desk-based assessment of the site was undertaken, the Buckinghamshire Historic Environment Record contained little evidence to suggest that the site contained significant archaeological remains (Appendix 5.1). However, this absence of data was in contrast to the findings of archaeological investigations to the north of the A421 in Milton Keynes. Therefore, this lack of evidence was considered to be more of a product of the lack of systematic survey within the site rather than a genuine absence of archaeological remains. So as to better assess the archaeological potential of the site, a geophysical survey was undertaken comprising a magnetic susceptibility survey of the entire site and an area to the east and west of the application site boundary followed by detailed magnetometer survey of a 20% sample of the survey area. The results of the geophysical survey are presented in Appendix 5.2.

- 5.038 Following completion of the geophysical survey, consultations with Buckinghamshire County Council were undertaken regarding the need and scope of archaeological evaluation trenching. The scope of works agreed comprised 2% of each area of the geophysical survey that identified actual or potential anomalies of archaeological origin as well as a buffer around each one to establish whether the edge of the remains identified in the geophysical survey was real. Trenches were also excavated along the line of the A421 as this follows the line of a Roman road and also alongside Weasel Lane. The evaluation was undertaken in accordance with a Written Scheme of Investigation that had been approved by Buckinghamshire County Council. Regular meetings were held on site with Buckinghamshire County Council during the evaluation fieldwork. The results of the evaluation trenching are presented in Appendix 5.3.
- 5.039 The location of Buckinghamshire and Milton Keynes Historic Environment Records (HER) sites referred to are shown on Figure 3 (in Appendix 5.1). The numbering is based on the numbering of the geophysical survey areas. The numbering of the sites and finds identified in the desk-based assessment is labelled in the key as "SMR Sites and Finds" (23- 38).

Designated Heritage Assets

- 5.040 There are no scheduled ancient monuments within the site.
- 5.041 The nearest scheduled monument is a fishpond in Water Spinney c. 400m to the north of the site in Tattenhoe (SAM no 19018, Site 23). This monument comprises a substantial earthen dam which now forms the northern boundary of Water Spinney, standing up to 1.5m high and extending north-west to south-east for some 100m. The pond is probably contemporary with the remains of the deserted medieval village of Tattenhoe which formerly occupied much of the area to the north-west of the SAM.
- 5.042 The scheduled remains of Tattenhoe deserted medieval village, moated site and fishponds lie c. 1km to the north of the proposed development site (SAM 19009).
- 5.043 There are no listed buildings within the site. There are a number of listed buildings within Newton Longville Conservation Area which will be considered as part of the conservation assessment rather than as individual buildings.
- 5.044 There are no conservation areas within or immediately adjacent to the proposed development site. The nearest conservation area is Newton Longville which is c. 850m to the south of the site at its nearest point.

Early Prehistoric

- 5.045 There are no recorded early prehistoric remains within the proposed development site. Neither the geophysical survey nor the evaluation trenching of the site revealed any pre-Iron Age features. Bronze Age/Iron Age pottery sherds were found in trench 34 which is located within Area 4 of the geophysical survey and trenching programme near the centre of the site (Appendix 5.2 & 5.3).
- 5.046 Evidence for early prehistoric remains in the study area is limited to Mesolithic worked flints c. 700m to the north (Site 24) and c. 1.5km to the southwest (Site 25). A single Neolithic stone axe has been recorded c. 750m to the north west (Site 26).

Iron Age/Roman

- 5.047 Archaeological investigations at Tattenhoe Park to the north of SWMK have revealed the remains of a middle to late Iron Age open settlement (Site 27). This settlement comprised at least 21 roundhouses, an area of copper working and possibly grain storage. The settlement was partially enclosed in the late Iron Age.
- 5.048 The geophysical survey revealed a number of settlement/enclosure complexes within the site that, although at the time were undated, were considered to be of Iron Age and/or Roman in date (Areas 18 and 22 in the geophysical survey report Appendix 5.2). These were all targeted during the evaluation trenching. The numbering system used in the trenching programme was different from the geophysical survey (which had considered a much larger area than the proposed development site). Area 1 equates to Area 22 of the geophysical survey and Area 2 equates to Area 18 of the geophysical survey.
- 5.049 The geophysical survey recorded a relatively large series of rectangular and irregular enclosures with internal divisions and features in the western part of the site (Area 4) which were interpreted as a being prehistoric/Roman settlement. The evaluation trenching revealed a series of enclosures, ditches and other features spanning the Late Iron Age/Roman transitional period into the 4th century AD, thereby confirming the presence of a late Iron Age/Roman settlement. These remains are more coherent and better preserved than the nearby findings of the evaluation and therefore are considered to be of regional significance and therefore are of moderate sensitivity.
- 5.050 The geophysical survey failed to reveal any coherent remains that could be interpreted as potentially prehistoric in date in the northern half of the site. This could be due to this part of the site being on a north facing slope and therefore less attractive for settlement than the south facing slope on which the sites described above are located. Therefore, while it is possible that there are further as yet unrecorded remains in the northern part of the site, the potential for this is considered to be limited.
- 5.051 A pit containing Roman pottery and a 1st century coin was recorded during an excavation of an Anglo-Saxon cemetery ahead of the construction of the A421, toward the north western corner of the site (Site 35). Whether this was a single isolated feature or was part of a larger Roman site is not known. However, the geophysical magnetic susceptibility survey of the site failed to reveal any probable hotspots adjacent to these features; therefore, it is considered unlikely that this pit was part of a larger settlement that extends further south into the development site.
- 5.052 The cropmark of a rectangular enclosure along with a possible ring ditch is recorded on the Buckinghamshire HER within of the proposed development site (Area 2 in the evaluation trenching report). The geophysical survey confirmed the presence of two rectangular enclosures with possible internal divisions and features at this location and the trenching subsequently confirmed that these are of late prehistoric/possibly Roman in date. These remains are considered to be locally important and therefore are of low sensitivity.
- 5.053 Geophysical survey recorded a circular enclosure attached to two linear features radiating to the north and the south adjacent to a 'D' shaped enclosure with an entrance within the centre of the proposed development site. The evaluation (Area 3) established that there are two enclosures present of middle Iron Age and later prehistoric date as well as a middle Iron Age linear ditch. These remains are considered to be locally important and therefore are of low sensitivity.
- 5.054 The results of the evaluation fall into a pattern recorded in the wider area which appears to have been a relatively densely occupied landscape in Roman times. Roman remains recorded in the wider study area include the route of a Roman road leading from the small town of Magiovinium (to the east) to Alchester (to the west) which the A421 (i.e. just within the northern boundary of the study area) follows.

- 5.055 A small Roman settlement/farmstead was recently recorded at Snelshall East, immediately to the north of the A421/ Buckingham Road roundabout (Site 28). This had been heavily truncated by ploughing and so was not fully understood but was interpreted as a settlement and its field system.
- 5.056 A 1st - 3rd century industrial site comprising a smelting hearth/kiln used for iron smelting, up to two timber framed buildings, pits, ditches, along with associated pottery, a coin and an inhumation burial, was recorded during the bulldozing of a former gravel pit and rubbish dump c. 700m to the south (Site 29). A probable settlement has also been recorded c. 600m to the north (Site 30) comprising a spread of pottery, tile, tegula, and a quern stone. The site has not been subject to intrusive archaeological investigation and therefore, the exact nature and extent of this site has not been fully established.
- 5.057 A number of isolated Roman finds have been recorded in the vicinity of the study site such as pottery to the west (Site 31) and a 4th century coin to the south (Site 32). Roman pottery sherds have been recorded c. 400m to the north east (Site 33) and c. 200m to the north (Site 34).
- 5.058 Geophysical survey of an area to the south east of the development site has identified a small Roman settlement comprising of ditched enclosures, pits and a possible hearth/kiln, all associated with a spread of Roman pottery and tile.
- 5.059 Sherds of Roman pottery and a piece of tile had been recorded c. 1km the southeast of the site beside the railway. A geophysical survey of the area has confirmed this interpretation as a series of rectangular enclosures suggestive of settlement which, due to the presence of the Roman pottery sherds, is considered likely to be Roman in date.

Saxon - Early Medieval

- 5.060 The study site is located away from the historic centres of the nearby villages which may have had Saxon origins. However, a metal detecting survey and an excavation ahead of the construction of the A421 at Bottle Dump Corner, just within the north eastern corner of the site, recorded the remains of an Anglo-Saxon cemetery (Site 35). Five adult inhumations burials, all aligned north-south were recorded along with grave goods comprising two spearheads, an iron knife, an unidentified copper object, an iron pin and, glass and amethyst beads. The grave goods were generally of 6th - 7th century date and therefore, the burials were pagan. The cemetery lies alongside the route of the Roman road and therefore it is possible that it has a direct association with the road which would probably have still been in use in the 6th - 7th century. The geophysical survey and the evaluation trenching revealed no anomalies or features that could be interpreted as the cemetery extending southwards into the site.
- 5.061 The only other records of Saxon/early Medieval finds in the vicinity of the study site is a single Edward the Elder penny (899-925 AD) (Site 34) and an early Medieval stud (Site 36).
- 5.062 The geophysical survey and trenching failed to reveal any remains that could be interpreted as potentially Saxon in date within the site.

Medieval

- 5.063 The study area was originally to the south east of Whaddon Chase which originated as a hunting chase possibly soon after the Norman Conquest and from c. 1242 became a hunting forest. The Chase persisted until it was enclosed in the early 19th century; however, it is clear that it was subject to partial and piecemeal enclosure prior to this. To the west of the site, beside Thrift Wood, lay within Whaddon Case. The rest of the

site lay to the southeast of the chase throughout the Medieval and post Medieval periods and would have lain within the open fields of Bletchley and Newton Longville.

- 5.064 Examination of aerial photographs of the site reveal the ploughed remains of large areas of ridge and furrow within the site. Ridge and furrow was recorded in all detailed geophysical survey areas.
- 5.065 The non-scheduled earthwork of a moated site lies c.1km to the southwest of the study site (Site 37). The site is presumed to be of Medieval date. It was formerly within a wood called Lodge Coppice and therefore, it may have contained the keeper's lodge.
- 5.066 The lack of recorded Medieval finds on the site and located within a 500m radius indicate that SWMK has low potential for Medieval remains other than remains of an agricultural nature which are of local and therefore low sensitivity.

Post-Medieval

- 5.067 The first map which shows the site at a reasonable and relatively accurate scale, is a plan of the demesne of Salden dated 1599. The detail shown of the development site is limited. However, at this time, Weasel Lane is depicted. The majority of the site lies within an area labelled as 'Part of Bletchley' and 'Part of Bletchley Fields' but has no detail depicted. At this time, Bletchley and Newton Longville would have possessed their Medieval open fields system as would have been evidenced by the extensive remains if this ridge and furrow had been not largely been ploughed out.
- 5.068 Jeffery's Map of Buckinghamshire (1770) (Figure 6 in Appendix 5.1) and Bryant's Map of Buckinghamshire (1825) (Figure 7 in Appendix 5.1) both depict the site as being in open countryside with the north western corner being within a large block of woodland.
- 5.069 The area was enclosed between 1813 and 1841 and the existing field boundaries reflect the enclosure layout albeit with many field boundaries removed. The 1885 OS map depicts the site essentially the same as it is today (Figure 8 in Appendix 5.1), since which time there has been a steady loss of field boundaries especially to the south of Weasel Lane (Figures 9 and 10 in Appendix 5.1).
- 5.070 The site lies within an area defined in the Buckinghamshire & Milton Keynes Historic Landscape Characterisation Report (2006) as 19th century parliamentary enclosure. Parliamentary enclosure is the dominant historic landscape character of Aylesbury Vale and is considered as being of medium sensitivity and has a medium capacity to absorb change. As stated above, there has been significant hedgerow reduction within the site to the south of Weasel Lane which has resulted in essentially 20th century prairie fields of little historic value.

Listed Buildings

- 5.071 There are no listed buildings within the site. The nearest listed building is Lower Salden Farmhouse (Grade II) located within a farm complex c. 1.5km to the southwest of the site. It is a mid to late 18th century property constructed of red and vitreous brick. The property has 19th century casements at first floor and small dormers in the roof. At ground floor, alteration is evident in so far as new upvc windows have been added at some time in the past. There is also a c.20th century extension to the east and a c.19th century lean-to to the rear (north-west). Modern prefabricated buildings lie to the north, west and south of the farmhouse; landscaped gardens lie to the east, along with an access road to the farmhouse complex from the east. These represent the core setting of the farmhouse. The wider setting of the farmhouse complex comprises agricultural fields which surround it. The development site lies beyond the wider setting of the farmhouse.

- 5.072 A number of listed buildings are within Newton Longville Conservation Area and will be considered below as part of the conservation area rather than individually.
- 5.073 There are a number of listed buildings located within the built up area of Newton Longville that are outside of the Conservation Area. These are The Crooked Billet (grade II NHLE 1216033), Haldins (NHLE 1216035), Hollybush Farmhouse (grade II NHLE 1216298), Rose Cottage (grade II NHLE 1216351), Ivy Lodge Farmhouse (grade II NHLE 1287692), Jasmine Cottage (grade II NHLE 1287666), September Cottage (grade II NHLE 1216032) and Paradise Farmhouse (grade II NHLE 1216272). These buildings are all located within the built up area of the village and their settings are contained within their immediate vicinity. The site therefore is located outside of the settings of these designated heritage assets.

Conservation Areas

- 5.074 Newton Longville Conservation Area comprises a small area centred on the Whaddon Road, Bletchley Road, Drayton Road and Stoke Road junction and incorporates buildings such as St Faith's Church, Newton Longville Manor House and historic development around Church End and the village green. The conservation area forms the historic core of the much larger essentially modern village. The modern expansion of Newton Longville has removed what would have been the former rural character of the village. There are number of listed buildings within the conservation area and to the west at Westbrook End. The Newton Longville Conservation Area Appraisal (2006) provide the following description of the conservation area itself, its setting and key vistas:

Despite its size, the Conservation Area boundary contains two areas of distinct identity. Enclosing the north-eastern side of the village green is a collection of modest vernacular properties which form a mixture of one and a half to two storey semi-detached and detached buildings, situated towards the front of their plots. Historically many of these buildings housed local trades. Mainly converted to domestic use, several small businesses and a public house still attract people to the green reinforcing its former role as the economic focus of the village.

In contrast, the properties located at the north-eastern end of Drayton Road are substantial in scale and set within sizeable grounds. They include Newton Longville Manor House, the Old Rectory and Parsonage, St. Anne's Grange and the Village School. Not only do these buildings provide visual landmarks, which help to create a strong sense of place, but they also represent the higher status buildings within the architectural hierarchy of the village. This clearly demarcated juxtaposition of vernacular and polite architecture in such a compact area is a key characteristic of the Conservation Area.

The former rural character of Newton Longville has to a large extent been lost through the impact of more recent development. However, the mature trees, hedges and grass verges concentrated around the churchyard and grounds of Newton Longville Manor still provide a connection with the wider rural landscape. This grouping of trees helps to locate the Conservation Area in distant views of the village from the south-east and within the boundary their natural forms provide a contrast with the sharp outline of the buildings.

Although not physically located at the centre of Newton Longville, the Conservation Area is perceived as the historic nucleus of the village. This small area contains the junction of four of the five arterial routes through the settlement and encloses the principal economic, social and religious focuses to community life. In a village which has grown and changed substantially during the last century the Conservation Area retains tangible connections with the past and possesses a distinct identity and sense of place which makes it worthy of designation.

Views into and out of the historic cores of Newton Longville changed significantly during the latter half of the 20th century with the development of the village. Modern housing has enveloped the area around the village green, Drayton Road and Westbrook End with the effect that formerly extensive views into these areas have been enclosed or destroyed. Distant views of the Conservation Area are limited and only visible from the area to the south-east of Newton Longville and south-west of Stoke Road.

Views out of the Conservation Area are also limited although, due to the elevated position of the village, long distance views of the rural landscape to the south-east of Newton Longville are visible from the village green. New development has restricted views within the historic core of the village and this has resulted in the formerly strong connection between the built and natural environment being severed. Today there is limited evidence of Newton Longville's previous rural character.

Most views within the Conservation Area focus upon or are truncated by buildings. St. Faith's church is the most visually prominent building and is an important landmark within the village. Significant views of the church are gained from Whaddon Road and Church End. Other visually prominent buildings include St. Anne's Grange and the Old Parsonage and Old Rectory located on the eastern side of Drayton Road.

Within the Conservation Area there are also a number of glimpsed views between buildings or across boundaries. These views have a more intimate and private character and include views from Drayton Road across the grounds of the Manor to the Manor building and between St. Anne's Grange and The Old Rectory to the trees located along their rear boundaries. This latter view provides an attractive backdrop to the buildings and forms a connection between the built environment and the adjacent rural landscape.

Likely Significant Effects

Designations

- 5.075 There are no scheduled ancient monuments, listed buildings, conservation areas, registered parks and gardens, battlefield sites or World Heritage Sites within the development site. Therefore, there will be no direct impacts on the significance of designated historic assets.
- 5.076 The proposed development lies beyond the setting of Lower Salden Farmhouse (Grade II) which lies 1.5km to the southwest of the site. The proposed development will have no effect on the setting or significance of the house.
- 5.077 The Newton Longville Conservation Area is entirely surrounded by late 20th century development except from the western edge of the conservation area along Whaddon Road. The proposed development will be visible in long distance views from Whaddon Road from within the Conservation Area. The proposed development will not be visible from elsewhere within the Conservation Area. Therefore, there will be minor magnitude of change within the periphery of the setting of the Conservation Area which will not result in any change to the significance of the Conservation Area itself.

Non-Designated Archaeological Remains

- 5.078 The presence of the two areas of late prehistoric/Roman settlement identified during the geophysical survey and evaluation trenching have been taken into account during the design stage of the proposed development. The intention has been to avoid or at the least limit the impact upon these remains, where possible. Taking each area in turn, the impacts will be as follows:

Area 3

The remains at this location comprise two enclosures indicative of a small settlement or field system which is considered to be of local significance. The area has been allocated as open space. The open space will not require significant ground works to complete and consequently, there will be a negligible impact upon these remains.

Area 4

The remains at this location comprise a number of enclosures, pits and ditches of a late Iron Age/Roman date which are considered to be of local significance. This area has been allocated as open space with a NEAP and LEAP. The western edge of the site lies within playing fields of the proposed primary school. The open space and the playing fields will not require significant ground works to complete and, consequently, there will be a negligible impact upon these remains.

- 5.079 It is possible that there may be as yet unrecorded archaeological remains within the application site beyond the areas that were evaluated. It is considered unlikely that there are any remains of national or regional importance that have not been detected by the geophysical survey and trenching that would require preservation in-situ.
- 5.080 Hedgerows within the site are being retained and therefore there will be a negligible effect on the parliamentary enclosure field system.
- 5.081 Weasel Lane is the oldest surviving feature of the historic landscape within the site and is considered to be of regional significance and therefore is considered to be of medium sensitivity. The retention of Weasel Lane in a largely unaltered form has been one of the principal objectives of the design of the development framework plan. Weasel Lane will be retained unaltered except for where internal roads cross the lane in up to three places. Therefore, the proposed development will have a minor impact on this important feature of the historic landscape.
- 5.082 The proposed development will be largely screened from Newton Longville Conservation Area by the 20th century built area of the village. Long distance views toward the south eastern end of the development will be possible from the Whaddon Road from within part of the Conservation Area. The topography of the site will block any views of the development beyond Weasel Lane. Therefore, the proposed development result in a slight change on the periphery of the setting of the western edge of the Conservation Area. However, this will have no material effect on the character and significance of the Conservation Area.
- 5.083 The proposed development is located beyond the setting of the listed buildings located in Newton Longville and outside of the Conservation therefore will have no impact upon their significance.

Mitigation Measures

Designations

- 5.084 There are no mitigation measures required.

Non-Designated Archaeological Remains

- 5.085 A watching brief will be undertaken on the construction of the development in areas close to the two areas of archaeological potential. The purpose of this is to record any peripheral archaeological features that may be associated with the four possible settlement areas.

Residual Effects

Designations

- 5.086 As described above, the proposed development will have a slight impact on views from the western edge of Newton Longville Conservation Area. Therefore, the proposed development result in a slight change on the periphery of the setting of the western edge of the Conservation Area. However, this will have no material effect on the character and appearance or the significance of the Conservation Area.
- 5.087 The proposed development will have no residual effects in the significance of the listed buildings located within Newton Longville.

Non-Designated Archaeological Assets

- 5.088 Once the mitigation measures outlined above have been implemented, no further archaeological work will be required. The residual impact of the development will be that the two areas of late prehistoric/Roman settlements and enclosures will be preserved in situ for the local community and future generations. There may be a negligible residual effect in the long-term at the local level on any peripheral archaeological features close to the two areas of archaeological potential.

Cumulative Effects

Designations

- 5.089 It is not considered that there will be any cumulative impacts on designated heritage assets from the proposed development in conjunction with other developments in the area or in combination with other impacts from the proposed development.

Non-Designated Archaeological Assets

- 5.090 The proposed development would destroy any peripheral archaeological features close to the two areas of archaeological potential, should they be identified through the watching brief. Therefore, there will be no cumulative effects with other sites or developments elsewhere.

Summary

- 5.091 The potential impacts of the proposed development have been considered utilising existing information contained in the Buckinghamshire and Milton Keynes Historic Environment Records, Newton Longville Conservation Area Review, the Buckinghamshire & Milton Keynes Historic Landscape Characterisation Report and DEFRA Magic Map. A geophysical survey and archaeological evaluation have also been undertaken, the scope of which was agreed with Buckinghamshire County Council.
- 5.092 This has enabled the potential direct and indirect impacts of the proposed development on designated and non-designated historic assets to be assessed. The geophysical survey and evaluation trenching have identified two areas of late prehistoric/Roman settlement within the development site. It is considered that the evaluation programme already undertaken has identified all significant archaeological remains within the site.
- 5.093 The proposed development has been designed so as to enable the two settlement areas to be preserved within open space and school playing fields. Consequently, the proposed development will have a negligible impact on non-designated archaeological heritage assets.

- 5.094 As mitigation, an archaeological watching brief will be implemented on the areas of the development closest to the two areas of prehistoric/Roman settlement remains so as to enable any peripheral remains that may be associated with these settlements to be recorded.
- 5.095 There are no scheduled ancient monuments, listed buildings, conservation areas, registered parks and gardens, battlefield sites or World Heritage Sites within the development site. Therefore, there will be no direct impacts on the significance of designated historic assets.
- 5.096 The proposed development will have a slight impact on views from the western edge of Newton Longville Conservation Area. This will result in a slight change on the periphery of the setting of the western edge of the Conservation Area. However, this will have no material effect on the character and significance of the Conservation Area.
- 5.097 The proposed development is located behind the setting of all listed buildings within the wider environs and therefore will have no effect on their significance.
- 5.098 The historic landscape of the site is essentially that of 19th century parliamentary enclosure which has subsequently suffered from significant hedgerow loss. This is the dominant historic landscape character of Aylesbury Vale and therefore when viewed in the wider district context, the proposed development will have a negligible impact upon this landscape type.
- 5.099 In the light of the above, the proposed development will have a minor impact upon the historic environment. These impacts will be mitigated as outlined above as a condition of planning permission.

References

Department of Communities and Local Government. 2019. Planning Practice Guidance

Department for Communities and Local Government. 2019. National Planning Policy Framework

Historic England. 2015. Historic Environment Good Practice Advice in Planning: 2 – Managing Significance in Decision-Taking in the Historic Environment

Historic England. 2017. Historic Environment Good Practice Advice in Planning Note 3 – The Setting of Heritage Assets

6. AGRICULTURAL LAND

Introduction

- 6.01 This Chapter assesses the likely significant effects of the Proposed Development, upon agricultural land and agricultural businesses. It considers policy set out in the National Planning Policy Framework (2019). This assessment considers the quality of the agricultural land lost due to the development and the impacts of the proposal on the occupying farm businesses.
- 6.02 The Proposed Development area extends to approximately 144.85 hectares, of which most is agricultural land. The agricultural land is primarily in arable use with a small area of grassland on the northern boundary. The Site is occupied by three farm businesses under a variety of tenures.

Legislative and Planning Policy Context

Legislation and Regulation

- 6.03 The Town and Country Planning (Development Management Procedure) (England) Order 2015 sets out the requirements for consultation with Natural England where development of agricultural land is proposed. The Order states that Local Authorities should consult with Natural England where *“development which is not for agricultural purposes and is not in accordance with the provisions of a development plan involves the loss of not less than 20 hectares of grades 1, 2 and 3a agricultural land which is for the time being used (or was last used) for agricultural purposes”* or where the loss of less than 20 hectares of BMV agricultural land *“is likely to lead to a further loss of agricultural land amounting cumulatively to 20 hectares or more”* (bullet point ‘y’ of schedule 4).

Statutory Development Plan

- 6.04 Adopted Local Planning Policy is contained within the saved policies of the Aylesbury Vale District Local Plan (January 2004), and the adopted Plan: MK (March 2019).
- 6.05 The adopted Plan: MK (2019) has a policy on the “Protection of the Best and Most Versatile Agricultural Land”. Policy NE7 states that:

“In assessing proposals for the development of greenfield sites, the Council will take into account the economic and other benefits of the best and most versatile agricultural land. Development involving the loss of agricultural land should seek to use areas of poorer quality land (grades 3b, 4 and 5 of the Agricultural Land Classification) in preference to that of a higher quality unless other sustainability considerations suggest otherwise”.

- 6.06 There are no policies relating to the development of agricultural land in the Aylesbury Vale District Local Plan (2004).

National Planning Policy Framework

- 6.07 National planning policy governing the non-agricultural development of agricultural land is set out in the National Planning Policy Framework (2019) (the NPPF). Paragraph 170 of the NPPF states that *“planning policies and decisions should contribute to and enhance the natural and local environment by”* inter alia

“recognising the intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land.” Annex 2 of the NPPF advises that the best and most versatile agricultural land is land in Grades 1, 2 and 3a of the Agricultural Land Classification.

- 6.08 Paragraph 171 states that *“Plans should: distinguish between the hierarchy of international, national and local designated sites; allocate land with the least environmental or amenity value where consistent with other policies in this Framework”*. Footnote 53 notes that *“where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality”*.

Emerging VALP

- 6.09 Emerging policy is set out in the Submission version of the Vale of Aylesbury Local Plan. Policy NE8 (as proposed to be modified) states that:

“Subject to the development allocations set out in the VALP, the Council will seek to protect the best and most versatile farmland for the longer term. Proposals involving development of agricultural land shall be accompanied by an assessment identifying the Grades (1 to 5) Agricultural Land Classification. Where development involving best and most versatile agricultural land (Grades 1, 2 and 3a) is proposed, those areas on site should be preferentially used as green open space and built structures avoided. Where significant development would result in the loss of best and most versatile agricultural land, planning consent will not be granted unless:

- a. There is no otherwise suitable sites of poorer agricultural land that can accommodate the development, and*
- b. The benefits of the proposed development outweighs the harm resulting from the significant loss of agricultural land.”*

Assessment Methodology

Scope of the assessment

- 6.010 The assessment has considered the two key agricultural circumstances. These are the effects of the Proposed Development on:
- agricultural land; and
 - farm businesses.

Method of Baseline Data Collection

- 6.011 Baseline data has been collected by:
- vii. Collection and review of all known Agricultural Land Classification (ALC Survey) information which identified that detailed ALC data exists for the site;
 - viii. Review of aerial photography and OS maps;
 - ix. Telephone interviews with the farming occupiers to update information obtained during site visits made in 2008 and 2014, and updated in 2018, 2019 and 2020.

Identification of Sensitive Receptors

- 6.012 The relevant receptors have been identified as agricultural land quality (a receptor of potentially national importance) and the affected farm businesses (being a transient receptor, i.e. they can change over time in order to react to external influences, these are of local importance) **Assessment Criteria**
- 6.013 The assessment of potential effects as a result of the Proposed Development has taken into account both the construction and operational phases of the Proposed Development. The significance level attributed to each effect has been assessed based on the magnitude of change and the sensitivity of the affected receptor/receiving environment to change.
- 6.014 There are no standard guidance / assessment criteria for assessing the effects on agricultural receptors. The criteria set out in the Tables below are based upon professional judgement and historic discussions with other agricultural consultants and officers from the Department for the Environment Food and Rural Affairs.

Assessing the Magnitude of Impact

- 6.015 The criteria for assessing the magnitude of the predicted impact is given in **Table 6.1** below.

Table 6.1 Criteria for Assessing Magnitude of Impact on Agricultural Receptors

MAGNITUDE	IMPACT	
	Soils	Agricultural Businesses
Major	The proposed development would directly lead to the loss of over 50 hectares of “best and most versatile agricultural land” (Grades 1, 2 and 3a).	The impact of the development would render a full-time agricultural business non-viable.
Moderate	The proposed development would directly lead to the loss of between 20 and 50 hectares of “best and most versatile agricultural land” (Grades 1, 2 and 3a).	The impact of the development would require significant changes in the day-to-day management of a full-time agricultural business.
Minor	The proposed development would directly lead to the loss of less than 20 hectares of “best and most versatile agricultural land” (Grades 1, 2 and 3a) or would directly lead to the loss of 5 ha or more of lower quality agricultural land (Grades 3b, 4 or 5).	Land take would require only minor changes in the day-to-day management / structure of a full-time agricultural business or land take would have a significant effect on a part-time business.
Negligible	The proposed development would directly lead to the loss of less than 5 hectares of poorer quality agricultural land.	Land take would require only negligible changes in the day-to-day management of a full-time agricultural business or land take would require only minor changes to a part-time farm business.
No Impact	No loss of agricultural land.	No impact on farm businesses.

Assessing the Sensitivity of Receptors

6.016 The methodology for determining the sensitivity of the receptors is set out in **Table 6.2** below. No receptors are considered to be of “very high” significance. BMV agricultural land is considered to be of “high” significance, but as it accounts for over 40% of agricultural land in England (Natural England, TIN049 (2012)), it is not of “very high” sensitivity. Poorer quality land is considered to be of medium sensitivity, and farm businesses are considered to be of medium or low sensitivity depending upon their full-time or part-time nature.

Table 6.2 Criteria for Assessing Sensitivity of Receptors

SENSITIVITY	RECEPTORS
Very High	No agricultural resources fall within this category.
High	Land resources are matters of potentially national importance. National planning policy towards the development and protection of agricultural land is contained in paragraphs 170 & 171 of the Framework. The effect on land resources is a combination of the quantum and quality of agricultural land affected, relative to both the national resource and the relative availability of land of that quality locally. Land resources that are of the best and most versatile quality should therefore be classified as being of high environmental value (sensitivity).
Medium	Land that is of poorer quality, Grades 3b, 4 and 5, is of lower sensitivity and is afforded no special protection in the NPPF. It is nevertheless a finite resource of local importance and so is regarded as of moderate sensitivity. Full-time farm businesses are of medium sensitivity, as the way that farms are operated will vary over time according to ownership, security of tenure and local and international economic factors. Farm businesses are tolerant of some change without detriment to their character.
Low	Part-time farm businesses are of low sensitivity. The way that farms are operated will vary over time according to ownership, security of tenure and local and international economic factors. Farm businesses are tolerant of some change without detriment to their character.

Determining the Significance of Effect

6.017 The significance of effect is determined by the magnitude of impact and the sensitivity of the affected receptor / receiving environment to change as set out in **Table 6.3**. An effect of Moderate Significance or above is considered to be Significant in EIA Terms.

Table 6.3 Matrix for Determining the Significance of Effect

SENSITIVITY	Very High	N/A	N/A	N/A	N/A	No impact
	High	Major	Moderate	Minor	Minor	
	Medium	Moderate	Minor	Minor	Negligible	

	Low	Minor	Minor	Negligible	Negligible	
		Major	Moderate	Minor	Negligible	No Impact
		MAGNITUDE OF IMPACT				

6.018 Two key areas of impact have been identified:

- Impacts on agricultural land quality, i.e. the effects of the loss of agricultural land as a national resource; and
- Impacts on farm businesses, i.e. the effects of the non-agricultural development on the viability of farm businesses operating within the Proposed Development Area.

6.019 These impacts can be split down into construction phase and operational phase impacts.

6.020 Construction phase impacts have been identified as:

- Effects on the national resource of agricultural land. This effect will be permanent and will continue throughout the operation of the proposal; and
- Effects on farm size and structure. Again this impact will be permanent and will continue throughout the operation of the proposal.

6.021 The following effects have been identified as being operational phase impacts:

- Effects of trespass.

Baseline Conditions

6.022 The Site is located to the east of Whaddon Road, to the south of the A421 and to the north of the Oxford to Bletchley railway line.

6.023 The site is primarily agricultural land and is broadly sub-divided by the Weasel Lane ridge into two segments; north and south. The application site contains two isolated farm buildings and a small group of dilapidated traditional farm buildings.

Agricultural Land Quality

6.024 The Agricultural Land Classification (ALC) system divides land into five grades according to the extent to which inherent characteristics can be exploited for agricultural production. Grade 1 is described as being of excellent quality and Grade 5, at the other end of the scale is described as being of very poor quality. ALC is based upon an assessment of limiting factors, including soils, climate and other physical limitations and the way in which these factors interact. The current MAFF system was last revised in 1988.

6.025 The application site is shown on the 1:25,000 published Provisional Agricultural Land Classification Map (MAFF 1976) as being of Grades 3 and 4 quality. Since these “provisional” maps were produced, there have been changes to the classification including the sub-division of Grade 3 to include Subgrades 3a and 3b. The effects of the interaction between climate and soils are now more clearly stated, which puts the land quality more clearly into the local context.

- 6.026 As the provisional maps cannot be relied upon for assessing land quality of a particular site, enquiries were made to Natural England regarding the availability of any published ALC survey work.
- 6.027 Natural England provided a copy of an ALC survey which was carried out by the FRCA in 1998. This covers the entirety of the Site. The survey identified mainly Subgrade 3b land with small areas of better quality land which fell into the Subgrade 3a category. The moderate quality (3b) land is limited by soil wetness and significant wetness/workability problems. The better quality land is described as having lighter textures or as soils with calcareous topsoils.
- 6.028 The findings of the FRCA survey are attached at **Appendix 6.1** and a breakdown of Grades across the Site is set out in **Table 6.4** below. The remaining 9.5 hectares of land comprise of non- agricultural land, e.g. highways land, woodland etc.

Table 6.4 Distribution of ALC Grades across the Site

ALC Grade	Area (Hectare)	Area (%)
1 Excellent		
2 Very Good		
3a Good	16.2	11.2
3b Moderate	118.8	82.2
4 Poor		
5 Very Poor		
Other	9.5	6.6
Total	144.5	100

Farming Circumstances

- 6.029 The Site was last inspected on foot in March 2014, however recent (May 2018) Google imagery has been viewed as part of this assessment and telephone interviews have been undertaken with the farming occupiers in 2018, 2019 and March 2020.
- 6.030 The site forms part of three farming entities.

- 6.031 **Unit A** is a substantial mixed arable and livestock enterprise operating from a main farm unit approximately 12 miles away. The farm operates mostly as an arable farm, but includes a beef breeding unit at the main farm. The farm includes both owned and rented land.
- 6.032 Within the site the land farmed is all cropped for arable purposes. In addition the business crops the arable land within Unit B. There is a small grain store within the site that is used for temporary storage in connection with the harvesting of this land.
- 6.033 **Unit B** is a smallholding of approximately 19.5 ha occupying the land under a secure AHA tenancy. The enterprise is based in Newton Longville and operates on a part-time basis. Some of the land within the site is grassland used for making hay. The arable land within the site is farmed on contract by Unit A. There is a small range of old buildings within the site no longer suitable for agricultural use.
- 6.034 **Unit C** is a full-time farm business and has occupied this land for 20+ years. The farm extends in total to about 250 ha, of which approximately 9% falls within the site, comprising a single arable field. There are no farm buildings within the site.

Likely Significant Effects

Construction Phase Impacts

Effects on the National Resource of Agricultural Land

- 6.035 The Site comprises predominately of Grade 3b agricultural land with small patches of good quality Grade 3a land. Only the Subgrade 3a land, which extends to approximately 16.2 hectares, falls into the “best and most versatile agricultural land quality” category. The magnitude of impact on the national resource of agricultural land as a result of the irreversible development of 16.2 hectares of “BMV” agricultural land is considered to be minor adverse. BMV agricultural land is a receptor of high sensitivity. The significance of effect is Minor Adverse.

Effects on Farm Size and Structure

- 6.036 The development will involve the loss of land from three occupying agricultural businesses.
- 6.037 **Unit A.** The land is partly owned, partly rented. The proposed development involves all of the land farmed near Milton Keynes. Overall the affected land comprises approximately 17% of the area farmed, and accordingly is a significant reduction in farmed area. However this land is located some considerable distance from the principal farm, and whilst it will affect farming operations it will not prejudice the ability of the holding to continue to farm in a viable and sustainable manner. The loss of the farm building within the site will not affect the farming operations of any other land as it is used only in connection with this holding.
- 6.038 **Unit B.** Unit B is a smallholding of approximately 19.5 ha, of which 16 ha falls within the site. The land within the site is rented, and is used for arable purposes (farmed on contract by the neighbours) and a small amount of hay production. The hay is made using contractors. The farm buildings are no longer used. Whilst there will be a considerable reduction, proportionately, of area the farming activities based at the main farm can continue, although additional fodder will have to be bought in. The overall impact on this part-time farm business will be considerable, but will not prejudice the ability of the farm to continue.
- 6.039 **Unit C.** This land is occupied by a full-time farming business that operates over about 250 ha of land locally. The land within the proposed development is rented land that has been farmed for over 20 years. It comprises

an arable field with no farm buildings. Accordingly the effect of development will be to reduce the farmed area, but will not result in any severance or other impacts. The loss of this land will reduce the current farmed area by about 9% but this will not prejudice the ability of the holding to continue to farm in a viable and sustainable manner.

6.040 Therefore the effects are assessed as follows:

- Unit A: The proposed development will result in a significant effect on a full-time farm business and thus an impact of moderate magnitude on a receptor of medium sensitivity. This results in an effect of Minor Adverse Significance;
- Unit B: The proposed development will result in a significant effect on a part-time farm business and thus an impact of minor magnitude on a receptor of low sensitivity. This results in an effect of Negligible Adverse Significance;
- Unit C: The proposed development will result in a significant effect on a full-time farm business and thus an impact of moderate magnitude on a receptor of medium sensitivity. This results in an effect of Minor Adverse Significance.

Operational Phase Impacts

- 6.041 Once in operation the non-agricultural use of sites can lead to the spread of trespass onto neighbouring agricultural land. The spread of such trespass can prohibit the full agricultural exploitation of adjacent land.
- 6.042 The presence of strong physical boundaries on all sides, together with the open space proposals, will restrict trespass. The potential magnitude of impact of trespass is deemed to be negligible, and as farm businesses are of medium or low significance the Significance of Impact is Negligible.

Mitigation Measures

- 6.043 It is not possible to mitigate the loss of agricultural land. However as identified in Planning Policy Guidance soils have a number of important functions beyond the support and growth of plants. These include improved drainage, supporting ecosystems and providing green areas for communities to use and enjoy. In order to sustain these basic functions, it is important that appropriate consideration is given to the soil resource on any development site, as if it is not managed carefully during the construction and ground preparation phases, these functions can be lost.
- 6.044 “The Construction Code of Practice for Sustainable Use of Soils on Construction Sites” is a practical guide to assist managers of construction sites in protecting the soil resources with which they work. The Code is not legally binding, but by using it, the soil resource at a Site may be enhanced and wider environmental benefits may be achieved. For example, careful movement of soil during ground preparation including the timing of land work and storage of soils for after use, will provide materials in better condition for landscaping and will also help natural site drainage.
- 6.045 British Standard 3882-2015 also provides specifications for the handling of topsoil including the stripping and retention of topsoil, its storage and its spreading and subsoil grading and preparation.
- 6.046 There is no need for any mitigation in relation to the impacts on farm businesses.

Residual Effects

- 6.047 As set out above there is nothing that can be done to mitigate the loss of agricultural land. Accordingly the residual impacts remain as set out above.

Construction Phase Impacts

Effects on the National Resource of Agricultural Land

- 6.048 The Site comprises predominately of Grade 3b agricultural land with small patches of good quality Grade 3a land. Only the Subgrade 3a land, which extends to approximately 16.2 hectares, falls into the “best and most versatile agricultural land quality” category. The magnitude of impact on the national resource of agricultural land as a result of the irreversible development of 16.2 hectares of “BMV” agricultural land is deemed to be minor adverse. As agricultural land is a receptor of high sensitivity, the significance of effect is Minor Adverse.

Effects on Farm Size and Structure

- 6.049 The magnitude of impact of the proposal on Units A, B and C is moderate or minor adverse. As these farm businesses are of medium or low sensitivity the significance of effect is Minor Adverse (Units A and C) or Negligible (Unit B).

Operational Phase Impacts

Effects on the National Resource of Agricultural Land

- 6.050 There are no further effects on agricultural land during the operational phase.

Effects on Farm Size and Structure

- 6.051 The effects on farm businesses following the completion of the Proposed Development resulting from potential trespass are of negligible magnitude, and consequently of Negligible significance.

Cumulative Effects

- 6.052 There are no cumulative impacts on agricultural resources.

Summary

- 6.053 This Chapter considers the effects on soils and other agricultural factors of the non-agricultural development of approximately 144.5 hectares of predominately agricultural land on the south-western edge of Milton Keynes.

Baseline Conditions

- 6.054 The Site was the subject of a detailed ALC survey in 1998. The survey identified the majority of the site to comprise of Grade 3b land (118.8 hectares) and three small areas (collectively amounting to 16.2 hectares) of Grade 3a land. The remaining 9.5 hectares comprises of non-agricultural land.
- 6.055 The Site is predominately in arable use with a small area of permanent pasture land. The site is occupied by three farm businesses.

Likely Significant Effects

- 6.056 The Proposed Development involves the loss of less than 20 hectares (16.2 hectares) of “best and most versatile agricultural land”. Accordingly the magnitude of impact of the loss of this quantity of BMV land is minor adverse. The significance of effect is Minor Adverse.
- 6.057 The Site is farmed by three separate businesses and forms part of three units. The magnitude of impact on the two full-time occupying businesses is moderate adverse and on the part-time business is minor adverse. As farm businesses are a receptor of moderate (full-time) or low (part-time) sensitivity the significance of effect in all cases is Minor Adverse or Negligible.

Mitigation and Enhancement

- 6.058 There is nothing that can be done to mitigate against the loss of agricultural land. There is no need for any mitigation in relation to the occupying farm businesses. One will remain operating off-site as a viable business and the second is already only a part-time business.

References

British Standard 3882-2015 *Specification for Topsoil*

Department for Communities and Local Government. February 2019 *National Planning Policy Framework*,

Department of the Environment Food and Rural Affairs. 2009 *The Construction Code of Practice for the Sustainable use of Soils on Construction Sites*.

MAFF 1988 *The Agricultural Land Classification of England and Wales: Revised Guidelines and Criteria for Grading the Quality of Agricultural Land, 1988*

Natural England. 2018 *Guide to Assessing development proposals on agricultural land*.

Department for Communities and Local Government. 2015. *The Town and Country Planning (Development Management Procedure) (England) Order*.

7. ECOLOGY

Introduction

- 7.01 This chapter assesses the likely significant effects of the proposed development in terms of Ecology and Nature Conservation.
- 7.02 The chapter describes the assessment methodology; the baseline conditions at the assessment site and surroundings; the likely significant environmental (ecological) effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed. Cumulative ecological effects in combination with other relevant local projects are also assessed where relevant.
- 7.03 This Chapter (and its associated figures and appendices) should be read together with the remainder of the ES and in conjunction with **Appendices 7.1 to 7.10** which provide detailed survey findings, information and plans upon which the assessment is based.
- 7.04 Ecological survey work was originally carried out at the Site in 2002, then between 2006-2009, 2012-2014 and finally 2018-2020. This breadth of survey information allows for a robust assessment of the Site's ecological importance and condition, as well as the likely significant effects of the proposed scheme. The most recent survey work conducted between March and April 2020 confirmed that the Site remains fundamentally as characterised in previous surveys, allowing the breadth of data collected since 2002 available to be relied upon as accurately reflecting the baseline position.

Legislative & Planning Policy Context

Legislation & Regulation

- 7.05 There are several pieces of legislation relating to wildlife and biodiversity. Those that are of particular relevance to ecology in the context of development are the Conservation of Habitats and Species Regulations 2017 (as amended), which enacts the Habitats and Birds Directives into UK law, the Wildlife and Countryside Act 1981 (as amended) and regarding specific protection of badgers, the Protection of Badgers Act 1992. Legislation relating to specific protected sites, habitats and species is set out under the relevant subheadings under Baseline Conditions below and within corresponding appendices. The Natural Environment and Rural Communities (NERC) Act 2006 requires planning authorities to consider impacts on "*species of principle importance for the conservation of biodiversity*" when determining planning applications, as described under Biodiversity and Priority Species below. These pieces of legislation and the species and habitats they afford protection to have been addressed in this chapter.
- 7.06 Natural England Standing Advice regarding protected species aims to support local authorities and forms a material consideration in determining applications in the same way as any individual response received from Natural England following consultation (except where applications require EIA or may affect a Natura 2000 site).

Local Policy

- 7.07 Planning policies of relevance to Ecology & Biodiversity at the local level are set out below..

- 7.08 Policy GP.40 Retention of existing trees and hedgerows: In dealing with planning proposals the Council will oppose the loss of trees, particularly native Black Poplars, and hedgerows of amenity, landscape or wildlife value.
- 7.09 Policy GP.66 Access corridors and buffers adjacent to watercourses: In riverside or canalside development proposals, the Council will require access corridors and buffers adjacent to the watercourse to:
- Conserve and enhance existing areas of landscape or wildlife value;
 - Promote public access and provide recreational opportunity;
 - Protect or enhance the environment and habitat of those watercourses.

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- 7.010 Policy NE1: Biodiversity and Geodiversity: Internationally or nationally important Protected Sites (SACs and SSSIs) and species will be protected. Avoidance of likely significant adverse effects should be the first option. Development likely to affect the Chiltern Beechwoods SAC will be subject to assessment under the Habitat Regulations and will not be permitted unless any significant adverse effects can be fully mitigated.
- 7.011 Development proposals that would lead to an individual or cumulative significant adverse impact on an internationally or nationally important Protected Site or species will be refused unless exceptional circumstances can be demonstrated as follows:
- the benefits of the development affecting the site significantly and demonstrably outweigh both the impacts that it is likely to have on the features of the site that make it of special scientific interest and any broader impacts on the national network of Sites of Special Scientific Interest, and
 - the loss can be mitigated and compensation can be provided to achieve a net gain in biodiversity/geodiversity.
- 7.012 Sufficient information must be provided for the Council to assess the significance of the impact against the importance of the Protected Site and the species which depend upon it. This will include the area around the Protected Site and the ecosystem services it provides and development has followed the mitigation hierarchy set out in (b) below.
- 7.013 Protection and enhancement of Biodiversity and Geodiversity
- 7.014 Protection and enhancement of biodiversity and geodiversity will be achieved by the following:
- a. A net gain in biodiversity on minor and major developments will be sought by protecting, managing, enhancing and extending existing biodiversity resources, and by creating new biodiversity resources. These gains must be measurable using best practice in biodiversity and green infrastructure accounting and in accordance with any methodology (including a biometric calculator) to be set out in a future Supplementary Planning Document.
 - b. If significant harm resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or as a last resort, compensated for, then development will not be permitted. Mitigation, compensation and enhancement measures must be secured and should be maintained in perpetuity
 - c. Development which would result in damage to or loss of a site of biodiversity or geological value of regional or local importance including habitats of principal importance or the habitats of species of principal

importance will not be permitted except in exceptional circumstances where the need for, and benefits of the development significantly and demonstrably outweigh the harm it would cause to the site, and the loss can be mitigated and compensation provided to achieve a net gain in biodiversity/geodiversity

d. The Council will, where appropriate, expect ecological surveys for planning applications. These must be undertaken by a suitably qualified person and consistent with nationally accepted standards (BS 42020:Biodiversity – Code of Practice for planning and development) as replaced

e. When there is a reasonable likelihood of the presence of protected or priority species or their habitats, development will not be permitted until it has been demonstrated that the proposed development will not result in adverse impacts on these species or their habitats. The only exception will be where the advantages of development to the protected site and the local community clearly outweigh the adverse impacts. In such a case, the Council will consider the wider implications of any adverse impact to a protected site, such as its role in providing a vital wildlife corridor, mitigating flood risk or ensuring good water quality in a catchment.

f. Development proposals will be expected to promote site permeability for wildlife and avoid the fragmentation of wildlife corridors, incorporating features to encourage biodiversity, and retain and where possible enhance existing features of nature conservation value on site. Existing ecological networks should be identified and maintained to avoid habitat fragmentation, and ecological corridors including water courses should form an essential component of green infrastructure provision in association with new development to ensure habitat connectivity

g. Planning conditions/obligations will be used to ensure net gains in biodiversity by helping to deliver the Buckinghamshire and Milton Keynes Biodiversity Action Plan targets in the biodiversity opportunity areas. Where development is proposed within, or adjacent to, a biodiversity opportunity area, biodiversity surveys and a report will be required to identify constraints and opportunities for biodiversity enhancement. Development which would prevent the aims of a biodiversity opportunity area from being achieved will not be permitted. Where there is potential for development, the design and layout of the development should secure biodiversity enhancement and the Council will use planning conditions and obligations as needed to help achieve the aims of the biodiversity opportunity area. A monitoring and management plan will be required for biodiversity features on site to ensure their long-term suitable management (secured through planning condition or Section 106 agreement).

h. Development proposals adversely affecting a local nature reserve will be considered on a case-by-case basis, according to the amount of information available about the site and its significance, relative to the type, scale and benefits of the development being proposed and any mitigation. Any mitigation strategy will need to include co-operation with the nature reserve managers.

- 7.015 Policy NE2 River and Stream Corridors: Development proposals must not have an adverse impact on the functions and setting of any watercourse and its associated corridor. They should conserve and enhance the biodiversity, landscape and consider the recreational value of the watercourse and its corridor through good design. Opportunities for de-culverting of watercourses should be actively pursued. Planning permission will only be granted for proposals which do not involve the culverting of watercourses and which do not prejudice future opportunities for de-culverting. Development proposals adjacent to or containing a watercourse shall provide or retain a 10m ecological buffer (unless existing physical constraints prevent) from the top of the watercourse bank and the development, and include a long-term landscape and ecological management plan for this buffer.

- 7.016 Policy NE8 Trees, Hedgerow's and Woodlands: Development should seek to enhance and expand the district's tree and woodland resource, including native black poplars.
- 7.017 Where trees within or adjacent to a site could be affected by development, a full tree survey and arboricultural impact assessment to BS 5837 (as replaced) will be required. The implementation of any protective measures it identifies will be secured by the use of planning conditions. A standalone Arboricultural Impact Assessment (AIA) has been prepared (BHA_C.2750) and is referred to within this chapter where appropriate.
- 7.018 Development that would lead to an individual or cumulative significant adverse impact on ancient woodland or ancient trees will be refused unless exceptional circumstances can be demonstrated that the impacts to the site are clearly outweighed by the benefits of the development.
- 7.019 Development that would result in the unacceptable loss of, or damage to, or threaten the continued well-being of any trees, hedgerows, community orchards, veteran trees or woodland which make an important contribution to the character and amenities of the area will be resisted. Where the loss of trees is considered acceptable, adequate replacement provision will be required that use species that are in sympathy with the character of the existing tree species in the locality and the site.
- 7.020 Where species-rich native hedgerow (as commonly found on agricultural land) loss is unavoidable the developer must compensate for this loss by planting native species-rich hedgerow, which should result in a net gain of native hedgerow on the development site.
- 7.021 Developers should aspire to retain a 10m (with a minimum of 5m) natural buffer around retained and planted native hedgerows (100m with a minimum 25m natural buffer around woodlands) for the benefit of wildlife, incorporating a dark corridor with no lighting.
- 7.022 Development must provide buffers to Ancient Woodland and should provide additional planting to join up fragmented areas of woodland as part of the development's GI. Buffers should allow the maximum space proportionate to the development, and would generally be expected to be a minimum of 50m between the ancient woodland and any built development or grey infrastructure. Within the buffer, native trees may be planted along with other ecology features to secure net gains in biodiversity and/or landscape mitigation unless the achievement of this would be contrary to other policies in the plan.

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- 7.023 Policy NE1 Protection Of Sites:
- a. Development proposals which would likely cause harm to the nature conservation or geological interest of internationally (RAMSAR sites, SACs and SPAs) important sites will not be permitted unless:
 1. There is no suitable alternative to the development;
 2. There are imperative reasons of overriding public interest;
 3. All reasonable possibilities for mitigation have been put in place; and
 4. Compensatory provision in line with the mitigation hierarchy can be secured to ensure that the overall coherence of the site is protected and with the intent to achieve a net gain in biodiversity.

- b. Development proposals which would likely cause harm to a National Nature Reserve, Site of Special Scientific Interest or irreplaceable habitats such as Ancient Woodland will not be permitted unless:
 - 1. There is no suitable alternative to the development;
 - 2. The benefits of the development, at this site, clearly outweigh the adverse impacts on the site;
 - 3. All reasonable possibilities for mitigation have been put in place; and
 - 4. Compensatory provision in line with the mitigation hierarchy to ensure that the overall coherence of the site is protected and with the intent to achieve a net gain in biodiversity.
- c. Development proposals which would be likely to harm the biodiversity or geological conservation value of a site of countywide or local importance (37) as shown on the Policies Maps or which serve as a 'biodiversity offset site' will only be permitted where:
 - 1. The local development needs significantly outweigh the biodiversity or geological conservation value of the site;
 - 2. All reasonable possibilities for mitigation have been put in place; and
 - 3. Compensatory provision in line with the mitigation hierarchy can be secured to ensure that the overall coherence of the site is protected and with the intent to achieve a net gain in biodiversity.

7.024 Policy NE2 Protected Species And Priority Species And Habitats:

- a. Where there is a reasonable likelihood of the presence of statutorily protected species or their habitats development will not be permitted unless it has been demonstrated that the proposed development will not result in a negative impact upon those species and habitats.
- b. Where the site contains priority species or habitats, development should wherever possible promote their preservation, restoration, expansion and/or re-creation in line with Policy NE3. Priority Habitats are shown on the Policies Map accompanying this plan.

7.025 Policy NE3 Biodiversity And Geological Enhancement:

- a. Development proposals will be required to maintain and protect biodiversity and geological resources, and wherever possible result in a measurable net gain in biodiversity, enhance the structure and function of ecological networks and the ecological status of water bodies in accordance with the vision and principles set out by the Buckinghamshire and Milton Keynes NEP.
- b. If significant harm to biodiversity resulting from a development cannot be avoided, adequately mitigated or, as a last resort, compensated for then planning permission should be refused.
- c. Development proposals of 5 or more dwellings or non-residential floorspace in excess of 1,000 sq. m will be required to use the Defra metric or locally approved Biodiversity Impact Assessment Metric to demonstrate any loss or gain of biodiversity.
- d. Mitigation, compensation and enhancement measures must be secured and be maintained for the lifetime of the development. Enhancement and compensatory measures should seek opportunities for

habitat protection, restoration and creation to meet the objectives of the UK and Bucks & Milton Keynes Biodiversity Action Plan and aims of the Biodiversity Opportunity Areas. These measures should also create and enhance habitats to help wildlife adapt to the impact of climate change.

National Policy

- 7.026 Planning policy at the national level are listed below as applicable to Ecology:
- 7.027 The **National Planning Policy Framework (2019)** ('NPPF') sets out the government planning policies for England and how they should be applied. With regards to ecology and biodiversity, Chapter 15: Conserving and Enhancing the Natural Environment, paragraph 170, states that the planning system and planning policies should minimise impacts on and provide net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures.
- 7.028 Paragraph 175 sets out the principles that local planning authorities should apply when determining planning applications:
- If significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts) adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused;
 - Development on land within or outside a Site of Special Scientific Interest, and which is likely to have an adverse effect on it (either individually or in combination with other developments), should not normally be permitted. The only exception is where the benefits of the development in the location proposed clearly outweigh both its likely impact on the features of the site that make it of special scientific interest, and any broader impacts on the national network of Sites of Special Scientific Interest.
 - Development resulting in the loss or deterioration of irreplaceable habitats (such as ancient woodland and ancient or veteran trees) should be refused, unless there are wholly exceptional reasons and a suitable compensation strategy exists.
 - Development whose primary objective is to conserve or enhance biodiversity should be supported; while opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity.
- 7.029 The **Government Circular 06/2005**, which is referred to within the NPPF (footnote 56), defines statutory nature conservation sites and protected species as a material consideration in the planning process. Circular 06/2005 also provides further guidance in respect of statutory obligations for biodiversity and geological conservation and their impact within the planning system.

Assessment Methodology

Introduction

- 7.030 The method for this assessment is based on the Guidelines for Ecological Impact Assessment (EclA) in the UK and Ireland 2018 (Version 1.1 Updated September 2019), published by the Chartered Institute of Ecology and Environmental Management (CIEEM). These guidelines provide a robust framework for ecological assessment, which has been approved by all relevant national agencies.
- 7.031 The main aims of this assessment are to:

- Consider the activities and biophysical changes likely to be associated with the proposed development and its zone of influence.
- Identify the baseline conditions within the zone of influence, with particular reference to those important ecological features that are likely to be affected, including important floral or faunal populations, habitats and nature conservation designations.
- Describe and assess the potential effects on the structure and function of the systems on which these features depend, in the absence of mitigation.
- Describe any mitigation needed to avoid or minimise adverse effects and explain how such actions have been incorporated into the scheme.
- Describe any compensation needed where an effect cannot be reduced to an insignificant level.
- Set out the residual effects of the proposed development, complete with mitigation.

Ecological Zone of Influence / Spatial Scope

7.032 The Ecological Zone of Influence (EZoI) is defined as the areas/resources that may be affected by biophysical changes resulting from the proposed development. Due to the scale and nature of the proposals, the EZoI includes all land within the Site as well as a wider area. When assessing the potential effects of the development proposals on statutory and non-statutory designated sites the following EZoIs have been adopted:

- Internationally designated statutory sites: all land within 20km of the Site boundary.
- Nationally and locally designated statutory sites: all land within 3km of the Site boundary.
- Non-statutory designated sites: all land within 1km of the Site boundary.

7.033 In respect of fauna, flora and habitats, the EZoI includes all land within the Site, with a wider 2km desk study area providing contextual records of notable and protected species. In addition, for great crested newt *Triturus cristatus*, the EZoI was extended to include all waterbodies within 500m of the Site boundary and for badgers all publicly accessible land within 100m.

Geographic Frame of Reference

7.034 The Geographic Frame of Reference method is adopted for this assessment to assign importance to ecological features based on that set out in CIEEM guidelines, where ecological resources are assessed as having importance at the following levels:

- International
- National
- Regional (if applicable)
- County (or Metropolitan, vice-county [biological recording region] and other local authority-wide area)
- Local

7.035 Ecological features which fall short of the threshold for local importance are those considered unable, or very unlikely, alone to experience significant adverse effects as a result of the proposals. However, all habitats contribute at least in some limited way to ecological networks, and as such they remain relevant when considering overall net effects (gains or losses) on biodiversity.

Designated Sites

- 7.036 Some sites are assigned a level of nature conservation importance through designation, and the guidelines recommend that the reasons for this designation need to be taken into account in the assessment. Such designations include:
- Internationally important sites: SACs, SPAs and Ramsar sites, including 'candidate' or 'potential' Sites (i.e. cSACs, pSACs, c.SPAs and pSPAs);
 - Nationally important sites such as SSSIs and NNRs; and
 - Regional/County important sites.
- 7.037 Where a particular site has multiple designations, effects of the proposals are considered in respect of each of the features of each designation, carefully distinguishing between them in accordance with the respective legislation and policy.
- 7.038 The Multi-Agency Geographic Information for the Countryside (MAGIC) (**Appendix 7.1**) online database was interrogated in March 2020 to identify the following ecological features (based on the EZoI defined above):
- Special Protection Areas (SPA), Special Areas of Conservation (SAC) and Ramsar sites.
 - Sites of Special Scientific Interest (SSSI), National Nature Reserves (NNR), Local Nature Reserves (LNR).
 - Other relevant data e.g. Ancient Woodland Inventory.
- 7.039 Buckinghamshire and Milton Keynes Environmental Records Centre (BMERC) were contacted for details of any non-statutory designations within 2km (based on the EZoI defined above) for which locations and details are provided in **Appendix 7.1**.

Habitats & Flora

- 7.040 The importance of areas of habitat, floral species and communities are measured against published selection criteria where available. Habitat types of European (International) conservation importance are listed on Annex I of the Habitats Directive. Habitats that are considered priorities for conservation in England are listed as habitats of principal importance under section 41 of the Natural Environment and Rural Communities (NERC) Act 2006. Additional, locally important habitats are listed in the Biodiversity Action Plan for Buckinghamshire and Milton Keynes, and those of relevance to the scheme comprise:
- Lowland Wood Pastures and Parkland
 - Traditional Orchard
 - Hedgerows
 - Ponds
 - Lowland Meadows
 - Reedbed
 - Native woodland
- 7.041 BMERC were contacted for details of records for protected and notable species within 2km (based on the EZoI as defined above). All relevant desk study data are presented in **Appendix 7.1**.
- 7.042 Extended Phase 1 Habitat survey work was carried out most recently in April 2020 (see **Appendix 7.2**), as illustrated in the Habitats Plan (**Fig 7a**). Detailed flora species lists have been compiled for the Site between 2002 and 2019. A detailed Hedgerow Survey was conducted in March & April 2020 (see **Appendix 7.3**).

Fauna

- 7.043 The importance of areas for faunal species are measured against published selection criteria where available. Species of European (International) conservation importance are listed in Annexes II, IV and V of the Habitats Directive and Annex I of the Birds Directive. Species that are considered to be priorities for conservation in England are listed under section 41 of the NERC Act 2006. Additional locally important species are listed in the Biodiversity Action Plan for Buckinghamshire, and those of relevance to the scheme comprise:
- All bat species recorded in Buckinghamshire and MK
 - Other mammals, including brown hare and badger
 - Notable and rare plants, including bluebell
 - A wide range of Invertebrates, including stag beetle and white letter hairstreak,
 - Notable or rare birds, including yellowhammer, linnet, songthrush, fieldfare, starling, barn owl, tawny owl, kingfisher, lapwing, kestrel, mallard and mute swan
 - All widespread reptiles and amphibians
- 7.044 The importance of faunal populations are determined using existing criteria where available and contextual information about distribution and abundance, including trends based on historical records.
- 7.045 Specific faunal species have legal protection under Annex IV of the EC Habitats Directive. In the UK other species are protected under Schedules 1, 5 and 8 of the Wildlife and Countryside Act 1981 (as amended). Where protected species are present and there is the potential for a breach of the legislation, these matters are considered, but addressed separately from ecological 'importance'.
- 7.046 BMERC were contacted for details of records for protected and notable species within 2km (based on the EZol as defined above). All relevant desk study data are presented in Appendix 7.1.
- 7.047 Consideration has been given to ensuring that land use changes do not result in contravention of laws relating to legally controlled plant and animal species under Schedule 9 of the Wildlife and Countryside Act 1981, under the Third Schedule of the European Communities (Birds and Natural Habitats) Regulations 2011 and under the Weeds Act 1959 (as Amended by the Ragwort Control Act 2003). Where appropriate measures to control such species have been identified.
- 7.048 The following detailed field survey work was carried out, with full methodologies and results provided in the relevant appendices:
- Badger (**Appendix 7.4**)
 - Bats (**Appendix 7.5**)
 - Riparian Mammals (**Appendix 7.6**)
 - Breeding Birds (**Appendix 7.7**)
 - Reptiles (**Appendix 7.8**)
 - Amphibians (**Appendix 7.9**)

Biodiversity

- 7.049 In addition to individually 'important' ecological features, and in line with CIEEM EcIA guidance, '*Consideration of impacts at all scales is important, and essential if objectives for no net loss of biodiversity and maintenance of healthy ecosystems are to be achieved*'. As such, a Biodiversity Metric Calculation was undertaken using the most current nationally recognised Biodiversity Metric (Natural England's published Biodiversity Metric 2.0 Beta), with a completed calculation tool for the scheme provided in **Appendix 7.10**. The outcome of the metric

is presented herein alongside impact assessments for individually important ecological features. This metric will allow for consideration of the scheme under policy NE3 of Plan:MK and draft policy NE1 of the VALP.

Future Baseline

- 7.050 Potential effects on ecological features have been assessed in the context of how the predicted baseline conditions within the EZol might change between the surveys and the start of construction.

Temporal scope

- 7.051 Effects have been assessed at the following stages:
- During construction: including any vegetation clearance, ground works and construction of infrastructure, dwelling, community facilities and landscaping of open space;
 - In-operation: during occupation of new dwellings and use of community/other facilities.

Characterising Effects

- 7.052 The following terminology is adopted to express the nature of any significant effects and to determine their level of significance:
- Beneficial (positive) or Adverse (negative) at the relevant Geographic Frame of Reference (i.e. International, National, Regional, County or Local) and;
 - extent or magnitude;
 - duration or timing;
 - frequency; and/or
 - reversibility.

Assessment of Cumulative Effects

- 7.053 The following types of actions which can cause cumulative effects were considered:
- Additive/incremental - refers to multiple activities/projects (each with potentially insignificant effects) which when added together give rise to a significant effect due to proximity in time and space. The effect may be additive or synergistic.
 - Associated/connected - refers to a development activity which 'enables' another development such as phased development as part of separate planning applications.
 - The following types of future development projects within the same zone of influence were considered:
 - proposals for which consent has been applied which are awaiting determination in any regulatory process;
 - projects which have been granted consent but have not yet been started or which have been started but are not yet completed;
 - proposals which have been refused permission but which are subject to appeal and the appeal is undetermined; or
 - proposed projects that will be implemented by a public body but for which no consent is needed from a competent authority.

Determining Significance

- 7.054 The significance of an ecological effect, whether beneficial or adverse, has been assessed in accordance with the CIEEM guidelines, which state that an effect is considered to be significant "...if it is *sufficiently important to require assessment and reporting*" and if it could result in a change in the conservation status or degree of integrity of any important ecological feature. Wherever possible therefore, a justification for determining whether effects are '*sufficiently important*', at whichever geographic scale (international, national, regional, county, local), to warrant assessment and reporting, and the change to conservation status or integrity of a feature, is provided.
- 7.055 This level of significance based on the CIEEM EclA guidelines has been transferred into 'major', 'moderate', 'minor' or 'negligible' level of effect to ensure consistency with EIA regulations, based on the following:

Significance level based on CIEEM guidelines	Significance based on EIA regulations
International	Major*
National	Major*
Regional	Major*
County	Major*
Local	Moderate*
Site	Minor**

*=Significant effect

**=Insignificant effect

- 7.056 In terms of the EIA regulations, only effects which are 'moderate' or 'major' are considered significant, the others constituting a non-significant effects.

Limitations and Assumptions

- 7.057 Limitations in respect of specific surveys are provided in the relevant appendices. However, no substantive limitations to work undertaken have been identified.

Baseline Conditions

Site Context & Description

- 7.058 The Site is located on the south western settlement edge of Milton Keynes but falls within the Aylesbury Vale District. It comprises predominantly arable land with hedgerows and is of similar character to the wider agricultural landscape to the west. Whaddon Road bounds the site to the south, with Standing Way/A421 to the north. A disused railway is present to the south of the Site, along which the nationally important infrastructure project: "East-West Rail" is currently in its early development phase. Tattenhoe Valley Park and Windmill Hill golf course are present to the north of the Site, with active landfill to the southeast beyond scrubland and Newton Longville to the south.
- 7.059 Agricultural land off-site to the west comprises predominantly arable and improved/poor semi-improved grassland for grazing, interrupted on higher 'clayey' ground by remnant ancient woodland, being less favourable for agriculture. These woodlands include Salden and Middle Salden woods to the southwest, Broadway and Thrift wood to the west, and Coddimoorhill, Thickbare, Hogpound and College wood northwest beyond the A421. A small area of remnant ancient woodland is also present further north of the Site (see below: Howe Park Wood SSSI) surrounded by existing residential areas of Milton Keynes.

- 7.060 The Site itself is dominated by farmland, bisected by Weasels Lane, with arable fields to the south and a combination of arable farmland and grazed grassland /arable leys to the north. Fields across the Site are typically bound by field hedgerows, as well as some drainage ditches. Some remnant wooded and scrub habitats are present to the north of the Site, along with a number of small and derelict ponds.

Nature Conservation Designations

- 7.061 There are no statutory nature conservation designations present on or immediately adjacent to the Site. Furthermore, there are no nature conservation designations of international importance (e.g. Special Protection Areas [SPAs], Special Areas of Conservation [SACs] or Ramsar Sites) within 20km of the Site.
- 7.062 A total of two Sites of Special Scientific Interest (SSSI) and a single Local Nature Reserve (LNR) are present within 3km. In addition, three non-statutory Local Wildlife Sites (LWSs) are present within 2km of the Site. These designations are describe in Table 7.1 below.

Table 7.1 Statutory and Non-Statutory Designations within Data Search Radii

Designation Name & Type	Distance & Bearing	Description & Status	Geographic Level of Importance
Howe Park Wood SSSI	1.2km north	Ancient semi-natural “coppice with standards” woodland surrounded by residential land. Varied soils and historic management resulting in wide range of woody species, 300 moth species records and notable for butterflies. Favourable condition status of single SSSI unit (2010), with active management and lack of rabbit/deer browsing important in maintaining condition. No cited recreational pressure/threat.	National
Oxley Mead SSSI	2.0km north	Ancient hay meadow (MG4 and MG5) with ancient hedgerows and stream Favourable condition status of single SSSI unit (2008), with annual management and hydrology important in maintaining condition. No cited recreational pressure/threat.	National
Blue lagoon LNR	2.4km east	Former clay ‘brickpits’ with lagoon, ponds, grassland, scrub and woodland. Supports a wide range of wildlife, including notably GCN, common toad and grass snake. Current status/condition unknown.	Local*
Railway sidings east of Salden Wood LWS (Ref: 83F08)	Adjacent to the Site, south west	Former railway sidings with varied low-nutrient substrate upon with range of grassland flora has established Significant scrub encroachment likely to diminish grassland interest	County

Designation Name & Type	Distance & Bearing	Description & Status	Geographic Level of Importance
Broadway and Thrift Wood LWS (Ref: 83B16)	0.1km west	Ancient and ancient-replanted woodland	County
Salden Wood LWS	1.1km southwest	Ancient and ancient-replanted woodland	County
Milton Keynes 'Wetland' and 'Woodland' Wildlife Corridors	On-site	'Wetland' Wildlife Corridor, on-site to the northwest and continuing off-site to the northeast 'Woodland' Corridor, on-site to the northwest and continuing off-site to the north, which connects the Site with Howe Park Wood and Oxley Mead SSSIs	County
Whaddon Chase Biodiversity Opportunity Area (BOA)	On-site, northwest corner of site		N/A

*LNRs are designated for their recreational interest in respect of nature conservation, but vary in their inherent ecological importance.

- 7.063 A number of other Biological Notification Sites (BNSs) are present in the local area although none are on-site or adjacent and are therefore not considered 'capable' of being affected by this scheme and as such are scoped out of this assessment. BNSs have however been considered below with regard to green infrastructure.

Green Infrastructure

- 7.064 In addition to nature conservation designations, a number of green infrastructure features and/or strategic biodiversity areas are present in the local area, as well as on-site, namely:

- On-site hedgerow network, with associated grassland, ditches and wooded areas
- Milton Keynes 'Railway' Wildlife Corridor, 500m off-site to the east, continuing further east
- Disused railway line to south of site, which connects the Site with Blue Lagoon LNR, as well as a number of LWSs and BNSs
- Whaddon Chase Biodiversity Opportunity Area (BOA) falls just within the Site to the northwest. BOAs represent a targeted landscape-scale approach to conserving biodiversity and the basis for an ecological network. Targets for this BOA which are of relevance to this site comprise:
 - Hedgerows – Management, Restoration, Creation
 - Lowland Meadows – Management, Restoration, Creation
 - Woodlands – Management, Restoration, Creation
 - Ponds – Management, Restoration, Creation

Habitats & Flora

Notable Flora

- 7.065 BMERC have provided 145 records of 42 notable or invasive plant specs within the search area. Those of potential relevance to the Site include the following **(A) arable species** stinking chamomile *Anthemis cotula*, field pepperwort *Lepidium campestre*, common gromwell *Lithospermum officinale*, and corn mint *Mentha*

arvensis; **(B) grassland species** crosswort *Cruciata laevipes*, woolly thistle *Cirsium eriophorum* and spiny restharrow *Ononis spinosa* **(C) aquatic/wetland species** fringed water-lily *Nymphoides peltata* and native black poplar *Populus nigra* subsp. *betulifolia*; **(D) woodland & hedgerow species** including wild strawberry *Fragaria vesca*, bluebell *Hyacinthoides non-scripta*, spiked star-of-Bethlehem *Ornithogalum pyrenaicum*, wood sorrel *Oxalis acetosella*; and **(E) non-native invasive species** including Nuttall's waterweed *Elodea nuttallii*, Canadian waterweed *Elodea Canadensis*, least duckweed *Lemna minuta*, New Zealand pygmyweed *Crassula helmsii*, Japanese knotweed *Reynoutria japonica*, orange balsam *Impatiens capensis*, Himalayan balsam *Impatiens glandulifera* and Japanese rose *Rosa rugosa*.

7.066 The majority of these locally recorded species were not found at the Site during any of the survey work undertaken to date. However, notable flora species recorded in habitats at the Site comprise the following:

- Woodland plants: bluebell (W4b), goldilocks buttercup *Ranunculus auricomus* (W4b)
- Invasive non-native species: variegated yellow archangel *Lamiastrum galeobdolon* ssp. *argentatum* (in W4 and eastern end of Weasel's Lane), hybrid bluebell *Hyacinthoides x massartiana* (in W4 and on spoil banks) and snowberry *Symphoricarpos albus* (spreading from W2)
- A male black poplar *Populus nigra* recorded within hedgerow H9 at dry field pond P5 displays a significant number of identifying of the native black poplar *P.nigra* ssp *betulfolia*, including leaning trunk, fissured bark, exuding spring buds, hairy leaves and petioles. However, given the lightness of the trunk bark and glabrous twigs, the tree is likely to be a hybrid, but anticipated close genetic similarity to the native, which is of significant conservation concern.

Arable

7.067 The Site is dominated by arable land, with a total of 12 fields in active cultivation (**F1, F3, F6-F11 & F12-F16**). The typically narrow field margins of arable land at the Site are not anticipated to meet the criteria for the "arable field margins" Section 41 Habitat of principal importance, as they are not managed specifically to provide benefits to wildlife or support notable or arable plants. Relatively few arable weeds were recorded within or adjacent to the crop, with no notable species recorded.

7.068 Given the intensive cultivation of this habitat coupled with the narrow field margins, arable land at the Site falls short of the criteria for Local importance.

Grassland

Semi-improved Grassland

7.069 A smaller proportion of fields at the Site, principally to the north of Weasel Lane, comprise permanent grassland, rather than being under arable cultivation. This include **fields F2, F4, F5 and F12**, with the latter showing ridge-and-furrow topography indicating it has remained uncultivated for a significant period of time. A number of the fields are grazed by livestock or cut for hay and silage. Occasional narrow field margins and verges along Weasels Lane comprise rank species-poor grassland similar to that in fields F2, F4, F5 and F12.

7.070 Typically, grasslands at the Site are dominated by coarse grasses, including as false oat-grass *Arrhenatherum elatius*, cocks' foot *Dactylus glomerata*, common couch *Elymus repens*, meadow foxtail *Alopecurus pratensis*, timothy *Phleum pratense* and common bent *Agrostis stolonifera*. Common herbs were rarely noted in the sward, although a moderate range of species were recorded in total, with slightly higher diversity within ridge-and-furrow grassland in F12.

7.071 Overall, habitats appear nutrient-rich based upon floristic composition and are therefore considered 'poor semi-improved grassland' of limited conservation interest falling short of the criteria for Local importance.

Nonetheless these grasslands have been considered in the wider assessment of net loss or gain of biodiversity at the Site, with permanent grassland being of greater interest than cultivated land.

Amenity Grassland

- 7.072 Limited areas of amenity grassland are present within the Application Site, restricted to roadside verges. The short sward is typically dominated by rye grass *Lolium perenne*, with occasional areas of fine leaved grasses, such as fescues *Festuca* sp., and few common herbs present. Such habitats are of limited conservation interest and fall short of the criteria for Local importance.

Hedgerows & Mature trees

- 7.073 A significant proportion of fields at the Site are bound by hedgerows, with a total of 37 hedgerow sections recorded within the Site.
- 7.074 A total of c.20 native woody species were recorded within hedgerows at the Site. Hedges were principally dominated by hawthorn *Crataegus monogyna*, blackthorn *Prunus spinosa*, elm *Ulmus* sp. and/or field maple *Acer campestre*, with dog rose *Rosa canina* agg, ash *Fraxinus excelsior* and occasionally buckthorn *Rhamnus cathartica*. Management of hedgerow appears to vary across the Site with some well-managed or clipped and a smaller number outgrown or defunct / gappy.
- 7.075 Of the 37 hedgerows, 10 were concluded to be 'species-rich' (H3, H6, H9, H18, H19, H22, H26, H29, H31, and H36). A total of 22 hedgerows were found to be in 'Good' condition, with the remaining 15 in 'Moderate' condition, based upon BM2.0 criteria. However, none of the hedgerow were found to be 'Important' under ecological criteria the Hedgerows Regulations (1997), primarily given the patchy distribution of woody species and sampling technique employed under these regulations. Nonetheless, given the dominance of native woody species, all hedgerows are anticipated to meet the criteria for the "hedgerows" Section 41 Habitat of principal importance under the NERC Act (2006).
- 7.076 Outside of woodlands, mature trees are frequently present within most hedgerows at the Site, dominated by ash, but with occasional oak, field maple, planted horse chestnut, some willows *Salix* spp. and rarely poplar (usually hybrid black or grey poplar but a close native black poplar hybrid in H9 adjacent to pond P5). A number of mature trees are also present outside of hedgerows on the eastern boundary adjacent to private gardens, although these ash, oak and willow trees appear to form part of an old field hedgerow largely lost to garden boundary planting and fencing.
- 7.077 Given that all hedgerows at the Site are anticipated to meet the criteria for the "hedgerows" Section 41 Habitat of principal importance, with some species-rich sections (10) and their wider contribution to habitat connectivity, the network of hedgerows at the Site is concluded to be of ecological importance at the **Local** level.

Woodland & Scrub

- 7.078 A total of seven woodland and scrub habitat areas are present on or adjacent to the Site, labelled W1-W6 on the habitats plan. The majority of wooded habitat is present to the north of the Site, either along the boundary itself (W1-W4) or running south from this boundary south (W5). In addition, woodland and scrub habitats are also present just beyond the Site to the south along the form railway corridor (W6) and to the east south of existing residential dwellings (W7).
- 7.079 **Woodland W1** is separated from the remainder of the Site by Whaddon Road, and comprises a landscaped bank area of planted and self-set trees along with some ornamental specimens, comprising ash, oak, field

maple, hornbeam, poplar and yew. An understory and ground flora of native and ornamental species are present including of snowberry, hazel, hawthorn, periwinkle *Vinca* sp. and Wilson's honeysuckle.

- 7.080 **Woodland W2** comprises a landscaped amenity space dominated by trees with a range of other habitats. It comprises secondary woodland, a bank of wooded roadside landscaping along Standing way (A421), dense trees and shrubs along a watercourse (dammed to form a backwater 'pond'- P1c), planted trees including poplar and ornamental shrub, central open grassland ('glade') with made footpath, and shallow ponds/swales (P1a and P1b). Given the dominance of wooded habitat this area has been mapped as woodland, with trees including ash, field maple, grey poplar, goat willow, osier, field maple, and shrubs such as dogwood *Cornus sanguinea*, hazel and hawthorn. Habitats along the watercourse appear older in origin, with more mature established trees, as well as dog's mercury *Mercurialis perennis*, betony *Stachys officinalis* and cowslip *Primula veris* in the ground flora layer. Open habitats have either established with wildflower or sown as part of landscaping, and include notably black knapweed *Centaurea nigra*, hedge bedstraw *Galium album*, ox-eye daisy, meadow foxtail and glaucous sedge *Carex flacca*.
- 7.081 **Woodland W3** continues off-site to the east of W2 between Standing Way (A421) and a metalled track (former road). W3 enters the site again further east located around the proposed vehicular access route for the scheme. W3 again comprises a combination of planted and established wooded habitats, including extensive ornamental shrub and tree planting, some native trees (planted or self-set established) and a former field hedgerow subsumed into the woodland along north for the metalled track (former road). Tree and shrub species present include ash, alder, goat willow, crab apple *Malus sylvestris*, silver birch *Betula pendula*, dogwood, hawthorn and blackthorn.
- 7.082 **Woodland W4** is located entirely within the Site and comprise older woodland, albeit with some likely planted hybrid poplar trees to the west. The **western section (W4a)** includes some very mature and veteran specimens (oak, ash, poplar and willow), with well-developed understorey of hawthorn and elder but with a relatively species-poor ground flora, and an establishing population of invasive variegated yellow archangel. A small watercourse runs south through the western section, as well as an agricultural structure is to the south. Extensive fly-tipping is present to the north of the woodland.
- 7.083 The adjacent linear stretch of **old woodland (W4b)**, includes two old hedge/wood banks with very mature/veteran oak, field maple and ash trees, along with a well-developed understory of hawthorn, wild privet and elm, as well as frequent honeysuckle climbers. A variable but species-rich ground flora is present including locally abundant native bluebell, occasional goldilocks buttercup, primrose *Primula vulgaris*, wood-avens *Geum urbanum* dog's mercury and lords and ladies *Arum maculatum*. Bunded spoil is present along much of the northern boundary of W4b which includes a number of non-native and invasive species, including hybrid bluebell and variegated yellow archangel.
- 7.084 **Woodland W5** runs south through the Site from W4b and is similarly old and potentially comprising the coalescence of two former field hedgerows. It is dominated by very mature and veteran oak and ash trees, although it appears to have also been planted with a number of other species includes grey poplar and Scots pine. These latter species appear to be dying off, with frequent standing deadwood (pine), or have collapsed (poplar). A well-developed understory of hawthorn and elder is present in places albeit with a relatively species-poor ground flora.
- 7.085 **Woodland and scrub habitats (W6)** have developed along the southern boundary on the embankment of the disused railway. This habitat is dominated by hawthorn, blackthorn and elder scrub, with frequent mature/semi-mature ash and some goat willow. The ground flora could not be thoroughly surveyed being the site boundary but appeared relatively species poor. A small drainage ditch runs along the northern edge of this wooded habitat, connecting with field drains flowing through the Site.

- 7.086 A small linear **secondary woodland W7** is present just off-site to the east of the Site between residential dwellings to the north, allotments to the east and the disused railway embankment to the south. This woodland comprises a former field hedgerow to the west, with hawthorn and elm, as well as a mature ash and other semi-mature self-set ash trees, field maple, cherry, horse chestnut and sycamore. Dense shrub layer includes a combination of ornamental species (snowberry, fire-thorn *Pyracantha* sp. and broom *Cystisus* sp.), as well as elder, hawthorn and bramble. Ground flora is relatively species poor, comprising cleavers, garlic mustard, cow parsley, arum lily and wood avens.
- 7.087 Taken together, the wooded habitats on-site provide the most structurally and botanically rich habitats at the Site, and provide a valuable wildlife resource and refuge. Although these habitats are likely to fall just short of Local Wildlife Site selection criteria partly due their limited extent, given their intrinsic ecological interest and certain areas of particular interest (either mature trees or ground flora) they are concluded to be of importance at the **Local** level.

Ditches

- 7.088 A small number of field ditches run through the Site, typically at the base of hedges. A number of ditches continue or start away from hedgerows, or where hedgerows have been removed or died off. These include ditches running through field F3, which continues into woodland W4a and is culverted off-site, along a ditch between F13 and F16. The majority of ditches at the Site are only seasonal and none were found to support significant aquatic plant community. All are either significantly shaded by hedges or trees/woodland with little vegetation or are dominated by long grass and/or ruderal vegetation.
- 7.089 A permanently wet ditch runs through woodland W1 and W2 to the northwest of the Site. This ditch is dammed within W2 and forms a pond/backwater (P1c). The ditch shows little flow and is assumed to form surface water attenuation from nearby roads. It is significantly shaded by dense trees and shrubs with little aquatic vegetation. Significant accumulation of rubbish and debris are present within this watercourse.
- 7.090 None of the watercourses or ditches at the Site support notable or particularly diverse plant communities or protected or notable fauna, with no evidence of otter or water vole recorded. As such, these habitats are therefore concluded to fall short of the criteria for Local importance.

Ponds

- 7.091 A number of waterbodies currently holding water are present within the site, with three to the northwest corner (P1a-c, of which P1c is part of a dammed watercourse) and a single pond (P2) present within woodland W2, part of a ditch feature.
- 7.092 Given the presence of a population of great crested newt associated with Pond P1c, this feature is considered to be a S41 priority habitat under the NERC act. However, none of these ponds are considered to be of wider conservation interest and are considered to fall short of criteria for Local importance.
- 7.093 In addition, three dry ponds/depressions are present on field margins and in dense scrub/wooded habitat to the northern boundary (P3-P5). These former water bodies, and others now completely lost, are evident on historic mapping for the wider site, presumably as part of a former mixed farming system. None of these ponds include significant open water or aquatic macrophytes being substantially shaded and are therefore not anticipated to be of conservation interest, falling short of criteria for Local importance. Opportunities to reinstate these ponds have however been taken into account as part of the scheme proposals.

- 7.094 A larger number of ponds are present off-site to the north (within Tattenhoe Park P6a-j & P7), open countryside to the west and south (P10-P15), and in Chepstow Local Park to the east (P9). All of these ponds are not likely to be affected by the proposed scheme and are therefore not considered any further in this assessment, except in reference to effects upon amphibian populations.

Buildings, Structures and Hardstanding

- 7.095 The Site includes a number of agricultural structures, including single-skinned breeze-block, steel or brick sheds with corrugated sheet asbestos. Sections of the Site include highway road surfaces and footpaths, A number of concrete pads are also present associated with agricultural structures with some limited establishment of vegetation. Electricity pylons also pass through the Site. None of these features are of ecological interest although, structures have been considered below in respect of roosting bats and birds.

Fauna

Bats

Desk study

- 7.096 BMERC have provided 201 records of at least 11 bat species from within the search area dating from 1977 to 2016 and covering the following species: common pipistrelle *Pipistrellus pipistrellus*, soprano pipistrelle *Pipistrellus pygmaeus*, Nathusius' pipistrelle *Pipistrellus nathusii*, brown long-eared *Plecotus auritus*, noctule *Nyctalus noctula*, Leisler's bat *Nyctaus leisleri*, serotine *Eptesicus serotinus*, Natterer's bat *Myotis nattereri*, Daubenton's bat *Myotis daubentonii*, whiskered/Brandt's bat *Myotis mystacinus/brandtii* and barbastelle *Barbastella barbastellus*.
- 7.097 The closest records are for 'a bat' (no species identification) within the north of the Site close to W4, a common pipistrelle in flight associated with the roundabout in the north-west of the Site and a noctule associated with Newton Longville disused railway. The closest bat roost record off-site, evident by the presence of droppings, is that of long-eared bat beyond the north-eastern corner of the Site, dating to 2015.
- 7.098 Work undertaken as part of the EWR scheme confirmed all of those species for which records were returned by BMERC above. In addition the survey work identified roosts west of the Site at Salden Wood of barbastelle and some Myotid species. A common pipistrelle hibernation roost (single bat) was also identified east of the site in relation to a railway bridge under which Newton Road passes.

Use of the Site

- 7.099 No bat roosts have been confirmed at the Site during any of the survey work undertaken in 2008 and 2013.
- 7.100 In respect of trees, no evidence of roosting bats was identified in 2020 or in previous years. However, 10 individual trees or groups of trees were found to have 'high' potential to support roosting bats, with 24 'moderate', 9 'low', and the remaining having negligible potential. None of the buildings at the Site provide substantive roosting opportunities for bats with no evidence of roosting recorded during any surveys. Whilst no survey work confirmed the presence of roosts, the bat activity recorded on-site indicates that bats are likely to roost locally, which may include those trees identified the Site. Wider roosting opportunities are likely to be available within nearby residential areas and woodlands (such as Salden Wood LWS), associated with both structures and trees.

- 7.101 The majority of the Site, being open farmland provides sub-optimal foraging opportunities for bats, with hedgerows and wooded habitats providing far greater prey resource and navigation interest. Ancient woodland habitats off-site to the west, as well as the disused railway to the south and wider connected habitats are anticipated to provide a good range of opportunities for bats to forage.
- 7.102 Nocturnal surveys and remote monitoring identified a total of five confirmed species making regular use of the Site, predominantly comprising common pipistrelle, with soprano pipistrelle, brown long-eared, noctule and at least a single Myotis species *Myotis* sp. A single recording of Nathusius' pipistrelle was identified in 2013, but this species is not anticipated to make regular use of the Site. Bat activity levels at the site were assessed to be 'low to moderate' in 2013. No rarer species or notable activity levels were recorded, which reflects the broad assessment of habitats at the Site being of sub-optimal interest to bats. Typically, bats were observed along hedgerows and field boundaries avoiding large open fields, with the exception of noctules which were observed to fly high over the site. Those areas of highest activity recorded are indicatively shown on the Bat Survey Plan (Figure 7d).
- 7.103 Based on the survey work carried out, and the limited extent of optimal habitats, the Site is concluded to be **Local** importance only in respect of bats. Those areas with the site of greater importance to bats comprise hedgerows, field margins, grassland, trees and wooded habitats, rather than arable habitat which dominates the Site.

Badger

Desk Study

- 7.104 BMERC have returned 30 records of badger *Meles meles* from within the search area dating from 1967 to 2017. The closest record is for a deceased badger found dead on Standing Way (A421), immediately to the north of the Site dating to 2015, with another record associated with Tattenhoe Park to the north, beyond the A421, dating to 2008. The closest identified sett record is within Woodpond Farm Wood c. 0.7km north-west of the Site beyond the A421, dating to 1974.

Use of the Site

- 7.105 The Site provides a range of opportunities for badgers to dig setts, principally along hedgerows and in wooded habitats, as well as to forage within arable, grassland and wooded habitats. Indeed, survey work has confirmed badgers to make use of the Site for sett digging, foraging and dispersal, albeit with activity levels varying substantially both temporally and spatially over the survey period.
- 7.106 No main badger setts, those used almost continuously by a badger clan, have ever been recorded within the Site. As confirmed in the desk study and during survey work, a single main sett is present immediately adjacent to the southern boundary within the disused railway corridor. The badger clan associated with this main sett is anticipated to make use of the Site for foraging, dispersal and the digging/use of smaller outlier badger setts.
- 7.0107 A total of three 'outlier' setts have been recorded at the Site during the surveys, including one to the west of the Site adjacent to an agricultural building, on the northern boundary with H22 and along Weasels Lane to centre of the Site. Two of these setts have been abandoned, but may be reused by badgers at certain times of year, such as for females to give birth and raise cubs. Furthermore, given the proximity of the main sett to the south, new outlier setts could be dug by badgers in suitable locations across the Site (e.g. within hedgerows and wooded habitats).

- 7.108 Territorial latrines, footprints and 'snuffle' holes (evidence of foraging for earthworm/invertebrate prey) has been noted across the Site, including to the northeast of the Site, along Weasels Lane through the centre of the Site, and on the southern boundary close to the main badger sett. This evidence suggests badgers make use of the Site as a whole, albeit with low levels of activity recorded.
- 7.109 Badgers are not of current conservation interest but both badgers and their setts are protected under the Protection of Badgers Act 1992 and are therefore considered as part of this assessment on this basis only.

Water vole & Otter

Desk Study

- 7.110 BMERC returned two records of water vole *Arvicola amphibius* located c.1.3km north-east associated with Loughton Brook and c. 2km east associated with Blue Lagoon LNR, dating to 1976 and 1989, respectively. These records are well removed from the Site with no hydrological connections and is of significant age. Furthermore, water vole are thought to now be largely absent from the Milton Keynes area due to the prevalence of American mink *Neovison vison* and the decline of suitable habitat. A single record for two adult otter *Lutra lutra* was returned c.0.3km south-west of the Site, dating to 2017.

Use of the Site

- 7.111 Otter and water vole surveys undertaken at the Site have not revealed any evidence of either species making use of the Site. Furthermore, all watercourses at the Site are of suboptimal interest to both species, being either significantly shaded or having with limited aquatic or bankside vegetation and low water levels. No suitable watercourses or ditches are present at the Site which are likely to support either species and both are therefore taken to be likely absent.
- 7.112 Other mammal species not discussed above, which have been anecdotally recorded during survey, either through direct sightings or field signs, comprise fallow deer *Dama dama*, Chinese water deer *Hydropotes inermis*, red fox *Vulpes vulpes*, field vole *Microtus agrestis*, water shrew *Neomys fodiens* (off-site at Tattenhoe Park), brown hare *Lepus europaeus* (off-site within field to west) and rabbit *Oryctolagus cuniculus*. In addition, BMERC returned records of hedgehog *Erinaceus europaeus* from within the search area.
- 7.113 BMERC have not returned any record for hazel dormouse *Muscardinus avellana* from within the search area. Furthermore, this species is understood to be extinct, or very rare, within the local area. Survey work carried out for EWR did not identify any populations within the adjacent disused railway corridor or anywhere along the length of the project (Bicester to Bletchley). Whilst habitats within the site do provide some modest opportunities for this species, given the absence of any known populations nearby this species is likely absent from the Site.

Birds

Desk study

- 7.114 BMERC returned 363 records of 67 bird species from within the search area. Those of particular relevance to the Site, i.e. those associated with farmland, include skylark *Alauda arvensis*, meadow pipit *Anthus pratensis*, lapwing *Vanellus vanellus*, yellow wagtail *Motacilla flava* and linnet *Linaria cannabina*. Of these only skylark and linnet were recorded at the Site.

Use of the Site

- 7.115 Habitats at the Site provide opportunities for a modest range of farmland birds, as well as for woodland and garden species. Intensive cultivation of much of the Site is likely to limit to a great extent diversity of birds making use of the Site.
- 7.116 Breeding bird survey work in 2020, and previously in 2013 and 2008 identified a total of 58 bird species to make use of the Site, with a total of 49 exhibiting some form of breeding behaviour, or present and with suitable breeding habitat, at the Site. These included, notably, skylark (maximum 21 individuals recorded), yellowhammer *Emberiza citronella*, linnet, bullfinch *Pyrrhula pyrrhula*, grey partridge *Perdix perdix* and a number of other Red- and Amber-listed Birds of Conservation Concern (BoCC). A number of migratory species were also noted including fieldfare *Turdus pilaris*, redwing *Turdus iliacus* and meadow pipit.

Table 7.2 Assessment Criteria for Breeding Bird Assemblage (based upon Fuller, 1980)

Importance	Number of breeding bird species
National	85+
Regional	70-84
County	50-69
Local	25-49

- 7.117 Given the number of confirmed and probable breeding birds and in accordance with Fuller (1980)¹ [see Table 7.2 above] (49 breeding species in combination with the presence of notable arable species (skylark, grey partridge, linnet, yellowhammer and bullfinch), the breeding bird assemblage is concluded to be of **Local** importance.

Reptiles

Desk Study

- 7.118 BMERC returned nine records for grass snake *Natrix natrix* and four records for common lizard *Zootoca vivipara* from within the search area. The closest record for grass snake is located just beyond the A421, associated with Tattenhoe Park, dating to 2010. The closest record for common lizard is located c. 0.6km south-east, dating to 2014 with several further records located along the disused railway, the closest of which is located c. 0.8km south-west of the Site, dating to 2010.
- 7.119 Work undertaken as part of the EWR scheme confirmed the presence of common lizard and grass snake on the railway embankment south of the Site in 2018. Previous survey work in 2013-2016 and identified populations of adder, although this species was not recorded in 2018.

Use of the Site

- 7.120 The majority of the Site provides very limited opportunities for reptiles, being heavily managed/cultivated farmland. However, field margins, scrub habitats and hedgerows do provide a limited quantum of suitable habitat for widespread reptile species to forage, bask, seek refuge and hibernate.

¹ Fuller, R.J., (1980), A method for assessing the ornithological interest of sites for conservation. *Biological Conservation* 17: 229-239

- 7.121 Common lizard and grass snake have been recorded at the Site, albeit only in small numbers, in discrete areas of the Site and undetected in some years of survey. Anecdotal records of adder were known for the disused railway to the south, but have not been confirmed to make use of the Site.
- 7.122 Based on the 'small' population of common lizard and grass snake, and the limited extent of suitable habitat present, the Site is concluded to fall short of the criteria for local importance. However, all widespread reptiles are partially protected under the Wildlife & Countryside Act 1981 and are therefore considered within the assessment on this basis only.

Amphibians

Desk Study

- 7.123 BMERC returned 16 records of common toad *Bufo bufo* and 71 records of great crested newt *Triturus cristatus* from within the search area. The closest record for common toad is located with Newton Longville Brickworks immediately to the south of the Site beyond the disused railway, dating to 1979. The closest records for great crested newt include numerous records associated with ponds in Tattenhoe Valley Park, c 0.1km north of the Site, beyond the A421. A further record is associated with Chepstow pond, c. 0.2km east of the Site, dating to 2015, as well as field ponds c.400m to the southeast.
- 7.124 In addition to the above the MAGIC online database revealed a total of 10 European Protected Species Mitigation Licence (EPSML) records for GCN from within the immediate vicinity, with records grouped to the north around Tattenhoe and Westcott, and to the southeast around the Newton Longville and the nearby brickpits/Blue Lagoon LNR. These records reflect the distribution and number of GCN populations recently or currently effected by development pressure.

Use of the Site

- 7.125 The Site is dominated by arable habitats of interest only to dispersing and resting amphibians, and principally only where a crop or rank vegetation is present. Field boundary hedgerows, wooded habitats and some areas of longer grassland provide greater opportunities for amphibians to disperse along, seek refuge, forage and hibernate.

GCN are known to make use of a pond P1c on-site in small numbers, but have not been recorded in any other waterbody on-site. Large numbers of GCN are present within ponds at Tattenhoe park (along with common toad, common frog *Rana temporaria* and smooth newt *Lissotriton vulgaris*) as well as a large population within pond at Chepstow Drive Local Park to the west (P9).

Given this distribution of GCN in the vicinity of the Site, this species is likely to make use of small areas of the Site such as hedgerows or wooded areas, principally to the northwest associated with pond P1c and possibly dispersal from Tattenhoe Park the north, but also to the southeast corner of the Site within dispersal distance of Chepstow Drive pond (P9). Dispersal from other known populations beyond 250m is also possible.

In considering the previous survey findings and records, and the findings of spring 2020, GCN and potentially other amphibians, are confirmed present on and near to the Site, albeit with arable land dominating the Site of limited interest for resting and dispersal only. Based on the above, the amphibian population associated with the Site is considered to be of **Local** importance. In addition, given the legal protection afforded to GCN, amphibians are taken through to the assessment section on this basis also.

Invertebrates

Desk Study

- 7.126 BMERC returned 500 records of 109 invertebrate species from within the search area. Of these, the closest were for cinnabar *Tyria jacobaeae* recorded along the disused rail line just south of the site, and other Lepidopteran within 50m of the site including wall *Lasiommata megera*, grizzled skipper *Pyrgus malvae* and Essex skipper *Thymelicus lineola*.
- 7.127 Furthermore, the local area is understood to support populations of a number of butterflies of conservation concern including, wood white *Leptidea sinapis* and white-letter hairstreak *Satyrion w-album* associated with woodland habitats, as well as dingy and grizzled skippers, associated with more open habitats, both of which are of conservation concern.

Use of the Site

- 7.128 Hedgerows, mature trees, woodland, scrub and pond habitats at the Site are likely to support a good range of common invertebrate species. A modest number of invertebrates were recorded anecdotally during survey work comprising: Lepidoptera (butterflies and moths) ringlet *Aphantopus hyperantus*, marbled white *Melanargia galathea*, wood white *Leptidea sinapis*, brimstone *Gonepteryx rhamni*, orange tip *Anthocharis cardamines*, gatekeeper *Pyronia tithonus*, peacock *Aglais io*, common blue *Polyommatus icarus*, holly blue *Celastrina argiolus*, cinnabar *Tyria jacobaeae*, hummingbird hawk moth *Macroglossum stellatarum*, privet hawk moth *Sphinx ligustri*, mullein moth *Cucullia verbasci*; Diptera (true flies) and a bee fly species *Bombyliidae* sp.
- 7.129 There is no indication that the majority of the Site, being dominated by arable land and species-poor grassland, would support a particularly notable or large assemblage of invertebrates. As such, the invertebrate assemblage at the Site is anticipated to fall short of the criteria for Local ecological importance.
- 7.130 Certain habitats or features, such as woodlands (particularly W4 and W5), mature trees (particularly oaks, within W4 and W5, black poplar suspected to be a close native hybrid, mature willows and large number of ash trees), species-rich hedgerows and ponds within P4 are of potentially greater interest in respect of their invertebrate populations. These features are considered separately in this assessment under their habitat interest, which will take account of their associated invertebrate interest individually.

Summary

- 7.131 Important ecological features have been evaluated and assigned a level of ecological importance, as summarised in Table 7.3.

Table 7.3 Evaluation of Important Ecological Features

Level of Importance	Important Ecological Features
International	No species, habitats or nature conservation designations are present and of importance at the international level.
National	No species or habitats are present on-site that are considered to be important at the national level. However, Howe Park Wood SSSI and Oxley Mead SSSI are situated within 3km of the Site.
County	No faunal species are present on-site that are considered to be important at the county level. However, two Milton Keynes Wildlife Corridors are present on site. In addition, the

Level of Importance	Important Ecological Features
	Blue Lagoon LNR and three LWSs are situated within 3km and 2km of the Site, respectively.
Local	Habitats present of Local importance include Hedgerows (with Mature Trees) and Woodland , with species/groups including Bats, Breeding Birds and Amphibians (GCN) also of Local importance.
Protected	Badgers are known to make use of the Site, with setts understood to be present nearby. Badgers are common and not considered to be of conservation concern, however, badgers and their setts are protected under the Protection of Badgers Act 1992 and are therefore included in the assessment of effects below in the context of this legislation. Legislative protections are also of relevance with regard to bats (roosts), nesting birds, reptiles, great crested newts and hedgerows (regulations).

Biodiversity

- 7.132 In addition to the above individually 'important ecological features' and based on the Biodiversity Metric Calculation (**Appendix 7.10**), a 'Baseline Score' of '363.42' for habitats, and '74.84' separately for hedgerows, has been calculated based upon the type and condition of habitats present, as well as other factors such as connectivity. This score is used to establish overall net loss/gain of biodiversity across all habitats when considered in context of the proposed scheme.

Likely Significant Effects

- 7.133 In the context of this assessment an effect is considered to be potentially significant if it could give rise to a change in the conservation status or degree of integrity of any important ecological feature. The assessment of effects set out below is made in respect of the proposed scheme as shown on the Parameter Plans and summarised earlier in this ES.

Howe Park Wood SSSI

Construction Phase

- 7.134 Given the distance of the SSSI from the Site (c.1.2km), the scheme is considered highly unlikely to have any effect upon the SSSI during construction (**no significant effect**).

Operational Phase

- 7.135 The entire Site falls outside of the impact Risk Zones (IRZs) for this SSSI as identified by Natural England in respect of this form of development proposed. In addition, the scheme provides significant areas and variety of open space adjacent to residential areas, as well as direct walking links to Tattenhoe Park to north and Chepstow Drive local park to the east. These open spaces are anticipated to absorb the vast majority of recreational pressure generated by new residential development and avoid any substantial increase in footfall to the SSSI.
- 7.136 Based on the above no significant adverse effects are predicted as a result of the proposed scheme on this SSSI (**no significant effect**).

Oxley Mead SSSI

Construction Phase

- 7.137 Given the distance of the SSSI from the Site (c.2.0km), the scheme is considered highly unlikely to have any effect upon the SSSI during construction (**no significant effect**).

Operational Phase

- 7.138 The entire Site falls outside of the impact Risk Zones (IRZs) for this SSSI as identified by Natural England. In addition, no hydrological pathway of impact are identified between the site and this wet grassland habitat. As such, no significant adverse effects are predicted as a result of the proposed scheme on this SSSI (**no significant effect**).

Blue Lagoon LNR

Construction Phase

- 7.039 Given the distance of the LNR from the Site (c.2.4km), the scheme is considered highly unlikely to have any effect upon the SSSI during construction (**no significant effect**).

Operational Phase

- 7.140 In operation, an increase in recreational pressure will be exerted upon open space and recreational sites locally. The scheme provides significant areas and variety of open space adjacent to residential areas, as well as direct walking links to Tattenhoe Park to north and Chepstow Drive local park to the east. These open spaces are anticipated to absorb the vast majority of recreational pressure generated by new residential development and avoid any significant increase in footfall to the Blue Lagoon LNR. As such, no significant adverse effects are predicted to this LNR as a result of the proposed scheme in operation (**no significant effect**).

LWSs

Construction Phase

- 7.141 Railway sidings east of Salden Wood LWS is located adjacent to the Site. However, it is located across Whaddon Road, beyond dense scrub and within a disused railway corridor. As such, there is limited potential for construction traffic, dust or run-off from the Site to adversely affect the LWS during construction (**no significant effect**). It should also be noted that this LWS will be lost in its entirety to the EWR project, with species-rich turfs translocated into adjacent land as part of mitigation works.
- 7.142 Of the other two LWSs within 2km of the Site, both Broadway and Thrift Wood LWS and Salden Wood LWS are sufficiently separated from the Site as to be highly unlikely of being affected by the scheme during construction (**no significant effect**).

Operational Phase

- 7.143 In operation, an increase in recreational pressure will be exerted upon open space and recreational sites locally. This could conceivably include publicly accessible LWSs, however of those present within 2km, only Thrift Wood has public access and this is limited to a single footpath bisecting the LWS. Furthermore, the scheme provides significant areas and variety of open space adjacent to residential areas, as well as direct walking links to Tattenhoe Park to north and Chepstow Drive local park to the east. These open spaces are anticipated to absorb the vast majority of recreational pressure generated by new residential development and avoid any significant increase in footfall to any LWSs. As such, no significant adverse effects are predicted to this or other LWS as a result of the proposed scheme in operation (**no significant effect**).

Milton Keynes Wildlife Corridors

Construction Phase

- 7.144 The north-western corner of the Site (c. 1ha) overlaps with both the 'Woodland' and 'Wetland' Milton Keynes Wildlife corridor. All of the on-site habitats within such corridors are to be retained, however, see the below

sections 'Woodland' and 'Amphibians' for any likely effects in these respects. It should also be noted that the large majority of both Wildlife Corridors are separated from the Site by the A421. Given the above, no significant adverse effects are predicted to the off-site sections of the Wildlife Corridors as a result of the proposed scheme in construction (**no significant effect**).

Operational Phase

- 7.145 See 'Woodland' and 'Amphibian' sections below for the on-site sections of Wildlife Corridors. Both off-site sections of the Wildlife Corridors form part of the Tattenhoe Valley Park, within which there is a network of formal and informal footpaths. This accessibility leaves the park, and habitats within, vulnerable to disturbance from recreation and as such an increase in the local population has the potential to adversely impact the habitats and species present. However, it is understood that the park is actively managed for both public access and its flora/faunal interest by The Parks Trust and therefore no significant adverse effects are predicted to the off-site sections of the Wildlife Corridors as a result of the proposed scheme in operation (**no significant effect**).

Hedgerow and Mature Trees

Construction Phase

- 7.146 In consideration of policy CP.40 of AVDLP (2004, saved policies) and draft policy NE9 of the VALP, the scheme has sought to retain, as far as possible, hedgerows and mature trees. Nonetheless to facilitate vehicular and pedestrian access into and within the Site, c.1.17km of an existing c.10km of hedgerow habitat will be lost during construction. This equates to a 12% loss of the existing hedgerow network. Within these hedgerow lengths fewer than 10 mature trees are anticipated to be removed, of which four are non-native horse chestnuts and grey poplars.
- 7.147 All hedgerows, with the exception of 13, will be subject to at least a single severance for pedestrian or vehicular access. As such, in addition to reduction in hedgerow length, the function of hedgerows as a 'network' will be reduced through the severance and/or isolation of hedgerow sections in c.35 locations for vehicle access and pedestrian routes.
- 7.148 Damage to any retained hedgerows and/or mature trees could also occur as a result of construction works occurring close to the hedgerows or within Root Protection Areas.
- 7.0149 Based on the above, in the absence of mitigation, an adverse effect significant at the **Local** level (**moderate adverse effect**) is predicted.

Operational Phase

- 7.050 Given their retention within open space areas, no potential significant effects arising from the operational phase of the development are predicted on retained hedgerows and/or mature trees within the network (**no significant effect**).

Woodland

Construction Phase

- 7.151 In consideration of policy CP.40 of AVDLP 2004 (saved policies) and draft policy NE9 of the VALP, the scheme has sought to retain, as far as possible, woodland habitats within the Site. Nonetheless construction of vehicular access and other infrastructure necessitates the removal of c.0.45ha of wooded habitat, principally Woodland W4b and W5 to the north for vehicular access into and through the site. In addition, a footpath is proposed through woodland W4a. Given that the existing wooded habitat covers an area of c.2.79ha, this

equates to a loss of c.16% loss of wooded habitat cover at the Site, with impacts to older woodland W4b and W5.

- 7.152 Damage/loss of retained trees within the wooded areas could occur as a result of construction works occurring close to trees or Root Protection Areas. This includes tracking/parking of heavy plant, soil stripping for cut/fill, storage of materials.
- 7.153 Based on the above, in the absence of mitigation, an adverse effect significant at the **Local** level (**moderate adverse effect**) is predicted.

Operational Phase

- 7.154 Unrestricted access to the wooded areas of the Site by new residents could result in trampling impacts resulting in soil compaction and inhibition of future development of ground flora and tree growth. In addition, there is potential for further introduction of non-native invasive species, such as hybrid bluebell and variegated yellow archangel recorded on-site, by new residents. In the absence of mitigation an adverse effect significant at the **Local** level (**moderate adverse effect**) is predicted in this respect.

Bats

Construction Phase

- 7.155 The construction phase will result in the permanent loss of the habitats utilised by bats for foraging and/or commuting, including semi-improved grassland and wooded habitats. The severance of linear hedgerows is also anticipated to interrupt some flight-lines through the Site with light-shy and low-flying species dissuaded from crossing open ground between hedge sections. Functionally the severance of hedges may reduce further the amount of available foraging and possibly roosting opportunities, for bats.
- 7.156 It should be noted that the majority of habitats removed for development (arable land) is not anticipated to result in significant adverse effects to bats.
- 7.157 No confirmed bat roosts are predicted to be directly impacted by development of the Site. However, a number of trees and groups of trees are anticipated to be impacted by the proposed scheme (felled for vehicular access, or subject to significant tree works) based upon the prepared AIA (BHA_C.2750) and which have potential to support roosting bats. This includes four individual trees with 'low' potential, three individual trees with 'moderate' potential, and one individual tree and two groups of trees with 'high' potential. These works have the potential to result in the loss of bat roosts, or of roosting opportunities for bats, at the Site.
- 7.158 In addition, potential adverse effects arising from night working (e.g. noise and light pollution) within close proximity to the hedgerows include disturbance and avoidance of this area by foraging/ commuting bats. This could potentially temporarily hinder movement between foraging and roosting areas for bats in the local area. This would primarily affect common and widespread species but could also affect low numbers of rare species.
- 7.159 Based on the above, in the absence of mitigation, an adverse effect significant at the **Local** level (**moderate adverse effect**) is predicted for the bat populations making use of the Site, with the potential for legal infringements.

Operational Phase

- 7.160 Artificial lighting, increased levels of human activity and associated noise arising from the residential areas and road infrastructure are anticipated to have an adverse effect on foraging/commuting bats within the Site. This could permanently hinder movement between foraging and roosting areas for bats in the local area. These

impacts are considered to primarily effect common species recorded at the Site and in the vicinity. As such, in the absence of mitigation, an adverse effect significant at the **Local** level (**moderate adverse effect**) is predicted.

Badger

Construction Phase

- 7.161 A number of outlier badger setts would be retained alongside development, with the associated main sett off-site to the South. Based on available survey information and that known setts will be retained, no offences are likely to be caused under the Protection of Badgers Act (1992) in respect of interference with, damage or destruction of a badger sett as a result of the proposed scheme.
- 7.162 The construction phase will result in the loss of foraging habitat associated with the existing badger setts including arable, grassland and some woodland. Whilst the extent of foraging loss is substantial, the potential for this to directly result in offences being caused is limited, given the wider availability of foraging habitat to the south. Cumulative effects have been considered below in respect of the likely closure of this main sett during construction of the East-West Rail scheme.
- 7.163 Natural England guidance advises that badgers are relatively tolerant of moderate levels of noise and activity around their setts and that low or moderate levels of apparent disturbance at or near to badger setts do not necessarily disturb the badgers occupying those setts. Therefore, offences are not considered likely to the off-site main sett for construction methods anticipated to be employed, as 'disturbance' is not likely to be greater than that which the badgers commonly tolerate.
- 7.164 It is acknowledged that badgers can build new setts in a relatively short period and therefore the potential for previously unidentified setts to be present at the Site when construction commences. As such, there remains the potential for offences to be caused under the Protection of Badgers Act (1992) as a result of the proposed scheme given the close proximity of an identified main sett. However, no potential significant effects arising from the construction phase of the development are predicted in respect of badgers (**no significant effect**).

Operational Phase

- 7.165 It is anticipated that development will displace badgers to some extent, with the potential for adaptation to suburban conditions and for badgers to potentially forage in gardens and/or retained open spaces. The development layout allows badgers continue to use habitats, albeit with hedges severed and loss of overall forage, subject to disturbance levels. Occupation of the dwellings on-site is anticipated to increase human disturbance, with offences potentially caused by local residents and pets (e.g. dogs) interfering with setts. However, the scheme itself, during operation is unlikely to result in any offences being caused under the Protection of Badgers Act (1992). Accordingly, no potential significant effects arising from the operational phase of the development are predicted in respect of badgers (**no significant effect**).

Birds

Construction Phase

- 7.166 Removal of the wooded habitats and hedgerow to enable development could disturb/displace many of the 49 breeding bird species recorded at the Site. Based on survey work undertaken it is anticipated that at least c.20 skylark will be permanently displaced as a result of clearance of the semi-improved grassland and arable land. Based on these broad assessments, an adverse effect significant at the **Local** level (**moderate adverse effect**) is predicted.

7.167 In addition to the above, where clearance works are undertaken during the nesting bird season, there is potential for offences to be caused under the Wildlife and Countryside Act (1982), as amended.

Operational Phase

7.168 Given the quantum of retained habitat and extent of habitat created within open space, as structural landscaping and for surface water attenuation/drainage purposes, it is anticipated that the majority of birds, save for certain arable species (i.e. skylark), would continue to utilise the Site for breeding during the operational phase. However, given the higher levels of human disturbance associated with residential development, it is anticipated that the more elusive species such as yellowhammer and bullfinch would be displaced to some extent also. In addition, the introduction of predators such as the domestic cat could result in a reduction in the abundance of breeding birds present at the Site.

7.169 Based on the above, in the absence of mitigation, an adverse effect significant at the **Local** level (**moderate adverse effect**) is predicted.

Reptiles

Construction Phase

7.170 Works during the construction phase including habitat clearance could potentially kill and/or injure common lizard and grass snake, particularly associated with the central hedgerows along Weasel Lane, the northern boundary and southern boundary habitats, but also within other field margins and wooded habitats. Given the small population of common lizard and grass snake recorded, and given their legal protection, offences could arise by the killing and/or injury of these species during construction. However, no potential significant effects arising from the construction phase of the development are predicted in respect of reptiles (**no significant effect**).

Operational Phase

7.171 Potential effects during the operational phase could include inappropriate management of retained habitats leading to killing and/or injury of reptiles. As above, these have the potential to result in legal infringements. However, no potential significant effects arising from the operational phase of the development are predicted in respect of reptiles (**no significant effect**).

Amphibians

Construction Phase

7.172 Works during the construction phase including habitat clearance could potentially kill and/or injure amphibian species recorded on or adjacent to the Site including both S41 priority species GCN and/or common toad. Based on the survey work undertaken, either species is likely to make use of a portion of the Site in small numbers, and therefore removal of wooded habitat, hedgerows and grassland could result in a reduction in terrestrial opportunities. No direct impacts to any aquatic habitat is anticipated based on the retention of ponds at the Site within open space and/or structural landscaping.

7.173 Based upon the above, any effects are considered to be low in magnitude and extent, and therefore not likely to constitute a significant adverse effect (**no significant effect**) in respect of amphibians and specifically common toad and/or GCN. However, removal of habitat within the vicinity of previously known great crested newt breeding ponds has the potential to result in offences arising under the Conservation of Habitats and Species Regulation 2017 (as amended) and the Wildlife and Countryside Act 1982 (as amended).

Operational Phase

- 7.174 Potential effects during the operational phase include inappropriate management of retained habitats leading to killing and/or injury of amphibians, e.g. becoming trapped within drainage features along roads close to ponds. Again, these effects are considered to be low in magnitude and extent, and therefore not likely to constitute a significant adverse effect (**no significant effect**), although could result in potential legal infringement.

Mitigation Measures

Hedgerows & Mature Trees

- 7.175 Retained hedgerows and mature trees will be protected in line with standard arboricultural practice (BS5837:2012).
- 7.176 Existing retained hedgerows will be reinforced and 'gapped-up' with new shrub and tree planting comprising native species of local provenance, and subject to appropriate ongoing management. The aim of this enhancement and management work is to increase the extent of species-rich hedgerows, as well as increase the condition of all hedgerows to 'good' condition, to maximise their contribution to biodiversity at the Site.
- 7.177 New 'woodland-edge' habitat will also be created along hedgerows across the Site, managed to establish grassland/tall herbs, grading to native shrub and trees, thereby establishing an 'ecotone' with the depth of this margin 'scalloped' to maximise structural diversity. This will ensure the botanical and structural of retained interest of hedgerows are maximised. Where necessary, laying or coppicing of hedgerows will be undertaken to where a more formal hedgerow structure is required adjacent to key public areas or formal spaces.
- 7.178 A total c.800m of new hedgerow is proposed to the east of the site, along the western boundary to the grid road reserve and to form the western boundary of the proposed allotments. As a result of this habitat creation, and the management and enhancement of retained hedgerows a net gain in hedgerow habitat has been demonstrated within the Biodiversity Metric Calculation (see below).
- 7.179 The above measures would be secured through control of detailed landscape design and via the production of a site-wide **Ecological Mitigation, Enhancement and Management Plan (EMEMP)** , as described below.
- 7.180 With the implementation of this mitigation **no significant residual effects** are predicted in respect of hedgerows and mature trees.

Woodland

- 7.181 Existing retained wooded habitat will be protected in line with standard arboricultural practice (BS5837:2012).
- 7.182 Subject to the precise alignment of access roads/paths through woodland through woodlands W4 and W5, any important ground flora (e.g. bluebell, goldilocks or betony plants) or established woody features (e.g. hazel stool, shrub or honeysuckle plant) will be translocated from these areas into appropriate locations in woodland elsewhere within the Site to retain these features. Translocations will take place in late Autumn during dormant period for these species, following a detailed methods statement undertaken under close supervision of a suitably qualified ecologist.
- 7.183 Extensive woodland and tree planting will be undertaken throughout the Site including new woodland, thicket and hedgerows. In time, this will mitigate for the loss of existing woodland and hedgerow severance. Native trees of local provenance will be used, including a variety of nut, fruit and seed-bearing species with differing

fruiting and flowering seasons, thereby maximising the ecological benefits of this tree planting. Furthermore, species will be selected for planting to reflect the local ancient woodland character, including: hornbeam English oak, hazel, midland hawthorn and field maple. Initial tree planting areas will be sown with wildflower seed mix to provide benefits for a range of wildlife whilst woodland habitats establish. Once woodland planting has initially matured (c.15 years), thinning of trees may be necessary and under-sowing of a suitable woodland flora seed mix will be undertaken to establish a diverse ground flora reflecting locally distinct woodlands.

7.184 Woodland flora/woody species translocation, planting schemes and management would be secured via detailed designs and/or a suitably worded planning condition, including the provision of a site-wide **EMEMP**.

7.185 Subject to the implementation of this mitigation **no significant residual effects** are predicted in respect of woodland.

Bats

7.186 Severance of hedgerows will be mitigated through detailed design of landscaping and management. At severance points, landscaping and trees / shrubs will be managed to establish bat 'hop-overs', where vegetation encourages bats to fly up and over roads/gaps. No artificial lighting will be installed at these severance points.

7.187 Retained hedgerows will be gapped up with new tree and shrub planting to maximise their navigational ('flight-line') interest for bats. No artificial lighting will be installed along these retained hedgerows.

7.0188 The loss of the foraging opportunities will be mitigated through increasing the quality of retained and created habitats, both in respect of structure, diversity and species-richness, including:

- New wildflower grassland creation (in open space and drainage basins)
- Woodland planting
- Retained hedgerow enhancement and management
- New hedgerow planting
- Drainage basins with 'micro-pool' ponds
- Wildlife ponds
- Orchard planting

7.189 The enhancements and new habitat creation detailed above will provide a structurally diverse and species-rich habitat which is anticipated to result in an increase in invertebrate biomass and thereby enhance the foraging potential at the Site for bats.

7.190 No bat roosts were confirmed to be present at the Site in historic survey work. However, a number of trees to be removed or subject to felling works are identified to have potential to support roosting bats. Therefore, prior to felling or significant tree surgery works, those trees identified to have potential to support roosting bats will be subject to aerial tree climbing inspection and/or emergence/return to roost surveys, with any subsequent mitigation and licensing where appropriate, carried out as required.

7.191 In addition to any mitigation required, enhancement measures will include integrated roosting features into new buildings/structures across the Site.

7.192 These measures would be secured via detailed designs and/or a suitably worded planning condition, including the provision of a site-wide EMEMP, as described below.

7.193 The lighting scheme for the Site will be sensitively designed so as to avoid light spill along the existing hedgerows (particularly severance points), retained section of the woodland and all enhanced and created habitats detailed above, thereby maintaining these habitats as foraging/commuting features for bats. This would be secured via control of detailed lighting designs and/or a suitably worded planning condition.

7.194 With the implementation of this mitigation **no significant residual effects** are predicted in respect of bats.

Badger

7.195 It is anticipated that the two existing outlier badger setts on-site can be retained alongside development, with the main sett south of the Site (along the disused railway line) unaffected by the scheme. However, there remains a limited risk that construction works could collapse badger tunnels associated with this sett or any new setts dug in the interim at the Site. Works will potentially generate a higher level of disturbance than the existing conditions (arable farmland), although these are anticipated to fall within the acceptable tolerances of badgers.

7.196 Given the potential for sett damage a licence from Natural England may be required to work in the proximity of existing/new setts, possibly to include full closure or partial/temporarily sett closure works. A licence from Natural England can only usually be obtained once full planning permission has been granted.

7.197 In addition, the following precautionary measures will be implemented, and would be secured via a suitably worded planning condition:

- Pre-construction badger survey and monitoring for signs of new sett digging.
- Covering any open excavations with wooden boards, or fitting them with appropriate escape ramps, in order to prevent badgers falling into them and injuring themselves or becoming trapped.
- Monitoring of site for any new sett excavation during prolonged remediation, construction or landscaping works.
- Night working within 30m of any active existing or new setts will be avoided to prevent noise disturbance and night time illumination near to setts.

7.198 The following mitigation measures will be implemented to minimise disturbance to badgers arising from the operational phase of the development:

- The lighting scheme for the site will be sensitively designed so as not to illuminate the vegetation which covers badger setts, or excessively illuminate features which are likely to function as 'badger corridors'.
- Protective shrubs i.e. prickly/thorny species, will be planted around new badger setts to deter interference from dogs and local residents. Species used will be native and also provide foraging potential, such as blackthorn.

7.199 These measures would be secured via control of detailed landscape design and/or a suitably worded planning condition, with details included within a site-wide EMEMP.

7.200 With the implementation of this mitigation **no significant residual effects** are predicted in respect of badger.

Birds

7.201 Based on their legal protection, any clearance of potential nesting habitat (e.g. wooded habitat, hedgerows, grassland fields or arable land) should be undertaken outside of the bird nesting season (March-August

inclusive) or immediately following confirmation by a suitably qualified ecologist that no active nests are present.

- 7.202 Extensive planting of tree and shrubs will be undertaken throughout the Site including scattered trees, woodland, hedgerows and an orchard, which would provide extensive foraging and nesting habitat for birds, mitigating for the loss of any existing hedgerow and wooded habitat to be removed. This planting will include abundant seed, fruit and nut-bearing species to provide a high-quality foraging resource. In addition, wider habitat creation, including wildflower grassland, wildlife ponds and 'micro-pool' ponds is anticipated to attract an abundant invertebrate biomass – an important foraging resource for a variety of birds.
- 7.203 New nesting opportunities will be provided with integrated bird nesting features, such as swift boxes, within buildings/structures across the Site.
- 7.204 It is acknowledged that the above would provide opportunities for a more suburban assemblage of bird species, and some arable associated birds such as skylark, could not be accommodated for within the scheme. Nonetheless, the overall number of bird species and their abundance (biomass), could be reasonably accommodated, where the above habitat creation and enhancement measures are robustly implemented and maintained.
- 7.205 These measures would be secured via detailed landscape designs and/or a suitably worded planning condition, including the provision of a site-wide EMEMP.
- 7.206 With the implementation of this mitigation **no significant residual effects** are predicted in respect of birds.

Reptiles

- 7.207 Any field margins, hedgerows and wooded habitat to be lost or damaged by construction works will be subject to precautionary clearance works to allow reptiles to disperse safely into adjacent retained habitat, avoiding any direct impact to individual reptiles.
- 7.208 Vegetation clearance would take place, during warm and dry conditions when reptiles will be active and able to disperse safely, subject to nesting bird constraints. Clearance will be completed in a staged manner, comprising gradual vegetation height reduction from 200mm to ground level. All arisings will be removed to prevent use as refugia.
- 7.209 Direction of cutting will be undertaken strategically at the furthest point from the retained suitable reptile habitats, moving gradually towards retained areas of the Site. Suitably experienced persons will move ahead of the clearance works, conducting a hand search of any potential refugia for reptiles. Any reptiles found will be captured and relocated to an adjacent area of retained habitat.
- 7.210 Prior to the onset of construction vegetation height will be maintained below 150mm to maintain habitat as unsuitable for reptiles and prevent the dispersal of reptiles into phase one of the development during construction.
- 7.211 Reptile mitigation measures would be secured via a suitably worded planning condition. In addition, appropriate management of existing and newly created habitat for reptiles at the Site will be set out within a site-wide EMEMP to ensure these areas provide suitable habitat for reptiles in the long-term.
- 7.212 With the implementation of this mitigation **no significant residual effects** are predicted in respect of reptiles.

Amphibians

- 7.213 The scheme will require one of the following mitigation options in respect of ensuring compliance with legal protections for GCN:
- Either clearance and construction work undertaken under a Non-licensed Methods Statement where risk of killing or injury can be sufficiently reduced to avoid offences being caused. This methods statement would include timing of works to avoid sensitive seasons (hibernation) and precautionary clearance works under ecological supervision;
 - Works undertaken under the auspices of a derogation ('mitigation') licence from Natural England to allow works that would otherwise be illegal. It is anticipated that such a licence would make use of the New Licencing Policies (NLPs) to minimise the extent of 'traditional' trapping and translocation exercises, and increasing the provision of new terrestrial and aquatic habitat provision that has been included within the scheme, or;
 - Registration of the scheme under the South Midlands District Licensing regime, whereby payments are made to the strategic initiative to deliver off-site mitigation and allowing works on-site to be undertaken with significantly reduced or no mitigation measures in respect of avoiding killing or injury of GCN.
- 7.214 The scheme includes a range of landscaping which will be of benefit to amphibians, GCN and common toad, including creation of **six dedicated wildlife ponds** (c.3000m²) off-line from SuDS features, c.10 basins with micro-pools (permanent waterbodies at the centre of drainage basins to serve as wildlife ponds), new hedgerows, woodland planting and wildflower grassland. In addition, the existing field ponds P3, P4 and P5 will be desilted/excavated/extended (subject to tree protection measures) and allowed to recolonise naturally. The creation of this habitat will mitigate for the loss of terrestrial opportunities and provide increased aquatic opportunities for breeding amphibians.
- 7.215 Amphibian mitigation measures would be secured via the above licensing frameworks and/or suitably worded planning condition, as set out in further details under the site-wide EMEMP.
- 7.216 With the implementation of this mitigation **no significant residual effects** are predicted in respect of amphibians.

Residual Effects

- 7.217 Based on the delivery of the mitigation set out above, secured via detailed design, planning obligation and/or planning condition and enshrined within the proposed site-wide **Ecological Mitigation, Enhancement & Management Plan (EMEMP)** and implemented across the scheme, no significant residual adverse effects on the identified important ecological features are predicted.

Biodiversity Net Gain & Ecological Enhancement

- 7.218 The following biodiversity metric calculation, provided in detail in **Appendix 7.4**, sets out the anticipated biodiversity net gain/loss for the proposed scheme, based upon indicative layout, landscaping and ecological mitigation measure proposed herein:
- **HABITATS:**
 - **A. Existing Baseline**= 358.01 Habitat units
 - **B. On-site Post-Intervention**= 557.37 Habitat Units
 - **C. Total Net Unit Change (B-A)**= +199.36 Gain of Habitat Units
 - **HEDGEROWS:**
 - **A. Existing Baseline**= 74.84 Hedgerow units

- **B. On-site Post-Intervention**= 79.35 Hedgerow Units
- **C. Total Net Unit Change (B-A)**= +4.50 Gain of Hedgerow Units

- 7.219 The Biodiversity Metric Calculation demonstrates a **substantive net gain for biodiversity of 116.26 units or +31.92% for habitats**, and separately **4.5 units or +6.02% gain for hedgerows** is deliverable based on the proposed scheme. Such a net gain would accord with policy NE3 of Plan:MK and draft policy NE1 of the VALP.
- 7.220 The final extent of any net gain will subject to the control of detailed landscape design and robust implementation of proposed ecological mitigation, as well as commitment to habitat establishment and longer-term management to be set out within the site-wide EMEMP. Subsequent biodiversity metric calculations may be necessary at the appropriate Reserved Matters stage.
- 7.221 It is important to note that the appended Biodiversity Metric Calculation proposes the management, restoration and creation of those habitats targeted within the Whaddon Chase BOA, namely:
- Hedgerows
 - Lowland Meadows
 - Woodlands
 - Ponds
- 7.222 Furthermore, targeted ecological enhancement measures are proposed to benefit specific invertebrates as part of the scheme, namely:
- Dry SuDS infiltration basins would be created to expose chalk-clay subsoil (no/little topsoil) and sown with an appropriate seed mix and managed sensitively to establish species rich calcareous grassland of significant invertebrate interest. Vegetation will include both bird's-foot trefoil and agrimony, the larval foodplants of dingy- and grizzled- skipper, respectively.
 - Appropriate woodland management and new woodland planting for wood white and other species
 - Planting of disease resistant elm trees for white-letter hairstreak
 - Planting of locally source native black poplar to benefit a range of invertebrates

Cumulative Effects

- 7.223 Cumulative adverse effects have been considered for the proposed development with the following project only:
- **East-West Rail**, a nationally important infrastructure project running adjacent to the Site to the south.
 - This major infrastructure scheme includes a significant provision of land as ecological mitigation along the railway route and the vast majority of impacts of the scheme will be mitigated accordingly.
 - In a localised context, EWR and the application scheme will cause further disruption to badger territories given the anticipated loss of main setts along the railway and foraging habitat at the application site. Whilst no significant adverse effects are predicted, potential further legal implications include the breakdown of badger clan territories, leading to the potential for new setts being dug in construction zones of either project. An artificial badger sett is understood to be proposed on the southwestern boundary
 - A 3.9ha area of Ecological Mitigation for EWR is to be undertaken in close proximity to the SWMK site (to the southwest), identified as "*B23 Land West of Whaddon Road, Newton Longville*". This includes the following habitats creation "...*Lowland mixed deciduous woodland (HPI), species-rich grassland*"

turves (translocated from Railway Sidings East of Salden Wood LWS) and reptile embankments”.

Proposed habitat creation at SWMK will likely complement some of this habitat creation/mitigation work. Two further areas of ecological mitigation to the east near Blue Lagoon LNR and west to Salden Lane which will contribute to the wider ecological networks in combination with the SWMK scheme.

- Overall, subject to the implementation of mitigation proposed for this scheme, no additional significant adverse effects are predicted as a result of ‘additive’ or ‘synergistic’ cumulative effects. Some additive or synergistic beneficial effects may occur as a result of combined habitat creation works.
- The remainder of the **Tattenhoe Park development** (ref 17/00918/OUT), located north of the Site;
 - This development is understood to be built out in 6 phases, with Phase 1 already complete together with a Primary School. The scheme is located largely within agricultural land, and provides some extension to Tattenhoe Country Park, with a number of ponds and woodland areas already in place
 - The important amphibian (GCN and common toad) population associated with Tattenhoe Country Park is largely isolated from the SWMK scheme with the possible exception of dispersal through a pedestrian underpass under Standing Way (A421). Therefore, effects from Tattenhoe Park development upon amphibians are unlikely to be cumulative with SWMK.
 - Cumulative loss of agricultural land is only anticipated to have an adverse effect upon a small range of farmland bird species. However, given the provision of habitat for a breeding birds, in general, both at SWMK and Tattenhoe Park development, the adverse effect upon the wider bird assemblage is not anticipated to be significant.
- The draft strategic allocation D-WHA001 **Shenley Park** as outlined within the Main Modifications versions of the VALP:
 - No ecological information is available in respect of Shenley Park, with the exception of that available via online resources (e.g. MAGIC maps) for the identified areas. This and aerial photograph indicate the site is dominated by agricultural land similar to that at SWMK
 - As with Tattenhoe Park Development cumulative loss of agricultural land is only anticipated to have an adverse effect upon a small range of farmland bird species. However, given the provision of habitat for a breeding birds in general both at SWMK and Tattenhoe Park development, the adverse effect upon the wider bird assemblage is not anticipated to be significant.

7.224 In summary no significant adverse cumulative effects are predicted as a result of the proposed scheme in combination with other identified schemes nearby subject to deliver of mitigation with each of the identified schemes and SWMK.

Summary

7.225 Table 7.4 below sets out a summary of the ecological impact assessment undertaken:

Table 7.4 Summary of Ecological Impact Assessment

Important Ecological Feature	Ecological importance	Likely Significant Effects OR Legal Infringement (before mitigation) Construction Phase	Likely Significant Effects OR Legal Infringement (before mitigation) Operational Phase	Mitigation	Likely Significant Residual Effects
SSSIs	National	None	None	-	-
Blue Lagoon LNR	Local	None	None	-	-

Important Ecological Feature	Ecological importance	Likely Significant Effects OR Legal Infringement (before mitigation) Construction Phase	Likely Significant Effects OR Legal Infringement (before mitigation) Operational Phase	Mitigation	Likely Significant Residual Effects
Railway sidings east of Salden Wood LWS	County	None	None	-	-
Other LWSs	County	None	None	-	-
Milton Keynes Wildlife Corridors	County	None	None	-	-
Hedgerows with Mature trees	Local	Local, adverse (Moderate effect)	None	Protection of retained habitat; new hedgerow planting; hedgerow management & enhancement	None
Woodland	Local	Local, adverse (Moderate effect)	Local, adverse (Moderate effect)	Protection of retained habitat; woodland management; ; new woodland planting	None
Bats	Local	Local, adverse (Moderate effect) & potential legal infringement	Local, adverse (Moderate effect) & potential legal infringement	Pre-construction survey of trees to be felled/subject to significant work; habitat creation; establishing bat hop-overs at hedgerow severance points, sensitive lighting scheme; provision of integrated bat boxes	None
Badger	Protected	None; potential legal infringement only	None	Pre-construction badger survey; precautionary working methods; potential need for NE mitigation licence	-
Birds	Local, Protected	Local, adverse (Moderate effect) & potential legal infringement	Local, adverse (Moderate effect) & potential legal infringement	Nesting bird avoidance measures; habitat creation; provision of integrated bird boxes	None
Reptiles	Local, protected	None; potential legal infringement only	None; potential legal infringement only	Precautionary clearance methods; habitat creation	-

Important Ecological Feature	Ecological importance	Likely Significant Effects OR Legal Infringement (before mitigation) Construction Phase	Likely Significant Effects OR Legal Infringement (before mitigation) Operational Phase	Mitigation	Likely Significant Residual Effects
Amphibians	Local, protected (GCN)	Potential legal infringement only	None	Habitat creation (incl. wildlife ponds/SuDS micro-pools); either (a) non-licensed methods statement, (b) EPS licence OR (c) registration under district licence;	None

7.226 In addition to the assessment of individually important ecological features, based on the 'Biodiversity Metric Calculation' undertaken, significant net gains in respect of all biodiversity (habitats) are predicted.

7.227 The proposed development will inevitably result in a change to the farmland communities of species and habitats present, but as demonstrated there is scope for the scheme to maintain, and enhance, biodiversity more generally, through the measures set out.

7.228 Based on the above, the proposed development is considered to accord with National and Local planning policies relating to wildlife and biodiversity including those highlighted above.

7.229 The following key measures will be implemented to ensure impacts are mitigated, enhancement delivered and Biodiversity Net Gain (BNG) achieved:

- **Habitat Creation and Commitment to Management** including:
 - A total of **six dedicated wildlife ponds** (c.3000m²) off-line from drainage features to benefit amphibians and other wildlife
 - SuDS basins & swales to include
 - A total of **10 'micro-pool' wildlife ponds** within drainage basins on northern and southern boundaries to benefit amphibians and other wildlife;
 - **Wet grassland** creation within attenuation basins adjacent to micropools and in swales
 - **Chalky-clay grassland creation** within exposed soil horizons dry infiltration basins (sown with calcareous wildflower grassland seed) to benefit invertebrates such as grizzled and dingy skipper
 - Desilting/excavation/extension of remnant field ponds (P3, P4 and P5), subject to tree protection measures
 - A community orchard (c.0.39ha), providing important invertebrate as well as amenity features;
 - Wildflower grassland creation within wider landscaping (c.18ha);
 - Extensive woodland planting (c.15ha);
 - Planting of locally sourced native black poplar *Populus nigra* ssp *betulolia* in wetter locations (SuDS basins, adjacent to swales and wildlife ponds) and Disease Resistant Elm (DREs) trees for white-letter hairstreak butterfly
 - New hedgerow planting, and management/enhancement of retained hedgerows.
- Inclusion of **Integrated Bat & Bird Boxes** into new buildings across the Site to provide permanent, zero maintenance features for bats and birds. An indicative quantum of one integrated bat or bird box per 10 residential units is suggested, with units/structures adjacent to open space and/or drainage features

favoured. Bird boxes would be installed on northern elevations and bat boxes on southern, all about 3m and away from lighting and visually important building elevations and windows.

- Appointment of dedicated **Ecological Clerks of Works (ECoWs)** responsible for site-wide ecological mitigation, enhancement and management measures set out herein are successfully implemented.
- **Safeguards for protected species** including for nesting birds, bats, badgers, reptiles and great crested newt to ensure compliance with legal protections.
- **Sensitive External Lighting Design** to ensure adverse effects on bats and other nocturnal wildlife are minimised.
- **Tree Protection Measures** employed to ensure trees, woodland and hedgerows are protected during construction

7.230 Importantly, all of these measures will be secured via detailed design, planning obligation and/or planning condition and set out in further detail in the proposed site-wide **Ecological Mitigation, Enhancement & Management Plan (EMEMP)** and implemented across the scheme. The EMEMP will set out in specific detail the mitigation proposed above for fauna and habitats, how existing habitats will be restored / enhanced, how new priority habitats will be created and managed. This plan would include a requirement for monitoring by the ECoW(s) where applicable.

Conclusion

- 7.231 Subject to the successful implementation of proposed mitigation measures, no significant adverse effects are predicted in respect of ecology and biodiversity. Furthermore, where proposed enhancement measures are successfully implemented and appropriate management regimes are established, the scheme is predicted to deliver some beneficial effects, potentially delivering substantial net gains for biodiversity.
- 7.232 The production and implementation of the site-wide EMEMP document, bringing together the detail of mitigation, enhancement and management measure will be instrumental in ensuring the necessary measures are successfully delivered and any net gains realised.

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8. DRAINAGE

Introduction

- 8.01 This chapter of the ES assesses the likely significant effects of the proposed development on water resources and flood risk.
- 8.02 The chapter describes the assessment methodology; the baseline conditions at the site and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after these measures have been employed.
- 8.03 It is proposed to implement a Sustainable Drainage Systems (SuDS) to sustainably manage surface water run-off within the proposed development in line with current best practice recommendations.
- 8.04 Through utilisation of a number of naturally landscaped features such as attenuation basins and conveyance swales, it will be possible to reduce run-off to the required greenfield run-off rates as required by the Environment Agency (EA).

Legislative and Planning Policy Context

Water Resources Act 1991

- 8.05 This Act sets out the regulatory controls and restrictions that provide protection to the water environment through controls on abstraction, impounding and discharges as well as identifying water quality and drought provisions.

Environment Act 1995

- 8.06 This Act established and outlined the duties of the EA in respect to (amongst other matters) water quality and flooding.

Water Act 2003

- 8.07 This Act formalises the Government's commitment to the sustainable management and use of water resources.

Groundwater Directive

- 8.08 The Groundwater Directive (80/68/EEC) aims to protect groundwater from pollution by controlling or prohibiting discharges and disposals of certain dangerous 'listed' substances to groundwater. In the UK, the directive is implemented through the Groundwater Regulations 1998.
- 8.09 The existing Groundwater Directive is to be repealed by the Water Framework Directive in 2013. New or amended regulations are expected before then to enact both the Water Framework Directive and its Daughter Directive (2006/118/EC) on the protection of groundwater.

Water Framework Directive

- 8.010 The EU Water Framework Directive (2000) has been a major driving factor in planning policy. The directive aims to generate a more integrated approach to water management, ensuring that links with ecology are increased. It strives to ensure that water quality is improved and not impaired by development. The directive has been transposed into English law as The Water Environment (Water Framework Directive) (England and Wales) Regulations, 2003 (Ref. 10.6).

Flood and Water Management Act 2010

- 8.011 This act aims to improve both flood risk management and the way we manage our water resources. The Act creates clearer roles and responsibilities and instils a more risk-based approach. This includes a new lead role for local authorities in managing local flood risk (from surface water, ground water and ordinary watercourses) and a strategic overview role for all flood risk for the EA.

Adopted Aylesbury Vale District Local Plan (2004)

- 8.012 The current Aylesbury Vale District Local Plan was adopted in 2004 and various policies within the adopted Local Plan were saved by ministerial direction in 2007.
- 8.013 The adopted Local Plan makes no reference to this proposed development within the 'Proposals Map.'
- 8.014 There are no saved policies from the Local Plan that relate to flooding & drainage matters.

Plan: MK (2019)

- 8.015 The new Local Plan for Milton Keynes, Plan:MK was adopted by Milton Keynes Council in March 2019. This document provides policy for 'Managing Flood Risk' (FR1), 'Sustainable Drainage Systems (SuDS)' and 'Integrated Flood Risk Management' (FR2) and 'Protecting and Enhancing Watercourses' (FR3).
- 8.016 Under Policy FR1 the *"Plan:MK will seek to steer all new development towards areas with the lowest probability of flooding. The sequential approach to development, as set out in national guidance, will therefore be applied across the Borough, taking into account all sources of flooding as contained within the Council's SFRA. Development within areas of flood risk from any source of flooding, will only be acceptable if it is clearly demonstrated that it is appropriate at that location, and that there are no suitable available alternative sites at a lower flood risk"*.
- 8.017 Under Policy FR2 the *"Plan:MK advocates the continuation of a strategic, integrated approach to managing flood risk which seeks the management of surface water to be planned at the largest appropriate scale for the new development and incorporated into the site at the earliest opportunity in the design process. New development is required to incorporate SuDS; in line with national policy and guidance and, which meet the requirements set out in national standards and the Council's relevant local guidance"*.
- 8.018 Under Policy FR3 *"All new development must be set back at a distance of at least 8 metres from any main rivers, at least 9 metres from all other ordinary watercourses, or at an appropriate width as agreed by the Environment Agency, Lead Local Flood Authority or Internal Drainage Board, in order to provide an adequate undeveloped buffer zone. The Council will resist proposals that would adversely affect the natural functioning of main rivers and ordinary watercourses, this includes through the culverting of open channels, unless for access purposes"*.

- 8.019 The Flood Risk Assessment and sustainable surface water drainage strategy demonstrate that flood risk will be managed, as far as reasonably practicable, in accordance with the above policies.

National Planning Policy Framework 2019

- 8.020 The updated National Planning Policy Framework (NPPF) was published in February 2019 and sets out the Government's national policies for flood risk management in a land use planning context within England.
- 8.021 Paragraph 155 of the NPPF states that *"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere."*
- 8.022 Paragraph 158 recognises the importance of the strategic flood risk assessment in the local plan process as the basis for applying the sequential approach. Paragraph 162 indicates that the sequential test need not be carried out on sites allocated in the development plan. Paragraph 163 further states that local planning authorities should *"ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment."*
- 8.023 Government guidance states that development proposals do not require a Sequential Test if the following applies:
The site has been allocated in the development plan through the sequential test. The site lies wholly within Flood Zone 1.
- 8.024 It is for the local planning authority to formally undertake the sequential test and the site has been assessed through the Aylesbury Vale Level 1 & 2 Strategic Flood Risk Assessments and has been proposed for allocation in the emerging VALP (site reference NLV001).
- 8.025 As such, notwithstanding the general requirement noting that the site is very largely in Flood Zone 1 and that a Sequential Test has already been undertaken to inform the proposed allocation in the draft VALP, additional sequential testing may not be considered necessary.

Aylesbury Vale Level 1 Strategic Flood Risk Assessment (SFRA) (August 2017)

- 8.026 Aylesbury Vale Level 1 SFRA was published in August 2017 and identifies flood risk as a key issue across the District and stresses the importance of surface water management for the area. It also identifies various infiltration potential across the District, with the need for site-specific infiltration testing to be undertaken to confirm the viability of this as a method of surface water disposal.
- 8.027 Intrusive site investigations as detailed within site investigation works, undertaken by Geo Environmental Group GEG detailed within the Phase I Review & Strategic Phase II Geo-Environmental Assessment, dated December 2017, have identified infiltration is highly unlikely to be a viable means of surface water disposal on the application sit. As such, an infiltration led drainage strategy will not be provided.

Aylesbury Vale Level 2 Strategic Flood Risk Assessment (SFRA) (August 2017)

- 8.028 The site is specifically referenced in the Aylesbury Vale Level 2 SFRA as site 'NLV001.' The Level 2 SFRA identifies that 99% of the site is located in Flood Zone 1 and that there has been no historic evidence of flooding at the site based on the Environment Agency Historic Flood Map.

- 8.029 It also identifies that the current Flood Zones within the site boundary are based on a JFLOW+ model. It is stated that;

“JFLOW+ shows the drain to the north of the site has a relatively confined floodplain, even at the 1 in 100 + 65% climate change, with relatively shallow floodplain depths (<0.1m)”

Milton Keynes Level 1 Strategic Flood Risk Assessment (April 2015)

- 8.030 The SFRA identifies that areas of Milton Keynes flooded significantly during floods of 1947 and 1968, including areas surrounding Bletchley, however since the development of Milton Keynes New Town catchment characteristics have altered significantly.
- 8.031 Within Bletchley, flooding was also reported on Water Eaton Road in both 1998 and 2006, however this was significantly downstream of the site.
- 8.032 It is also indicated that Tattenhoe Park (north of the proposed development site) is understood to have swales and ponds taking surface water from roads and surrounding residential developments and to control outflow rates to the Loughton Brook.
- 8.033 The proposed development will sustainably manage surface water to ensure that there is no increase in potential flood risk to nearby receptors.

Draft Vale of Aylesbury Local Plan (2013-2033)

- 8.034 The draft Vale of Aylesbury Local Plan (2013-2033) was submitted to the Planning Inspectorate in February 2018 and public examination hearings were held in July 2018.
- 8.035 Following the Local Plan Inspector's publication of his interim findings, AVDC published its proposed Main Modifications, which were subject to consultation in November and December 2019. It is anticipated that VALP will be adopted during 2020.
- 8.036 Policy I14 (Flooding) of the draft VALP states that development layout should be informed by SuDS, and all sites should manage surface water run-off using SuDS.
- 8.037 In addition to this a management plan should be provided to ensure the maintenance of SuDS on new development sites. The draft Proposals Map 8 does not identify any proposals within the allocated site area.
- 8.038 The site is proposed for allocation (site reference NLV001) within the draft VALP, with the following comment is made with relation to surface water drainage and the site; *“Multi-functional Green Infrastructure will be required to control surface water flows and flooding.”*
- 8.039 An indicative sustainable surface water drainage strategy, complying with Local Plan policy, has been proposed for the development (ref. 1442-D-003.pdf, WSP, March 2020).

Planning Practice Guidance

- 8.040 The Planning Practice Guidance (PPG) sets out the Government's national guidance for flood risk management in a land use planning context within England.

- 8.041 The guidance states that local planning authorities should “*apply a sequential approach to the site selection so that development is, as far as reasonably possible, located where the risk of flooding (from all sources) is lowest, taking account of climate change and the vulnerability of future site uses to flood risk*”.
- 8.042 Allocation and planning of development must therefore be considered against a risk-based search sequence as provided by the guidance. With regards to fluvial flooding, the guidance categorises the risk in four principal levels as shown in **Table 8.1**.

Table 8.1 Flood Zones (PPG Table 1)

FLOOD ZONE	PROBABILITY	DESCRIPTION
Flood Zone 1	Low <0.1% AEP	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown without colour (clear) on the Environment Agency Flood Map for Planning – all land outside Zones 2 and 3).
Flood Zone 2	Medium 0.1% - 1.0% AEP	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue area on the Environment Agency Flood Map for Planning).
Flood Zone 3a	High >1.0% AEP	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue area on the Environment Agency Flood Map for Planning).
Flood Zone 3b	Functional Floodplain >5% AEP	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency (Land that is also shown within the dark blue area on the Environment Agency Flood Map for Planning. It should be noted that this is not separately distinguished from Zone 3a on public mapping).

Milton Keynes Surface Water Drainage; Local Guidance for Planning Applications (December 2014)

- 8.043 This guidance document provides advice for developers including recommendations that surface water should be controlled as near to source as possible, promotes the use of green open SUDS features, and that future maintenance of proposed features should be considered.
- 8.044 Attenuation & runoff requirements, surface water drainage strategy and the respective operation and maintenance information for the proposed development have been provided to ensure compliance with the guidance.

Assessment Methodology

8.045 The criteria for assessing the magnitude of the predicted impact is given in **Table 8.2** below.

Table 8.2 Criteria for Assessing Magnitude of Impact on Environment Receptors

MAGNITUDE	IMPACT
Major	Loss of Asset
Moderate	Loss of integrity or partial loss of asset
Minor	Minor impact / loss of asset
Negligible	Insignificant loss of asset that does not affect use or integrity

Assessing the Sensitivity of Receptors

8.046 The criteria for assessing the sensitivity of receptors is given in **Table 8.3** below.

Table 8.3 Criteria for Assessing Sensitivity of Receptors

SENSITIVITY	RECEPTORS
High	Attribute with high quality and rarity, important at a regional or local scale, or a feature of medium quality and rarity, important at a regional or national scale.
Medium	Attribute with a medium quality and rarity, important at a regional or local scale, or a feature of low quality and rarity important at a regional or national scale.
Low	Attribute with low quality and rarity, important at a local scale.

Determining the Significance of Effect

8.047 The matrix for assessing the significance of an effect is given in **Table 8.4** below. Moderate and Major effects are considered to be significant, as explained in Chapter 4 of this ES: EIA Methodology.

Table 8.4 Matrix for Determining the Significance of Effect

Significance	High	Major	Major	Moderate	Minor	Insignificant
	Medium	Major	Moderate	Minor	Negligible	
	Low	Moderate	Minor	Negligible	Negligible	
		Major	Moderate	Minor	Negligible	No Impact
MAGNITUDE OF IMPACT						

Baseline Conditions

8.048 The water resources and flood risk baseline conditions of the Site and surroundings have been assessed at the time of the planning application. The key local water (or water related) features are identified and their context outlined prior to the identified specific conditions in terms of:

- Flood risk;
- Surface water drainage;
- Geomorphology;
- Water quality;
- Water resources; and
- Groundwater (in terms of its interactions with surface water).

Historic Flooding

8.049 Contact has been made (in March 2020) with Buckinghamshire County Council (now Buckinghamshire Council) LLFA and Milton Keynes Council LLFA to enquire about historical flooding in proximity to the proposed development however no response has been received to date.

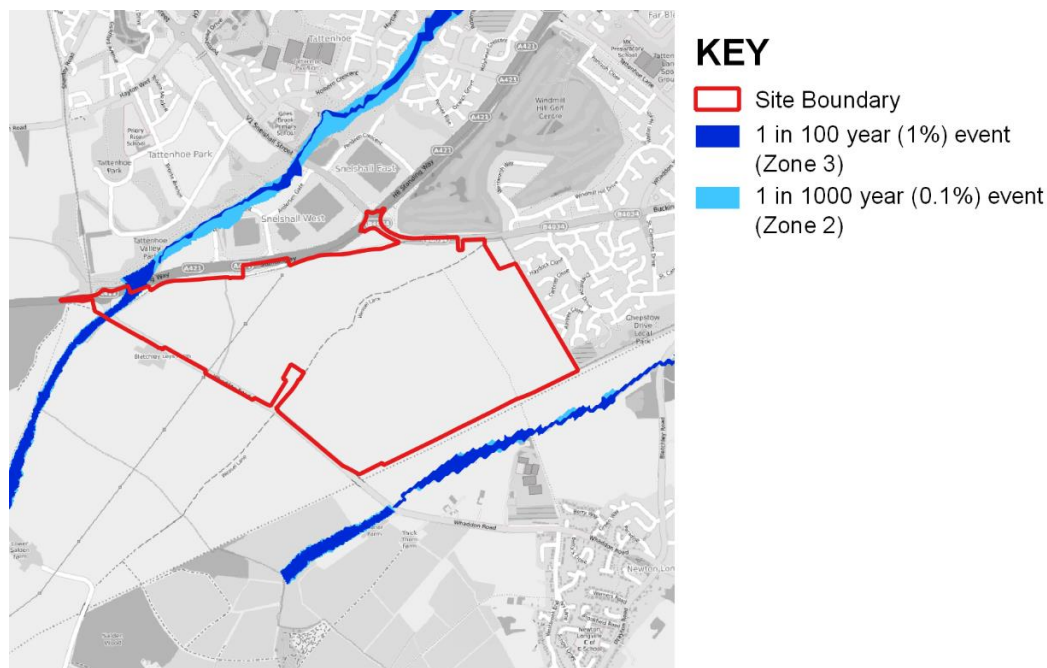
8.050 Strategic Flood Risk Assessments undertaken for both Aylesbury Vale District Council and Milton Keynes Council have been examined for historic flood risk. These do not identify any historic flooding within the site boundary.

Fluvial Flood Risk

8.051 Reference to the publicly available Flood Map for Planning confirms that the majority of the proposed development site lies within Flood Zone 1, with a small area (approximately 9,000m²) of the north-west corner of the site within Flood Zones 2 and 3, associated with an unnamed ordinary watercourse.

8.052 An extract of the publicly available Flood Map for Planning is reprinted in **Figure 8.1**.

Figure 8.1 Flood Map for Planning Extract



8.053 The site is specifically referenced in the Aylesbury Vale Level 2 SFRA as site 'NLV001' which explains that 99% of the site is located in Flood Zone 1. The localised Flood Zone 2 and 3 associated with the unnamed, ordinary watercourse, have been delineated based on a JFLOW+ model. It is stated that;

"JFLOW+ shows the drain to the north of the site has a relatively confined floodplain, even at the 1 in 100 + 65% climate change, with relatively shallow floodplain depths (<0.1m)."

8.054 Given this, fluvial flood risk may be considered to be low. **Identified Fluvial Flood Risk: Low**

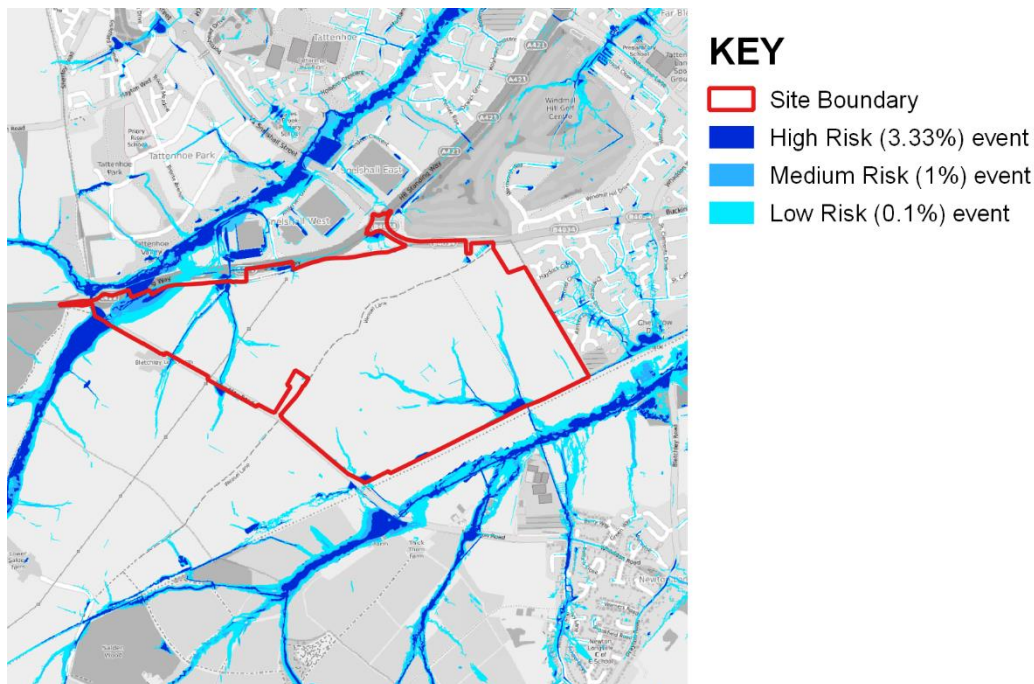
Tidal Flood Risk

8.055 Due to its inland location, tidal flooding may not be considered to be a risk to this site. **Identified Tidal Flood Risk: Very Low**

Surface Water Flood Risk

8.056 The 'Long Term Flood Risk Information,' in particular relating to the 'Flood Risk from Surface Water Mapping,' identifies a number of surface water flow paths across the site, and an area of surface water ponding in the south of the site as shown in **Figure 8.2**.

Figure 8.2 Flood Risk from Surface Water Map Extract



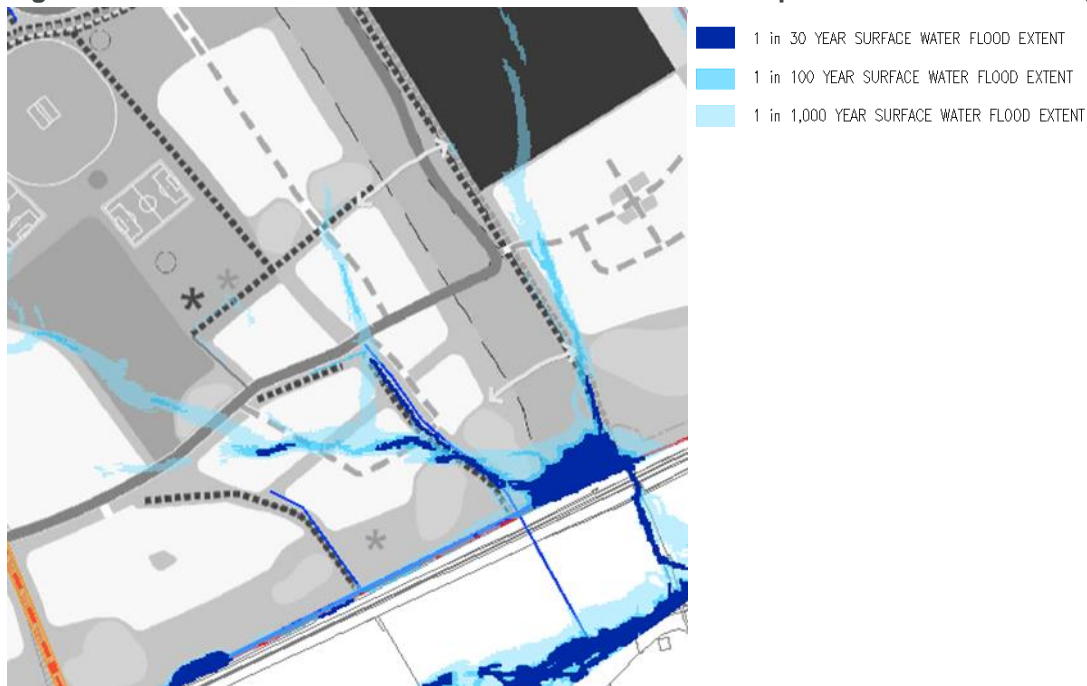
8.057 The production of this mapping has been undertaken at a national scale to provide the first publicly available generation of surface water flood risk mapping. The two previous generations were primarily developed for regulator use as the approach and risk was refined. For example, the first did not include any allowance for sewers, whilst the second incorporated a national loss coefficient.

8.058 Although this generation incorporates local estimates of the sewer infiltration loss, generally at a Lead Local Flood Authority (LLFA) level along with various other refinements in runoff estimation, it does not allow for local improvements to the underlying Digital Terrain Model (DTM). This means that local features such as the adjoining highways are represented as determined from the LiDAR without any consideration to existing drainage features such as culverts or small watercourses which typically manage surface water flow routes.

There are three small, un-named watercourses identified within the site boundary, which are identified as areas of 'high surface water flood risk;' two in the north west area of the site and one in the south east area of the site.

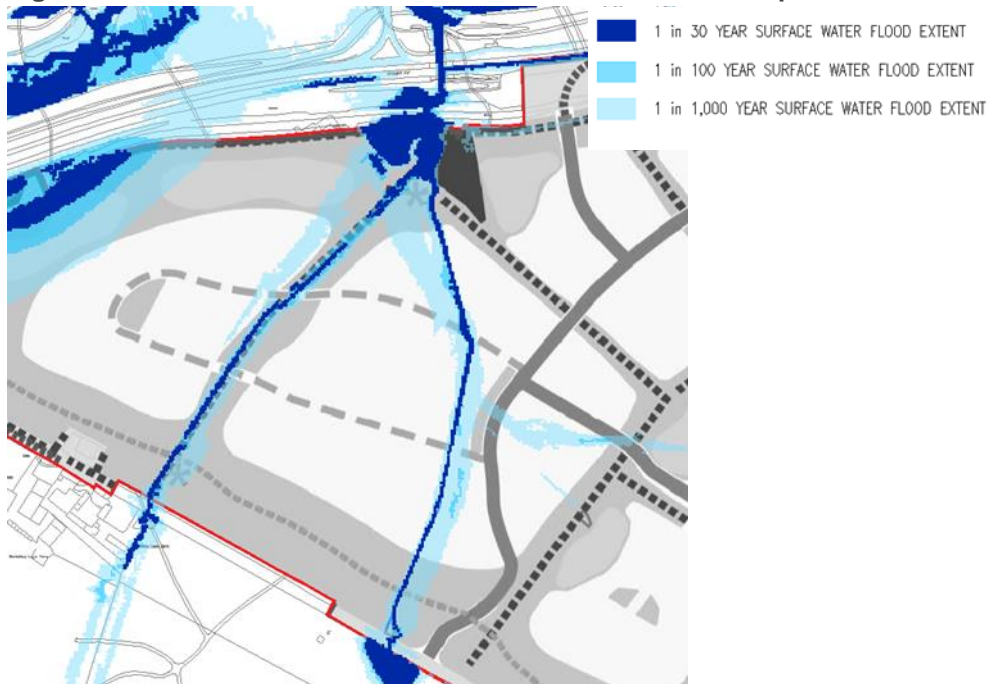
- 8.059 Within the south east area of the site, there are a number of small, unnamed, ordinary watercourses identified with an area of localised, surface water ponding, adjacent to the railway. It is our understanding that there is an existing culvert under the railway line, which is to be retained with the re-opening of the line as part of the East-West Rail project. Following review of the existing land profile within the south of the site, the contributing catchments of these small, unnamed, ordinary watercourses are identified to be wholly located within the site. Given the nature of the proposed development, the contributing catchments, of the small, unnamed, ordinary watercourses, will be managed through the implementation of a sustainable surface water drainage strategy and as a result it may be considered that the currently identified potential surface water flood risk may be reduced. Furthermore, as shown in Figure 8.3, no development is proposed within the area of currently identified surface water ponding, immediately adjacent to the railway, and it is proposed to manage exceedance/overland flow routes through the integration of strategic green-blue corridors or within highways, wherever reasonably practicable, which will be determined through the detailed design and reserved matters process.

Figure 8.3 – Surface Water Flow Routes Illustrated on Development Parameters Plan (South)



- 8.060 It was further noted in correspondence with Buckinghamshire County Council Lead Local Flood Authority (LLFA) dated 20th April 2020 that the surface water flow routes currently identified in the north-east area of the site should be a consideration within the proposed development. The areas of high surface water flood risk in the north-west of the site are illustrated overlaid on the Development Parameters Plan in Figure 8.4.

Figure 8.4 – Surface Water Flow Routes Illustrated on Development Parameters Plan (North)



- 8.061 As shown in Figure 7, no development is proposed within the currently identified area of surface water ponding adjacent to the existing highway to the north, with the western small, unnamed, ordinary watercourse proposed to be retained and enhanced through the implementation of a blue-green corridor.

It is currently proposed to integrate, enhance and reprofile the eastern small, unnamed, ordinary watercourse within the development, as far as reasonably practicable. This will be determined through the detailed design and reserved matters, but may include:

- Diversion and enhancement of the small, unnamed, ordinary watercourse within a blue-green corridor.
- Integration of the small, unnamed, ordinary watercourse within the development parcel within a multi-functional space.
- Maintaining, and enhancing, the small, unnamed, ordinary watercourse within its current alignment.

- 8.062 At the next stage of design, further consideration to the integration of the eastern small, unnamed, ordinary watercourse within the development will be undertaken, ensuring that the proposed development does not exacerbate, and where possible mitigates, existing potential surface water flood risk.

- 8.063 Given this, the potential risk of surface water flooding may be considered to be low. **Identified Surface Water Flood Risk: Medium – Low**

Ground Water Flood Risk

- 8.064 Milton Keynes Council Level 1 SFRA (Appendix B) contains a Groundwater susceptibility map which identifies that the site has limited potential for groundwater flooding to occur both above and below the surface.
- 8.065 The map does not identify any historic Environment Agency groundwater flood records within the vicinity of the proposed development site.

- 8.066 There is one publicly available BGS borehole within the site boundary, of 3.7m depth, which does not encounter groundwater within its depth.
- 8.067 A Phase I Review and Strategic Phase II Geo-Environmental Assessment was undertaken by Geo Environmental Group (GEG) in December 2017 which identified groundwater depths in the winter of 2017 across the site varied from 2.2m – 6.54m deep below ground level across the proposed development site during installation of monitoring.
- 8.068 Given this, the risk of groundwater may be considered to be low. **Identified Groundwater Flood Risk - Low.**

Sewer Flood Risk

- 8.069 Sewer flooding occurs as a result of a number of influencing factors. It is most likely to occur during storms, when large volumes of rainwater enter the sewers. However, it can also occur when pipes become blocked or damaged.
- 8.070 Existing sewerage systems are present on land surrounding the site, by way of existing highway and adopted public sewers serving built development.
- 8.071 Due to confidentiality agreements, Anglian Water have not been contacted for available sewer maps or historic flood records at this time. A site constraints plan (SWMK03\075, David Lock Associates) produced in February 2014 identifies a sewer east of the site. However, no other known sewers are identified within the site boundary.
- 8.072 Given the recommendations by Anglian Water, and that these will be incorporated into the proposed development, potential flood risk from sewers may be considered to be low. **Identified Sewer Flood Risk - Low.**

Reservoirs

- 8.073 Reservoir flooding is extremely unlikely to happen. There has been no loss of life in the UK from reservoir flooding since 1925. All large reservoirs are inspected and supervised by reservoir panel engineers.
- 8.074 The Long Term Flood Risk Information, Flood Risk from Reservoirs Map shows that the site lies outside of the zone of influence from nearby reservoirs.
- 8.075 Given this, the potential flood risk from reservoirs may be considered to be low. **Identified Flood Risk from Reservoirs - Low.**

Canals

- 8.076 Canal flooding is generally rare and the canal network is designed in such a way to direct all additional water beyond the navigation capacity to impounding areas or surrounding watercourses to be conveyed downstream. The risk from canal flooding becomes more of a concern where the structure is elevated on an earth embankment and if there is a rare instance of a catastrophic breach, leading to a sudden drain-down of the pound and resultant overland flow flood risk to development immediately downstream.
- 8.077 The nearest canal is the Grand Union Canal which flows through Bletchley approximately 4km east of the proposed development site.

8.078 Given this, potential flood risk from canals may be considered to be very low. **Identified Flood Risk from Canals: Very Low.**

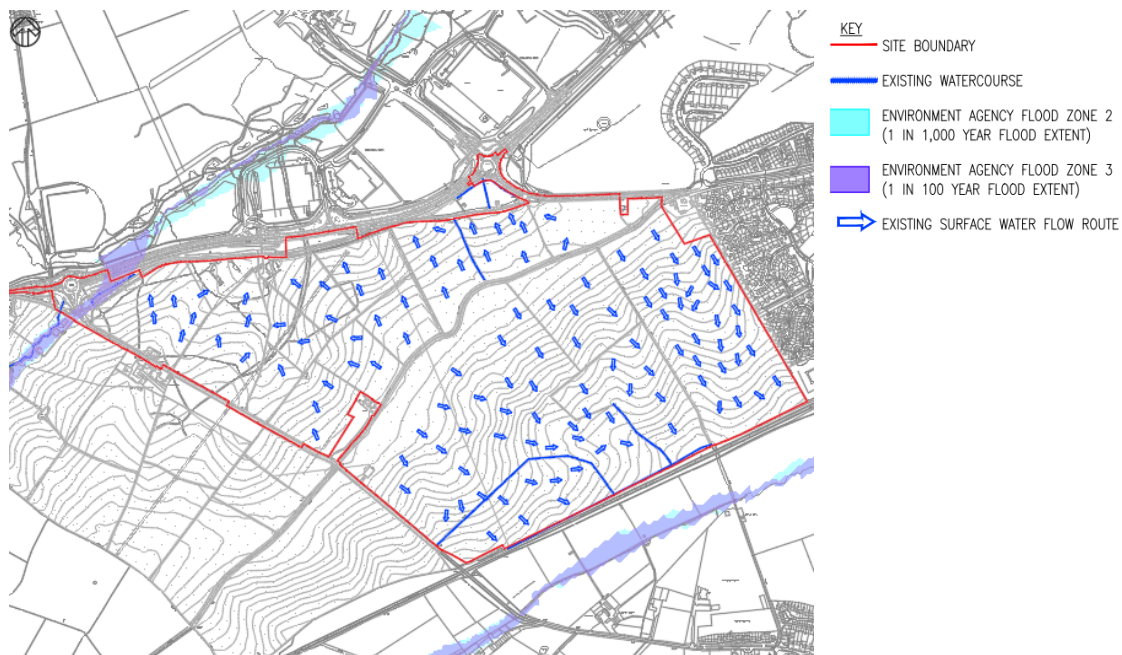
Existing Surface Water Drainage

8.079 The north of the site currently drains towards A421 where there are a number of existing unnamed watercourses, including the Tattenhoe Brook which runs through the north-eastern boundary of the site and has associated areas of Flood Zone 2 and 3.

8.080 The southern area of the proposed development site currently drains towards the railway line, which forms the southern boundary of site. There are a number of unnamed ordinary watercourses that run from the centre of the site towards the south, which drain into a ditch that runs adjacent to the disused railway line before entering a culvert underneath the disused railway embankment.

8.081 The baseline drainage features described above are shown indicatively in **Figure 8.3**

Figure 8.3 Baseline Drainage Features



8.082 There are a number of existing unnamed ordinary watercourses within the site boundary, which are considered to be the most appropriate receptors for surface water from the proposed development site in accordance with the SuDS hierarchy.

8.083 Further to this, Anglian Water has identified that a connection into the public sewer could be made at the 150mm diameter surface water located in Steinbeck Crescent (NGR SP 82773 32909) should the need arise.

Likely Significant Effects

8.084 Following the description of the current baseline conditions, there are a number of areas of likely significant effects that could occur during both the construction phase and completed development phases, with these grouped under the following headings:

- Flood risk;

- Surface water drainage;
- Geomorphology;
- Water quality; and
- Water resources.

8.085 The proposed development is described in Chapter 2. This assessment considers the likely effects which will occur during all phases, with any likely significant effects during a key phase being highlighted.

Construction

8.086 A short description of the likely effects during the construction phase is given below.

Flood Risk

8.087 Flood risk during the construction phase includes potential risks to receptors including workers, machinery, equipment and materials. This also includes the potential effect of the construction activities to flood risk elsewhere, such as blockage of infrastructure resulting from the relocation of machinery, equipment and materials by floodwaters.

8.088 The risk of flooding is highest during the construction of the surface water balancing features because these areas will involve construction activities that are particularly vulnerable, such as: construction of the proposed surface water outfall to the unnamed, ordinary watercourse in the north-west of the site.

8.089 Without inclusion of mitigation or management measures, the following effect is considered during the construction phase:

- Sensitivity: Low
- Magnitude: Moderate
- Significance of Effect: Minor

8.090 While it is noted that there are potential risks during construction, given the existing flood risk to the site, flood risk during construction is considered to be low.

Surface Water Drainage

8.091 The proposed development, particularly through the phased construction period, has potential to alter the response of the Site to rainfall events, such as variation in runoff rates and alterations to flow routes with the re-profiled land areas.

8.092 The potential increase in surface water runoff during the construction phase is likely to result from changes in land use or characteristics of the ground surface. This may include: the removal or alteration of surface water drainage infrastructure; inclusion of additional hardstanding surfaces with construction compounds; and with the compression and exposure of bare soil due to the movement of machinery. This may reduce the natural percolation of water into the ground thereby increasing surface water runoff rates, potentially impacting upon receptors.

8.093 Without inclusion of mitigation or management measures, the following effect is considered during the construction phase:

- Sensitivity: Low
- Magnitude: Moderate

- Significance of Effect: Minor

8.094 Given the proposed sustainable surface water drainage scheme and the currently identified risk of surface water flooding, the surface water drainage risk is considered to be low.

Geomorphology

8.095 The potential effects during the construction phase on the geomorphology of the unnamed ordinary watercourse to the north west, being the primary watercourse receptor, generally relate to potential construction activities in close proximity to the watercourse. These may be most likely to result from the construction of the sports park and drainage features however across the wider residential areas there are potential effects resulting from increases in surface water runoff which would result in the mobilisation and deposition of sediments within the river channel, impacting upon geomorphology.

8.096 Without inclusion of mitigation or management measures, the following effect is considered during the construction phase:

- Sensitivity: Medium
- Magnitude: Minor
- Significance of Effect: Minor

8.097 Given the location of the proposed development offset from the watercourses, the risk to geomorphology is considered low.

Water Quality

8.098 There is the potential for water quality effects on the unnamed ordinary watercourse receptors resulting from activities during the construction phase, such as the interaction between surface water and groundwater and potential mobilisation of sediment. These are most likely to occur during land re-profiling; transport and storage of materials; and movement and operation of vehicles and machinery.

8.099 There is also potential for water quality effects from surface water discharge from the proposed development, to receptors should free discharge occur.

8.100 There are a number of materials and wastes or by-products which could arise during the construction phase, which may give rise to water quality effects. Given that the unnamed ordinary watercourse runs through the north west of the Site, there is the potential for direct contamination from a pollution incident associated with the use and storage of machinery, equipment and materials on-site during the construction phase. There is also the potential for direct contamination of surface water runoff, and the potential for an indirect contamination of the unnamed ordinary watercourses surrounding the site.

8.101 Examples of potential pollution sources during the construction phase include:

- Mobilisation and deposition of fine materials (e.g. silts and clays) from the movement and operation of machines and vehicles (e.g. access routes, construction / storage areas), especially during the construction of the attenuation area;
- Pollution risk with the use of certain materials (e.g. cement, lubricants) together with accidental leaks or spills of these materials during their transportation and storage;
- Pollution risk associated with hydrocarbons from the machinery used within the Application Site, from accidental spillages, leakage or maintenance of machinery;

- Contaminant discharge as a result of remedial works or sediment movement/storage as a result of this;
- Increased potential for erosion and mobilisation of sediments, such as with the attenuation area, the surface water drainage strategy and with works on and adjacent to the floodplain; and / or
- Provision of temporary on-site sanitary and welfare facilities for construction site staff which may result in misconnections to the surface water sewer or spillages.

8.102 Without inclusion of mitigation or management measures, the following effect is considered during the construction phase:

- Sensitivity: High
- Magnitude: Moderate
- Significance of Effect: Major

8.103 Given the potential for mobilisation and the current surface water flow paths present on site, the risk to water quality is considered major

Groundwater

8.104 During the construction phases, there are potential effects on the surface water and groundwater interaction, as there will be alterations to the levels across the development platform and variations in groundwater levels combined with remedial works. These works lead to an increase in the potential for contaminated groundwater to interact more frequently and in larger volumes.

8.105 Without inclusion of mitigation or management measures, the following effect on groundwater is considered during the construction phase:

- Sensitivity: Medium
- Magnitude: Moderate
- Significance of Effect: Moderate

8.106 Given the potential for ground water interaction during the construction phase, the risk to ground water is considered moderate.

Completed Development

8.107 A short description of each of the likely significant effects during the completed development phase is given below:

Flood Risk

8.108 The proposed development introduces residential development together with leisure and recreational facilities and associated infrastructure to an area of land adjacent to an unnamed ordinary watercourse.

8.109 The FRA (see **Appendix 8.1**) demonstrates that post construction the development platform is located within Flood Zone 1 and therefore not considered to be at risk of fluvial flooding for events with a return period less than 1:1,000 years. The informal and formal public use areas on the eastern boundary of the site are located in Flood Zones 2 and 3 and will be at medium to high risk of fluvial flooding.

8.110 Without inclusion of mitigation or management measures, the following effect on the existing and new residential receptors is considered during the completed development:

- Sensitivity: Medium
- Magnitude: Minor
- Significance of Effect: Minor

8.111 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, the significance of the effect of 'fluvial flood risk' is considered to be 'Minor' for the completed development.

Surface Water Drainage

8.112 The proposed central greenway, and sports park, is a large extensive, grassed area of the site and relatively low-lying, with surface water drainage from this area occurring at a greenfield runoff rate.

8.113 Appropriate mitigation will be required to prevent an adverse effect on the existing and proposed receptors (people and properties) due to surface water drainage. Due to the size of the Site and given the changed land use, this could result in a significant effect. The proposed development includes residential development, and as such the sensitivity is high at a local level. In addition, there are residential properties in the surrounding area.

8.0114 Additionally, ecologically sensitive green areas and existing areas of water may also be detrimentally impacted by the proposed increase in impermeable areas across the site.

8.115 Without inclusion of mitigation or management measures, the following effect is considered during the completed development:

- Sensitivity: Medium
- Magnitude: Minor
- Significance of Effect: Minor

8.116 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, the significance of the effect of 'surface water drainage' is considered to be 'Minor' for the completed development.

Geomorphology

8.117 There is no anticipated impact on river channel geomorphology during the completed development phase. It is considered that the development will mimic baseline conditions with respect to geomorphology.

Water Quality

8.118 The completed development introduces residential development together with leisure and recreational facilities and associated infrastructure to an area of land adjacent to the unnamed ordinary watercourse. The completed development will also include a road access and internal road infrastructure, together with areas where cars are to be parked (private driveways, roadside parking or car park areas). Aside from an accident or spillage event which may occur from vehicles, the pollution associated with a first flush of materials that have accumulated on the road surface is likely to have the most significant effect on surface water quality. Particularly, if no SUDS or surface water drainage infrastructure with water quality benefits are included within the completed development. This first flush is likely to be more prolific after a prolonged dry period and with a low intensity rainfall event, as this offers little dilution of pollutants. Periods where there is a greater use of vehicles and number of vehicle journeys are also likely to result in an increased build-up of pollutants on the ground surface.

- 8.119 In a similar sense to the first flush of materials from the road infrastructure, the mobilisation of silt and sediment from areas of the completed development could also adversely affect water quality. Particular areas are those where there is significant landscaping or recreational areas, such as the attenuation areas. the completed development will involve the relocation of soils from one part of the completed development to other parts to enable the ground re-profiling. The period of time before these soils have settled, together also with the use of fertilizers and herbicides on certain parts of the completed development such as with the maintenance of the playing pitches, could potentially effect water quality and ecology.
- 8.120 Without inclusion of mitigation or management measures, the following effect on water quality of the unnamed ordinary watercourse is considered during the completed development:
- Sensitivity: Medium
 - Magnitude: Moderate
 - Significance of Effect: Moderate
- 8.121 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, the significance of the effect of 'water quality' is considered to be 'Moderate' for the completed development.

Groundwater

- 8.122 During the completed development phase, there are potential effects on the surface water should there be interaction with the groundwater, as there will have been alterations to the levels across the development platform and variations in groundwater levels. Should there be interaction with the perched water table then there will be continuing interaction between the waterbodies. This would lead to an increase in the potential for the contaminated groundwater to interact more frequently and in larger volumes. There is also potential for infiltration to occur, particularly from the permeable paving areas, which could lead to mobilisation of contaminated groundwater.
- 8.123 Without inclusion of mitigation or management measures, the following effect is considered on the groundwater receptor during the completed development:
- Sensitivity: Medium
 - Magnitude: Minor
 - Significance of Effect: Minor
- 8.124 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, the significance of the effect of 'groundwater' is considered to be 'Minor' for the completed development.

Mitigation Measures

Construction

General

- 8.125 A Construction and Environment Management Plan (CEMP) will be prepared before the start of works to ensure that best practice is employed and the environment safeguarded. The CEMP would include method statements for the proposed works, details of materials to be taken from and to the Site, and a pollution control and contingency plan.

- 8.126 In addition, the CEMP would also detail mitigation and management measures on the appropriate timing for completion of certain works and activities, based on the antecedent and forecasted weather conditions. The location of construction compounds and storage areas in areas at flood risk would be restricted, where possible. The CEMP would also provide details on suitable evacuation procedures for workers at the Site. Consideration would also be given to the use of certain equipment and materials, such as those that could be more easily mobilised and relocated by floodwaters (such as temporary fencing, wooden sheets, signage and loose material). The appropriate location of the sheeting of this equipment and material would help reduce these impacts.

Flood Risk

- 8.127 In addition to the CEMP the phasing of the development will be undertaken to ensure that the sustainable drainage features are constructed prior to the development of the relevant phase thereby minimising the potential risk of flooding during construction. Additional mitigation measures (e.g. temporary protection measures) may be implemented where deemed necessary.

Surface Water Drainage

- 8.128 Temporary surface water drainage facilities will be provided during the construction phase to ensure the controlled discharge of surface water run-off, until such a time as the permanent surface water drainage strategy is implemented.
- 8.129 Surface water during construction should aim to restrict the ponding of surface water within the construction site, convey surface water around sensitive or vulnerable areas and also ensure that the risk of localised flooding is not increased. Any ponds for the management of construction flow will be located in the same position as the ponds for operational water management. The construction pond will be fitted with a flow control device to manage flows and a sediment sump system to minimise impacts on the surrounding unnamed ordinary watercourses. Further detail on the incorporation and design of the surface water drainage strategy is included in the FRA in **Appendix 8.1**.

Geomorphology

- 8.130 As the potential effects on river channel geomorphology during the construction phase mainly relate to construction of the surface water outfalls, along with the mobilisation and deposition of sediment and materials across the remainder of the proposed development, then measures outlined in the surface water drainage strategy and location of stock piles would be included to restrict and manage this occurrence. For example, the use of the strategy as described in the Flood Risk Assessment would assist with managing the movement of sediments.
- 8.131 The CEMP will also include measures to help restrict the movement of materials stockpiled from demolition and excavation works. The CEMP would therefore include specific measures to mitigate and manage the potential impact on river channel geomorphology.

Water Quality

- 8.132 The potential effects identified in relation to surface water quality are applicable to most construction sites, with the exception of the potential increase in movement of material from the attenuation areas. The CEMP will be applied during construction of the proposed development to mitigate for potential adverse effects on surface water quality, which may arise from the construction works.

8.133 The CEMP will draw on the Construction Industry Research and Information Association (CIRIA) document “Control of Water Pollution from Construction Sites” and the Environment Agency guidance on Sustainable Drainage Systems. The following specific measures for the protection of surface water quality during the construction phase will be included within the CEMP prepared for the Application Site:

- Management of construction works so as to comply with the necessary surface water quality standards and consent conditions;
- Surface water run-off will be managed through a temporary drainage infrastructure, including measures for removing suspended solids and potential contaminants;
- Plant machinery and vehicles will be maintained in a good condition, with washing and dust suppression measures used to prevent the migration of pollutants;
- Areas at risk of spillage will be carefully sited and protected (e.g. bunds) so as to minimise the risk of hazardous substances affecting surface water quality – this may include vehicle maintenance and storage areas for hazardous materials;
- The movement of plant machinery and vehicles and the storage of materials during the construction works will be limited near to surface water features;
- Excavation activities will be carefully monitored and co-ordinated with forecasted dry periods, where possible, with excavation works covered during periods of heavy rain to minimise the entry and collection of rainwater and the transport of pollutants;
- The movement of plant and machinery over bare soil areas will be limited so as to avoid soil compaction and smearing, with suitable preparatory works included where this could not be avoided so as to minimise effects on the surface water runoff regime; and
- Additional mitigation measures for reducing effects would include an emergency activity plan for enabling a timely and efficient clean-up operation, including shut-off valves

Water Resources

8.134 Measures to reduce water use during the construction phase would be considered, such as materials with a low water demand and using low water use fittings in construction compounds.

Groundwater

8.135 Measures (rapid surface water runoff collection, as outlined in the surface water drainage section) to limit the interaction between the surface and groundwater during the construction phases will be included within the CEMP and treatment of the groundwater will be undertaken prior to discharge as required.

Completed Development

8.136 This section outlines the mitigation measures which will be incorporated into the development to ensure that there are no adverse impacts during the completed development phase.

Flood Risk

8.137 The FRA included in **Appendix 8.1** provides an assessment of the location of the various parts of the proposed development in relation to the Flood Zones. It concludes that the locations of the various parts of the proposed development are appropriate given their flood risk vulnerability.

8.138 Careful attention must be given to potential exceedance flows, being events that are more extreme than current design criteria. Various national guidance has been published on the matter of exceedance flows and measures

that should be incorporated into a development to ensure the safety of occupiers and those using the infrastructure.

- 8.139 Published guidance in the form of Sewers for Adoption 7th Edition and the Environment Agency document "Improving the Flood Performance of New Buildings: Flood Resilient Construction" advocate the design of developments that implement infrastructure routes that will safely convey flood waters resulting from sewer flooding or overland flows away from buildings and along defined corridors.
- 8.140 The principal aim is to direct exceedance flows away from properties and along defined corridors. At a local level, this may mean water being conveyed along a length of highway, as long as the predicted flow depths and velocities are acceptable. More strategically, the implementation of conveyance corridors is important in avoiding deep and high velocity flows that present a high risk.
- 8.141 Whilst many of the measures for dealing with exceedance flows must be dealt with at the detailed design stage, the strategic layout for the site provides a framework that can effectively deal with any future exceedance flows.

Surface Water Drainage

- 8.142 The proposed development will incorporate measures to manage the surface water runoff. It will utilise attenuation basins to provide surface water attenuation management and conveyance swales. Flows will be limited, via a flow control device (e.g. vortex flow control) to ensure that maximum peak discharge rates do not exceed the QBar event for any event up to and including the 1 in 100 year plus climate change event.
- 8.143 An surface water drainage strategy is detailed in the FRA (**Appendix 8.1**), which demonstrates that there is a betterment on the existing surface water runoff rates by the development attenuating the 100 year plus climate change flows down to QBar and that the Site does not increase the risk to surface water flooding to any of the adjacent locations.
- 8.144 This surface water strategy will be developed in accordance with current legislation, guidance and best practice and will be approved at the detailed design stage. The responsible management of surface waters is to be achieved through the use of a surface water drainage network, which utilises swales and attenuation ponds to provide the necessary volumetric storage prior to discharge to the ordinary watercourses within the site boundary.

Geomorphology

- 8.145 There is no anticipated impact on river channel geomorphology during the normal completed development phase and as such, no significant mitigation measures are proposed.

Water Quality

- 8.146 As described above, the proposed development will include a surface water strategy, with swales and attenuation ponds and the inclusion of permeable paving (where appropriate).
- 8.147 The implementation of the SuDS components acts as a treatment process to reduce contaminant levels in runoff to acceptable levels, delivering gradual improvement in water quality and providing an environmental buffer for accidental spills or unexpected high pollutant loadings from the site. The proposed strategy uses a number of components in series, which will further improve of water quality.

Groundwater

- 8.148 Measures to limit the interaction between the surface and groundwater during the operational phase will be included within the design as required, this could include lining the permeable paving areas and vegetated treatment of any groundwater.

Water Resources

- 8.149 Measures to promote the re-use and recycling of water within the proposed development will be encouraged so as to reduce overall demand – such as the inclusion of private water butts for rainwater harvesting.
- 8.150 Measures to reduce the consumption and discharge of water from the proposed development will also be encouraged, such as low water consumption units and fixtures (e.g. toilets and taps) fitted with water efficiency and cut-off features.
- 8.151 The inclusion of a surface water drainage strategy, with an attenuated release to the unnamed ordinary watercourses within the site boundary, means that waters are being directed away from a sewer infrastructure, thereby reducing demand. Further details of this are given in **Appendix 8.1**.

Residual Effects

- 8.152 This section assumes that the mitigation described above has been adopted and describes the potential effects that remain. Following mitigation the majority of the potential effects are considered to be negligible.

Construction

Flood Risk

- 8.153 Activities during the construction phase would be completed according to an appropriate Construction Environmental Management Plan (CEMP). The CEMP will ensure that the risk of potential flood waters on construction activities are taken into account, and the measures implemented to mitigate and manage this to a reasonable and safe level (e.g. the construction of temporary attenuation basins at the beginning of the construction programme). The mitigation measures would provide protection up to the design return period event (i.e. the 1 in 100 year event + 40%CC) with free board, and some protection for events in excess of this.
- 8.154 Through inclusion of mitigation or management measures, the following revised evaluation of flood risk receptors has been undertaken:
- Sensitivity: Low
 - Magnitude: Negligible
 - Significance of Effect: Negligible
- 8.155 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, following the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'negligible.'

Surface Water Drainage

- 8.156 Surface water drainage during the construction phase would be properly managed and maintained through the use of a CEMP. The CEMP would make a commitment to the maintenance of the temporary drainage strategy. On this basis, the significance on surface water drainage up to the design storm event is considered to be

negligible. More extreme rainfall than the design event (intensity and/or duration) may cause some flooding over the site and surrounds.

- 8.157 The mitigation measures would provide protection up to the design return period event, and some protection for events in excess of this. Although the probability of occurrence is considered to be low, this could still have an adverse effect on surface water drainage.
- 8.158 Through inclusion of mitigation or management measures, the following revised evaluation of surface water drainage receptors has been undertaken:
- Sensitivity: Low
 - Magnitude: Negligible
 - Significance of Effect: Negligible
- 8.159 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'negligible.'

Geomorphology

- 8.160 As the potential effects on river channel geomorphology during the construction phase relate to the mobilisation and deposition of sediment and materials, then measures would be included to restrict and manage this occurrence. For example, the implementation of a construction management plan that ensured only small areas of bare earth could be exposed, that a flood warning system would give sufficient time to protect exposed areas and that material was not stockpiled in the floodplain. The CEMP will include measures to help restrict the movement of materials stockpiled from demolition and excavation works and thereby would mitigate and manage the potential impact on river channel geomorphology.
- 8.161 Through inclusion of mitigation and management measures, the following revised evaluation of geomorphology receptors has been undertaken:
- Sensitivity: Medium
 - Magnitude: Negligible
 - Significance of Effect: Negligible
- 8.162 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'negligible.'

Water Quality

- 8.163 It is important that the mitigation measures for protecting water quality during the construction phase are properly managed and maintained. This will be secured through the CEMP. On the basis that that these mitigation measures (e.g. spill kits to be included within vehicle re-fuelling area) are correctly managed and maintained, there are no residual effects anticipated and the significance is considered to be negligible. The exception to this relates to extreme spillage, with this having the potential to effect surface water quality. The surface water quality measures in place would offer some protection from an extreme spillage, although not necessarily complete protection.

8.164 Through inclusion of mitigation or management measures, the following revised evaluation of water quality receptors has been undertaken:

- Sensitivity: Medium
- Magnitude: Moderate
- Significance of Effect: Minor

8.165 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'Minor.'

Groundwater

8.166 There are no residual effects anticipated on the groundwater. Through inclusion of mitigation or management measures (e.g. bunded storing areas of fuel and oils to prevent pollution to groundwater), the following revised evaluation of groundwater receptors has been undertaken:

- Sensitivity: Medium
- Magnitude: Negligible
- Significance of Effect: Negligible

8.167 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'negligible.'

Completed Development

Flood Risk

8.168 The main residual risk relates to the attenuation areas and drainage ditches, and to the need to ensure that the mitigation and management measures to restrict the erosion, mobilisation and deposition of sediments from the banks of the basins and ditches are effectively implemented.

8.169 Through inclusion of mitigation or management measures, the following revised evaluation of flood risk receptors has been undertaken:

- Sensitivity: Medium
- Magnitude: Negligible
- Significance of Effect: Negligible

8.170 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'negligible.'

Surface Water Drainage

8.171 As with the residual effects listed during the construction phase, there are residual effects anticipated during the completed development phase. More extreme rainfall than the design event (intensity and/or duration) may cause some flooding over the Site and surrounds.

8.172 The measures proposed as part of the proposed development (including the proposed drainage designed to the 1 in 100 year plus 40% climate change event, a 10% allowance for urban creep being sensitivity tested and 300mm freeboard being provided in the proposed attenuation ponds) would provide protection up to the design event, and some protection for events in excess of this. Through inclusion of mitigation or management measures, the following revised evaluation of surface water drainage receptors has been undertaken:

- Sensitivity: Medium
- Magnitude: Negligible
- Significance of Effect: Negligible

8.173 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'negligible.'

Geomorphology

8.174 There are no residual effects anticipated on geomorphology. Through inclusion of mitigation or management measures, the following revised evaluation of geomorphology receptors has been undertaken:

- Sensitivity: Low
- Magnitude: Negligible
- Significance of Effect: Negligible

8.175 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'negligible.'

Water Quality

8.176 There are no residual effects anticipated provided that the mitigation measures are properly managed and maintained. The significance is therefore considered to be negligible. The likelihood of an accidental spillage after construction is reduced. However, should there be an accidental spillage, the residual adverse effect would be reduced to minor adverse by including an emergency activity plan for the clean-up operation. Through inclusion of mitigation and/or management measures, the following revised evaluation of water quality receptors has been undertaken:

- Sensitivity: Medium
- Magnitude: Moderate
- Significance of Effect: Minor

8.177 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'Minor.'

Groundwater

8.178 There are no residual effects anticipated on the groundwater. Through inclusion of mitigation and/or management measures, the following revised evaluation of water resource receptors has been undertaken:

- Sensitivity: Medium
- Magnitude: Negligible
- Significance of Effect: negligible

8.179 Following evaluation and assessment of the sensitivity of receptors and the magnitude of impact, through the implementation of mitigation and/or management measures, the significance of the effect is considered to be 'negligible.'

Overall

8.180 Overall there are no significant residual effects expected to result from the development of the Site.

Cumulative Effects

8.181 No significant effects have been identified in either the construction or operational phases of the project and no significant cumulative impacts are considered likely to arise.

8.182 With regards to the nearby Shenley Park, all sites should be brought forward to the same local standards and as such, there should be no cumulative impacts.

8.183 This scheme promotes a sustainable surface water drainage scheme to manage with surface water run-off and as such, no negative cumulative impacts are anticipated.

8.184 Overall, it is anticipated that implementation of current guidance, such as the Planning Practice Guidance and the NPPF will ensure that all proposed developments in the area achieve the minimum baseline standard for dealing with water resources and flood risk, ensuring there are no significant adverse off site or on-site effects.

Summary

8.185 The likely significant effects that could occur during both the construction phase and completed development phases on the water resources and flood risk have been assessed, there are a number of areas to be considered, with these grouped under the following headings:

- Flood risk;
- Surface water drainage;
- Geomorphology;
- Water quality; and
- Water resources.

8.186 The likely significant effects that may occur during the construction phase include impacts on flood risk (including works within the flood plain), surface water drainage (including increased runoff) water quality (including increased sediment movement and the potential for increased contaminants entering the water environment), geomorphology (including the construction of the attenuation features and changes to the sediment transport regime) water resources (including additional demand on potable and sewerage supplies) and groundwater (including potential for increased interaction between the surface and groundwater).

8.187 The likely significant effects that may occur during the completed development phase include impacts on flood risk (the introduction of new properties), surface water drainage (including altered response to rainfall events) water quality (including the potential for increased contaminants entering the water environment as a result of

the first flush), geomorphology (including the remobilisation of sediments) water resources (including increased and changed demands on potable and sewerage supplies) and groundwater (including potential for increased and altered interaction between the surface and groundwater).

- 8.188 The mitigation for the construction phase includes the preparation of a CEMP to ensure that best practice is employed and the environment safeguarded. The CEMP would include method statements for the proposed works, details of materials to be taken from and to the Proposed Site, and a pollution control and contingency plan.
- 8.189 The mitigation for the completed development includes implementation of attenuation ponds, conveyance swales and other sustainable drainage features to manage surface water, thereby providing a positive impact in terms of ecology, landscape and surface water run-off.
- 8.190 Following the adoption of the proposed mitigation measures, the identified potential effects are considered to be minor and negligible and therefore not significant.
- 8.191 There are no identified cumulative effects on the water environment, including the nearby Shenley Park, as the design of each scheme will need to be undertaken to ensure that there are no adverse impacts resulting from each scheme on the receiving water features.

9. LANDSCAPE AND VISUAL

Introduction

- 9.01 This chapter of the ES assesses the likely significant effects of the Proposed Development on landscape and visual amenity during both construction and operation.

Planning Policy Context

- 9.02 Planning policy and guidance at the national and local level are listed below as applicable to landscape and visual issues:

- National Planning Policy Framework
- Planning Practice Guidance
- Aylesbury Vale District Council Local Plan adopted January 2004 (AVDLP2004) – saved policies
- Proposed Submission Vale of Aylesbury Local Plan November 2017 (VALP)
- Plan MK: Adopted March 2019

Legislation and Regulation

- 9.03 There is no applicable legislative framework in regard to landscape and visual effects.

Statutory Development Plans

- 9.04 The Application Site lies across the administrative boundaries of Aylesbury Vale District and Milton Keynes Borough. Relevant planning policies from both authorities are summarised below.

Aylesbury Vale District Local Plan adopted January 2004 (AVDLP2004) – saved policies

- 9.05 Policy GP8 Protection of Amenity of Residents states that planning permission will not be granted where proposed development would unreasonably harm any aspect of the amenity of nearby residents. The Council will use conditions or planning obligations to ensure any potential adverse impacts on neighbours are mitigated or designed out.
- 9.06 Policy GP35 Design of New Development Proposals states that new development proposals should respect and complement: the physical characteristics of the site and surroundings; the surrounding architectural vernacular; historic scale and context of the setting; natural qualities and features of the area; and effects on important public views and skylines.
- 9.07 Policy GP38 Landscaping of New Development Proposals outlines that the landscaping of new developments should be in keeping with the surrounding vernacular and conserve the existing natural and other features as far as possible. Hard landscaping should use materials appropriate to the character of the locality and new planting should be predominantly native species.
- 9.08 Policy GP39 Existing Trees and Hedgerows outlines that in the consideration of planning applications the Council will require a survey of the site; may serve tree preservation orders to protect trees with public amenity

value; and use conditions on permissions to ensure the retention or replacement of trees and hedgerows of amenity during the process of construction as well as in the design proposals.

- 9.09 Policy GP40 Retention of Existing Trees and Hedgerows states that the Council will oppose the loss of trees, particularly native Black Poplar and hedgerows of amenity, landscape or wildlife value.
- 9.010 Policy GP84 Public Rights of Way outlines that where applications will affect public rights of way, the Council will consider the convenience, amenity and public enjoyment of the route together with the desirability of its retention or improvement for users, including those with disabilities. Planning conditions may be used to impose the enhancement of public rights of way within development schemes. Where diversions or closures of public rights of way are required to enable development, permission will only be granted if there is an existing alternative route or provision made for another.
- 9.011 Policy GP86 Provision of Outdoor Playing Space requires that sufficient outdoor play space is provided within a new development. Normally this is based on a standard of 2.43ha of outdoor play space per 1000 population, together with the provision of and accessibility to existing open space in the locality.
- 9.012 GP91 Provision of Amenity Areas requires that the design of new housing and other building proposals should include suitable informal amenity open spaces appropriate to the character of the occupation of the development. Especially in the case of sites adjoining open water or watercourses, or where protection is given to nature conservation interests.

Plan:MK Adopted March 2019

- 9.013 Policy SD15 Place-Making Principles for Sustainable Urban Extensions in Adjacent Local Authorities outlines the approach that the Council will take in relation to development on the edge of Milton Keynes which is wholly or partly within the administrative boundary of a neighbouring authority. The principles they will follow relate mainly to joint working on planning, design and implementation. Those principles relevant to landscape and visual issues include: the design of the development should respect its context as well as the character of the adjoining areas of the city; and linear parks should be extended into the development where possible to provide recreational, walking and cycling links within the development area and add to the city's extensive green infrastructure network.
- 9.014 Policy FR3 Protecting and Enhancing Watercourses requires all new development to be set back at a distance of a minimum of 8m from main rivers, minimum 9m from all other ordinary watercourses, or at an appropriate width agreed by the Environment Agency, LLFA or Internal Drainage Board.
- 9.015 Policy NE3 Biodiversity and Geological Enhancement requires development proposals to maintain and enhance the biodiversity and structure of ecological networks wherever possible. Proposals should demonstrate a mitigation hierarchy where firstly, harm is avoided, reduced and then mitigated before considering compensation.
- 9.016 Policy NE4 Green Infrastructure states that the network of green infrastructure through the Borough will be protected and enhanced for biodiversity, recreational, accessibility, health and landscape value and the contribution it makes towards combating climate change. Where possible, development proposals will provide new or enhance existing green infrastructure. Proposals will ensure that existing ecological networks are identified and maintained to avoid habitat fragmentation.
- 9.017 Policy NE5 Conserving and Enhancing Landscape Character states that where development is located in the open countryside and is accepted in principle, it will need to be designed in a way that respects the character

of the surrounding landscape. The policy outlines certain aspects of landscape character that development proposals need to demonstrate through sensitive design, landscape mitigation and enhancement measures. These include:

- *'The locally distinctive natural and man-made features that contribute towards the landscape character and its quality;*
- *The historic setting and structure of the villages and hamlets;*
- *Important views e.g. of local landmarks;*
- *Tranquillity and the need to protect against intrusion from light pollution, noise and motion.'*

The policy requires that development proposals take into account the findings of the Milton Keynes Landscape Character Assessment (2016) and other relevant landscape and visual studies. Site specific landscape and visual impact assessments (LVIAs) should be undertaken as part of planning applications where appropriate.

- 9.018 Policy D1 Designing a High Quality Place outlines various principles and objectives that development proposals should follow. These include: responding appropriately to the site and surrounding context; good definition between public and private spaces within development proposals; layout should maximise surveillance of the public realm; soft and hard landscaping should continue the verdant and green character of Milton Keynes and the quality of the public realm with street trees incorporated into schemes to soften streetscapes; ensuring ease of movement by creating permeable and well-connected places; ensuring that the development proposals are legible and can be navigated easily; and including a variety of layouts, streets types, building sizes, landscapes, uses and housing tenures across the development.
- 9.019 Policy D2 Creating a Positive Character outlines objectives and principles that development proposals should incorporate. These include: layout, massing and scale, boundary treatments and landscaping to provide positive character and sense of place; ensure that the proposed development is inspired by local architectural vernacular; and allowing for visual interest through careful use of detailing.
- 9.020 Policy D5 Amenity and Street Scene outlines that all proposals are required to create and protect good standards of amenity of buildings and their surrounding areas. This should be done to ensure that, amongst other elements, levels of light within buildings and open spaces are satisfactory; external private or shared communal garden space meets reasonable needs of its users; development should not be overbearing; outlook and visual amenity afforded within buildings takes account of the relationship between the buildings and the other elements of the surrounding development.

Other Material Considerations

Proposed Submission Vale of Aylesbury Local Plan November 2017 (VALP)

- 9.021 The suggested modifications to the VALP were published during summer 2019. The consultation period for the main modifications ran from November to December 2019. The following summarised policies include these modifications which, for most of the policies, were minor edits. The below text summarises the policies as they are presented in the Proposed Submission Plan (November 2017) as Proposed to be Modified (October 2019) which shows the main and additional modifications.
- 9.022 Draft Policy S2 Spatial Strategy for growth outlines the Council's District-wide strategy for growth. It outlines that strategic growth and investment will be concentrated in sustainable locations. These include the *'land in the north east of Aylesbury Vale will make provision for 3,362 homes on a number of sites.'* The Application Site is located within this area.

- 9.023 The Application Site forms part of the draft strategic allocation D-NLV001 Salden Chase. The allocation policy includes several site specific requirements. In relation to landscape, the allocation policy states that the development should respect and complement the physical characteristics of the site and its surroundings. This includes the implementation of a defensible boundary along the western edge of Milton Keynes. The development should also respect the local architectural traditions in scale and context of the setting, natural qualities and features of the area. The allocation policy also states that proposals should consider the effects on important public views and skylines. Development of the site should ensure that Newton Longville, Whaddon, Mursley and Far Bletchley remain separately identifiable. Proposals should retain all A and B category trees (as identified in an arboricultural survey). It also stipulates that development should make provision for a multifunctional network of open spaces and green corridors including a linear park to the south of the site with both formal and informal areas of public open space. It also states that the existing woodland priority habitat in the north of the site should be retained.
- 9.024 Draft Policy BE2 Design of New Development requires all new development proposals to respect the physical characteristics of the site and surroundings including the scale and context of the site and its setting; the local distinctiveness of surrounding architectural vernacular; the natural qualities and features of the area; and the effect on important public views and skylines. Further guidance for this policy is provided within the District Design SPD.
- 9.025 Draft Policy BE3 Protection of the Amenity of Residents outlines that proposed development will not be granted planning permission where it would result in unreasonable harm to any aspect of the amenity of existing residents. New development proposals should achieve a satisfactory level of amenity for future residents.
- 9.026 Draft Policy NE2 (previously NE3) River and Stream Corridors requires that development proposals must not have an adverse impact on the function and setting of any watercourse or its associated corridor. Proposals should conserve and enhance the biodiversity and landscape and consider the recreational value of the watercourse and its corridor through good design. De-culverting should be actively pursued and planning permission will not be granted if culverting is proposed. A 10m ecological buffer should be provided or retained from the top of the watercourse bank to the development.
- 9.027 Draft Policy NE4 (previously NE5) Landscape character and locally important landscape states that development must recognise the individual character and distinctiveness of particular landscape character areas (LCA) as set out in the landscape character assessment, giving due consideration to their sensitivity to change and contribution to a sense of place. Development should consider the characteristics of the LCA by meeting certain criteria, summarised below:
- Minimise impact on visual amenity;
 - Be located to avoid the loss of important views on and off site towards important landscape features;
 - Respect local character and distinctiveness with regard to settlement and field pattern, landform and ecological value;
 - Consider the space, height, scale, plot shape and size, elevations, roofline and pitches, colour palette, texture and boundary treatments;
 - Minimise impacts of lighting to avoid blurring between urban and rural areas;
 - Development in areas which are intrinsically dark should be designed to avoid light pollution to the night sky;
 - Development should not be visually prominent in the landscape; and
 - Should not generate an unacceptable level of noise in areas which are relatively undisturbed by noise or valued for their recreational or amenity value.

- 9.028 The policy goes on to explain that any identified significant adverse impact should be avoided and designed out of a proposed scheme. Where it is accepted that there will be harm, specific on-site mitigation will be required as part of the proposals. Development will be supported where appropriate mitigation to overcome any adverse impact to the character of the receiving landscape has been agreed.
- 9.029 Draft Policy NE8 (previously NE9) Trees, hedgerows and woodlands requires development proposals to seek to enhance and expand the district's tree and woodland resource, including native Black Poplars. A full tree survey of any potential development site should be undertaken and where development could result in unacceptable loss of, or damage to, trees, hedgerows or woodland, permission will not be granted. Where the loss is considered acceptable, ample additional tree planting to offset the loss will be required as part of the development scheme. The policy also states that development that would lead to an individual or cumulative significant adverse impact on ancient woodland or ancient trees will be refused unless exceptional circumstances can be demonstrated or the impacts to the site are demonstrably outweighed by the benefits of the development. The policy also stipulates that a minimum 50m buffer is expected between ancient woodland and any built development or grey infrastructure.
- 9.030 Draft Policy C4 Protection of public rights of way states that the Council will enhance and protect public rights of way in order to ensure that the integrity and connectivity of the resource is maintained. New development should be integrated within the existing public rights of way and public transport networks to provide benefits from new development.
- 9.031 Draft Policy I1 Green Infrastructure has been rewritten as part of the main modifications for the VALP (as outlined in the suggested modifications earlier in 2019). The amended policy explains that the Council will support proposals for green infrastructure where there is no significant adverse impact on various things, including the wider green infrastructure network; potential to contribute to biodiversity net gains; management of flood risk; a range of types of green infrastructure; sports provision; potential food cultivation by communities; and achieving satisfactory landscaping schemes between development and adjacent open land. It goes on to explain that new housing developments of more than 10 units which have a maximum gross floorspaces of more than 1,000 square metres will be required to meet the ANGSt (accessible natural green space standards) and the accessibility standards in Appendix C of the VALP. It provides that conditions will be imposed on permissions or planning obligations sought in order to secure green infrastructure which is reasonably related to the scale and type of housing proposed.

National Planning Policy Framework (NPPF)

- 9.032 National policy is set out in the NPPF – February 2019 and those parts relevant to this assessment are summarised below.
- 9.033 Paragraph 10 and 11 of the NPPF states that at the heart of the Framework is a presumption in favour of sustainable development, which should be applied in relation to both plan-making and decision-taking.
- 9.034 Paragraph 20 of the NPPF states that strategic policies should set out an overall strategy for the pattern, scale and quality of development, and make sufficient provision for, among other elements, the *'(d) conservation and enhancement of the natural, built and historic environment, including landscapes and green infrastructure, and planning measures to address climate change mitigation and adaptation.'*
- 9.035 Section 12 of the NPPF sets out that planning policies and decisions should support the creation of high quality buildings and places. Paragraph 125 states that *'... design policies should be developed with local*

communities so they reflect local aspirations, and are grounded in an understanding and evaluation of each area's defining characteristics.'

- 9.036 Paragraph 127 states that planning policies and decisions, should ensure that developments, amongst other things:
- *'will function well and add to the overall quality of the area, not just for the short term but over the lifetime of the development;*
 - *are visually attractive as a result of good architecture, layout and effective landscaping;*
 - *are sympathetic to local character and history, including the surrounding built environment and landscape setting, while not preventing or discouraging appropriate innovation or change...'*
- 9.037 Paragraph 130 states that development should be refused where poor design *'... fails to take the opportunities available for improving the character and quality of an area and the way it functions...'* after having taken other design guidance into account. The paragraph continues that design should not be used for a reason for refusal when proposals accord with plan policies.
- 9.038 Section 15 of the NPPF deals with conserving and enhancing the natural environment. Paragraph 170 of the document states that the planning system should contribute to the protection and enhancement of the natural and local environment through, among other things, protecting and enhancing valued landscapes, *'... (in a manner commensurate with their statutory status or identified quality in the development plan).'* The paragraph also outlines that the planning system should recognise the, *'...intrinsic character and beauty of the countryside, and the wider benefits from natural capital and ecosystem services – including the economic and other benefits of the best and most versatile agricultural land, and of trees and woodland.'*

Planning Practice Guidance

- 9.039 The Planning Practice Guidance ('PPG') is in the process of being updated to reflect the changes following the publication of the revised NPPF. Any PPG paragraphs which have not been updated remain relevant until they are updated, insofar as they are consistent with the Revised NPPF 2019. The guidance as relevant to this assessment covers landscape and the natural environment, and the design of new developments.
- 9.040 Paragraph 001 (ID 26-001-20191001) of the Design: process and tools section sets out the purpose of the guidance, which aims to explain the process and tools that can be employed to achieve well-designed places. The guidance refers to paragraph 130 of the NPPF which relates to ensuring good design, and states that the section should be read in conjunction with the National Design Guide (published Oct, 2019), which it notes should be used in both plan-making and decision making. Ten good design characteristics are identified in the National Design Guide, and these are set out as follows in the PPG:
- Context
 - Identity
 - Built form
 - Movement
 - Nature
 - Public places
 - Uses
 - Homes and buildings
 - Resources
 - Lifespan.

- 9.041 Paragraphs 006 and 007 deal with masterplans, stating that they should be site specific and should ‘... *set the vision and implementation strategy for a development...*’. Paragraph 006 notes that they may need to be accompanied by other technical reports including landscape assessment and proposals for securing biodiversity net gain.
- 9.042 The Natural environment section of the guidance aims to explain the key issues to consider in relation to the implementation of policies to protect and enhance the natural environment, including local requirements.
- 9.043 Paragraph 004 defines Green Infrastructure and paragraph 005 it explains its importance as a natural capital asset that provides multiple benefits, including enhanced biodiversity, landscapes and urban cooling. In paragraph 006 the guidance sets out the planning goals green infrastructure can assist in achieving which are:
- *Building a strong, competitive economy;*
 - *Achieving well-designed places;*
 - *Promoting healthy and safe communities;*
 - *Mitigating climate change, flooding and coastal change;*
 - *Conserving and enhancing the natural environment.*
- 9.044 The final paragraph (008) in the green infrastructure sub-section notes that:
‘Green infrastructure opportunities and requirements need to be considered at the earliest stages of development proposals, as an integral part of development and infrastructure provision, and taking into account existing natural assets and the most suitable locations and types of new provision.’
- 9.045 Within the Biodiversity, geodiversity and ecosystems section, the topic of net gain is address in paragraph 020, which describes net gain as ‘... *an approach to development that leaves the natural environment in a measurably better state than it was beforehand. Net gain is an umbrella term for both biodiversity net gain and wider environmental net gain.*’
- 9.046 In the Landscape section of the guidance, paragraph 036 refers to that part of paragraph 170 of the NPPF which deals with the recognition of the intrinsic character and beauty of the countryside in local plans, and the need for strategic policies to ‘... *provide for the conservation and enhancement of landscapes. This can include nationally and locally-designated landscapes but also the wider countryside.*’ Paragraph 036 goes on to note that:
‘Where landscapes have a particular local value, it is important for policies to identify their special characteristics and be supported by proportionate evidence. Policies may set out criteria against which proposals for development affecting these areas will be assessed. Plans can also include policies to avoid adverse impacts on landscapes and to set out necessary mitigation measures, such as appropriate design principles and visual screening, where necessary. The cumulative impacts of development on the landscape need to be considered carefully.’

National Design Guide (October 2019)

- 9.047 The National Design Guide (2019) provides guidance to illustrate ‘... *how well-designed places that are beautiful, enduring and successful can be achieved in practice.*’
- 9.048 The guidance identifies ten good design characteristics and the following are of most relevance to landscape and visual assessment (our emphasis):
- Context is described as ‘... *the location of the development and the attributes of its immediate, local and regional surroundings.*’ The Guide goes on to state that,

‘An understanding of the context, history and cultural characteristics of a site, neighbourhood and region influences the location, siting and design of new developments. It means they are well grounded in their locality and more likely to be acceptable to existing communities. Creating a positive sense of place helps to foster a sense of belonging and contributes to well-being, inclusion and community cohesion.

- *The identity or character of a place comes from the way that buildings, streets and spaces, landscape and infrastructure combine together and how people experience them. It is not just about the buildings and how a place looks, but how it engages with all of the senses. Local character makes places distinctive. Well-designed, sustainable places with a strong identity give their users, occupiers and owners a sense of pride, helping to create and sustain communities and neighbourhoods.*
- *Nature contributes to the quality of a place, and to people’s quality of life, and it is a critical component of well-designed places. Natural features are integrated into well-designed development. They include natural and designed landscapes, high quality public open spaces, street trees, and other trees, grass, planting and water.’*

Supplementary Planning Documents

Buckinghamshire Green Infrastructure Strategy (April 2009)

9.049 This document found that Priority Action Area 1 (North Aylesbury Vale) is an area where the deficiency in accessible green infrastructure is most prominent. The aims of the Strategy are:

- to provide green infrastructure for the western side of Milton Keynes and Leighton-Linslade in Bedfordshire; and
- to provide green infrastructure for new communities in Buckinghamshire, specifically from the expansion of Milton Keynes to the south west.

9.050 Whaddon Chase (a historic environment asset) including the Milton Keynes Urban Fringe, which covers part of the Site, is identified as a strategic opportunity for landscape-scale habitat management, restoration and creation. It suggests the re-creation of its pre-19th century form with replanting of extensive woodland cover for recreational use and perhaps supplying fuel for sustainable bio-power generation.

Aylesbury Vale Green Infrastructure Strategy 2011-2026

9.051 This document sets out the Council’s framework for the creation and management of the Green Infrastructure Strategy of AVDC. Within the section on Priority Action Areas, it is noted that, *‘there is a notable lack of larger areas of accessible greenspace in the arc around the south and west of Milton Keynes; this deficit will be exacerbated as Milton Keynes expands.’*

9.052 The document also outlines nine strategic principles for Aylesbury Vale. Those of relevance to this Site and assessment include:

- Contribution to the protection, conservation and management of historic landscapes, archaeological and built heritage assets;
- Maintenance and enhancement of biodiversity;
- Delivering and enhancing existing woodlands and create new woodlands and tree features;
- Create new recreational facilities, in particular to create links between urban and rural areas; and
- Take account of and integrate natural processes and systems.

Whaddon Chase Green Infrastructure Plan (March 2010)

- 9.053 This document outlines the aspirations for the future provision and management of environmental assets within the Whaddon Chase area. The significant existing features of green infrastructure within Whaddon Chase that lie within the Application Site are identified as the existing public rights of way (Figure 2 within the Infrastructure Plan). Although the Application Site lies outside of the identified Whaddon Chase Project Area, the document identifies an opportunity for a linear green space along the disused railway that runs along the south eastern boundary of the Site (Figure 3 within the Infrastructure Plan).

Milton Keynes Green Infrastructure Strategy (March 2018)

- 9.054 This document provides an overarching appraisal of the existing green infrastructure assets in Milton Keynes and builds on the Vision and Principles for Green Infrastructure developed by the Buckinghamshire and Milton Keynes Natural Environment Partnership to identify strategic priorities for Milton Keynes.
- 9.055 The document references the Salden Chase strategic housing and employment allocation (within which the Application Site lies) and states that, *'It will be important that this new development is stitched into the surrounding green infrastructure network, and in particular accommodates green links around the west and south of Milton Keynes.'*

Aylesbury Vale District Development Concept Statements and Design Guides (Last updated July 2015, adopted by the Council in 1995)

- 9.056 These documents set out guidance on different types of development and design considerations. Those relevant to this Site and assessment include those on New Buildings in the Countryside and Building Materials.
- 9.057 The New Buildings in the Countryside guidance includes a ten point code for building in the countryside. Those of relevance to the Site and this assessment include:
- Using local materials and details wherever possible and consider the building form in combination with landscape setting with an aim to minimise visual impact;
 - Siting new buildings to blend with the landscape, form, planting and boundaries. Retain existing trees and hedgerows and allow sufficient distance between new tree planting and proposed housing;
 - Have due consideration for building mass and ensure that large buildings are not excessively bulky and avoid large areas of tarmac in favour of permeable surfaces;
 - Ensure that buildings relate to long distance as well as near distance views favouring organic forms rather than repetitive patterns;
 - Ensure that boundary treatments are in keeping with the surrounding landscape character and architectural vernacular; and
 - Work to design out any modern technologies that may appear visually intrusive and erode the character of the countryside, namely the private car.

Milton Keynes Council New Residential Development Design Guide (Adopted April 2012)

- 9.058 This document has been prepared to help ensure that residential developments in Milton Keynes are of high quality.

9.059 In respect of landscaping, the guide recommends the retention of existing landscape features within Proposed Development schemes. It also recommends planting along 'main local routes' in order to cultivate a significant character element and allow space to be legible while providing wildlife corridors. Streetscape design, including both hard and soft landscaping combined with building frontages help to create a sense of place. Significant hedge planting along front boundaries helps to provide a unifying character to the development.

Assessment Methodology

9.060 This assessment has been undertaken in accordance with the methodology as set out below which is based on the principles and guidance set out within the following published guidelines:

- 'Guidelines for Landscape & Visual Impact Assessment', produced jointly by the Institute of Environmental Assessment and the Landscape Institute (GLVIA 3rd edition 2013); and
- 'An Approach to Landscape Character Assessment', October 2014 (Christine Tudor, Natural England) to which reference is also made. This stresses the need for a holistic assessment of landscape character, including physical, biological and social factors.

9.061 In landscape and visual impact assessment, a distinction is normally drawn between landscape/townscape effects (i.e. effects on the character or quality of the landscape (or townscape), irrespective of whether there are any views of the landscape, or viewers to see them) and visual effects (i.e. effects on people's views of the landscape, principally from public rights of way and areas with public access, but also private views from residential properties). Thus, a development may have extensive landscape effects but few visual effects if, for example, there are no public viewpoints or properties nearby, or alternatively, few landscape effects but substantial visual effects if, for example, the landscape is already degraded or the development is not out of character with it, but can clearly be seen from many public areas and/or residential properties.

9.062 The assessment of landscape and visual effects is less amenable to scientific or statistical analysis than some environmental topics and inherently contains an element of subjectivity. However, the assessment should still be undertaken in a logical, consistent and rigorous manner, based on experience and judgement, and any conclusions should be able to demonstrate a clear rationale.

9.063 Through the design process an iterative approach has been adopted which has been informed by the initial landscape and visual appraisal work.

Landscape/Townscape Effects

9.064 Landscape/townscape quality is a subjective judgement based on the condition and characteristics of a landscape/townscape. It will often be informed by national, regional or local designations in respect of its quality e.g. AONB. Sensitivity relates to the inherent value placed on a landscape/townscape and the ability of that landscape/townscape to accommodate change. Landscape sensitivity can vary with:

- existing land uses;
- the pattern and scale of the landscape;
- visual enclosure/openness of views, and distribution of visual receptors;
- susceptibility to change;
- the scope for mitigation, which would be in character with the existing landscape; and
- the condition and value placed on the landscape.

9.065 The concept of landscape/townscape value is considered in order to avoid consideration only of how scenically attractive an area may be, and thus to avoid undervaluing areas of strong character but little scenic

beauty. In the process of making this assessment, the following factors, among others, are considered with relevance to the site in question: landscape quality (condition), scenic quality, rarity, representativeness, conservation interest, recreation value, perceptual aspects and associations.

- 9.066 Nationally valued landscapes are recognised by designation, such as National Parks and Areas of Outstanding Natural Beauty ('AONB') which have particular planning policies applied to them. Nationally valued townscapes are typically those covered by a Conservation Area or similar designation. Paragraph 170 of the Framework provides that planning policies and decisions should contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes '*...in a manner commensurate with their statutory status or identified quality in the development plan*'.
- 9.067 There is a strong inter-relationship between landscape/townscape quality, value and sensitivity as high-quality / value landscapes/townscapes usually have a low ability to accommodate change.
- 9.068 For the purpose of our assessment, landscape/townscape quality, value and sensitivity is assessed using the criteria within Tables LE1 and LE2 as set out in Appendix 9.1. Typically, landscapes/townscapes which carry a quality designation, and which are otherwise attractive or unspoilt will in general be more sensitive, while those which are less attractive or already affected by significant visual detractors and disturbance will be generally less sensitive.
- 9.069 The magnitude of change is the scale, extent and duration of change to a landscape arising from the Proposed Development and is assessed using the criteria in Table LE3 as set out in Appendix 9.1.
- 9.070 Landscape/townscape effects are assessed in terms of the interaction between the magnitude of the change brought about by the development and the quality, value and sensitivity of the landscape resource affected. The landscape/townscape effects, which can be beneficial, adverse or neutral, have been assessed using the criteria in Table LE4 as set out in Appendix 9.1. Landscape effects can be direct (i.e. impact on physical features, e.g. landform, vegetation, watercourses etc.), or indirect (i.e. impact on landscape character as a result of the introduction of new elements within the landscape).
- 9.071 In this way, landscapes/townscapes of the highest sensitivity and quality, when subjected to a high magnitude of change from the development under consideration, are likely to give rise to 'substantial' landscape/townscape effects which can be either adverse or beneficial. Conversely, landscapes of low sensitivity, when subjected to a slight magnitude of change from the development under consideration, are likely to give rise to only 'slight' or neutral landscape/townscape effects. Beneficial landscape effects may arise from such things as the creation of new landscape features, changes to management practices and improved public access. For the purpose of this assessment the landscape/townscape effects have been judged at completion of the development and at year 15. This approach acknowledges that landscape/townscape effects can reduce as new planting/mitigation measures become established and achieve their intended objectives.

Visual Effects

- 9.072 Visual effects are concerned with the views of the landscape/townscape experienced by people and the change that will occur. Like landscape effects, viewers or receptors are categorised by their sensitivity. For example, views from private dwellings are generally of a higher sensitivity than those from places of work (although it is acknowledged that private views may have more limited weight in planning terms).
- 9.073 In describing the content of a view, the following terms are used:
- No view - no views of the development;

- Glimpse - a fleeting or distant view of the development, often in the context of wider views of the landscape;
- Partial - a clear view of part of the development only;
- Filtered - views to the development which are partially screened, usually by intervening vegetation – the degree of filtering may change with the seasons;
- Open - a clear view to the development.

- 9.074 The sensitivity of the receptor varies according to its susceptibility to a particular type of change, or the value placed on it (e.g. views from a recognised beauty spot will have a greater sensitivity). The visual sensitivity of receptors has been assessed using the criteria in Table VE1 as set out in Appendix 9.1.
- 9.075 The magnitude of change is the degree to which the view(s) may be altered as a result of the Proposed Development and will generally decrease with distance from its source, until a point is reached where there is no discernible change. The magnitude of change in regard to the views has been assessed using the criteria in Table VE2 as set out in Appendix 9.1.
- 9.076 Visual effects were then assessed in terms of the interaction between the magnitude of the change brought about by the development and the sensitivity of the visual receptor affected. The level of visual effect, whether beneficial, adverse or neutral, was assessed using the criteria set out in Table VE3 as set out in Appendix 9.1.
- 9.077 As with landscape effects, a high sensitivity receptor, when subjected to a high magnitude of change from the development under consideration, is likely to experience 'substantial' visual effects which can be either adverse or beneficial. Conversely, receptors of low sensitivity, when subjected to a slight magnitude of change from the development under consideration, are likely to experience only 'slight' or neutral visual effects, which can be either beneficial or adverse.
- 9.078 This chapter also considers the likely night time effect of the predicted light levels on night time visibility. As the scheme is in outline form only, this is based on the anticipated effects of new lighting resulting from the Proposed Development.
- 9.079 During the site visit, photographs were taken with a digital camera with a lens that approximates to 50mm, to give a similar depth of view to the human eye. In some cases images have been joined together to form a panorama. These are available at Figure 9.E (i.e. photosheets). The prevailing weather and atmospheric conditions, and any effects on visibility are noted.
- 9.080 Unless specific slab levels of buildings have been specified, the assessment has assumed that slab levels will be within 750mm of existing ground level.

Significance of Effect

- 9.081 In assessing EIA development, a judgement needs to be made about whether an effect is likely to be 'significant' in EIA terms. GLVIA3 advises that: *'There are no hard and fast rules about what effects should be deemed 'significant' but LVIA's should always distinguish clearly between what are considered to be the significant and non-significant effects.'*
- 9.082 In terms of the significance of landscape effects GLVIA3 provides the following advice:
- *"major loss or irreversible negative effects, over an extensive area, on elements and/or aesthetic and perceptual aspects that are key to the character of nationally valued landscapes are likely to be of the greatest significance;*

- *reversible negative effects of short duration, over a restricted area, on elements and/or aesthetic and perceptual aspects that contribute to but are not key characteristics of the character of the landscapes of community value are likely to be of the least significance and may, depending on circumstance, be judged as not significant;*
- *where assessments of significance place landscape effects between these extremes, judgements must be made about whether or not they are significant with full explanations of why these conclusions have been reached.”(Paragraph 5.56)*

9.083 In terms of the significance of visual effects GLVIA3 provides the following advice:

- *“Effects on people who are particularly sensitive to changes in views and visual amenity are more likely to be significant.*
- *Effects on people at recognised and important viewpoints or from recognised scenic routes are more likely to be significant.*
- *Large-scale changes which introduce new, non-characteristic or discordant or intrusive elements into the view are more likely to be significant than small changes or changes already involving features already present within the view.” (Paragraph 6.44)*

9.084 The assessment methodology in Chapter 4 of the ES sets out the different levels of significance, and states that ‘major’ or ‘moderate’ significance equates to significant impacts in the context of the EIA regulations. For the purpose of this chapter, this would include any ‘substantial’ and ‘moderate’ Adverse or Beneficial effects on landscapes and/or views. Slight adverse effects, although not considered ‘significant’ in EIA terms should not be wholly disregarded. Negligible or neutral effects would see limited or no change or effects.

9.085 Where significant adverse effects are identified, measures to avoid, prevent, reduce or, if possible, offset these effects are recommended (i.e. mitigation measures). The level of effect is then assessed with these measures in place i.e. residual effects.

Mitigation and Residual Effects

9.086 Mitigation measures are described as those measures, including any process or activity, designed to avoid, prevent, reduce and/or, if possible, (offset) compensate for any adverse landscape and/or visual effects likely to occur as a result of the Proposed Development. Residual effects are those that are predicted to occur once mitigation measures are in place.

9.087 In situations where proposed mitigation measures are likely to change over time, for example landscape planting to screen development, it is important to make a distinction between any likely effects that will arise in the short-term and those that will occur in the long-term or ‘residual effects’ once mitigation measures have established. In this assessment, the visual effects of the Proposed Development have been considered at the date of completion (Year 1) and once mitigation has established (after 15 years). For the purpose of this assessment it has been assumed that broadleaf planting would have, on average, grown by an additional 5 metres over a 15-year period, based on typical growth rates and previous experience.

9.088 Embedded mitigation measures have also been included as part of the spatial planning of the site and a series of landscape and visual principles used in developing the layout are set out later in this chapter, with the more sensitive areas kept free of development. Similarly, height parameters (see Parameters Plan drawing number 4857_114_Building Heights Parameters Plan) have been established to mitigate the impact of the development on sensitive views. These have been assessed as part of the scheme and any further mitigation measures are additional to these embedded measures.

Assessment of Effects

9.089 The assessment considers and describes the main landscape/townscape and visual effects resulting from the Proposed Development. The narrative text sets out the rationale of judgements concerning the landscape and visual effects. Where appropriate the text is supported by tables which summarise the sensitivity of the views/landscape/townscape, the magnitude of change and describe the resulting effects.

Cumulative Effects

9.090 Cumulative effects are:

“the additional changes caused by a Proposed Development in conjunction with other similar developments or as the combined effect of a set of developments, taken together.” (GLVIA 3, page 120, paragraph 7.3)

9.091 Those schemes or potential schemes which could, together with the Proposed Development, give rise to cumulative landscape or visual effects are considered to be:

- The implementation of the East West Rail project – no details of this are yet available, so the principle of this development alongside the Proposed Development will be considered;
- The remainder of the Tattenhoe Park development (ref 17/00918/OUT), located north of the Site; and
- Strategic Allocation D-WHA001 Shenley Park (VALP Main Modifications version), located north west of the Site.
- Application 13/00888/OUTEIS - Mixed Use Development at Newton Leys.

Zone of Theoretical Visibility

9.092 A Zone of Theoretical Visibility Map ('ZTV') can help to determine the potential visibility of the Site and identify those locations where development at the Site is likely to be most visible from the surrounding area. The ZTV for the Site is contained at Figures 9.F and 9.G.

9.093 The process of producing a ZTV is as follows. It is in two stages and for each, a digital terrain model ('DTM') using Key TERRA-FIRMA computer software is produced and mapped onto an OS map. The DTM is based on Ordnance Survey Landform Profile tiles, providing a digital record of existing landform across the UK, based on a 10 metre grid. There is the potential for minor discrepancies between the DTM and the actual landform where there are topographic features that are too small to be picked up by the 10 metre grid. A judgement will be made to determine the extent of the study area based on the specific site and the nature of the proposed change and the reasons for the choice will be set out in the report. The study area will be determined by local topography but is typically set at 7.5km.

9.094 Different heights are then assigned to significant features, primarily buildings and woodland, thus producing the first stage of an 'existing' ZTV illustrating the current situation of the Site and surrounding area. This data is derived from OS Open Map Data, and verified during the fieldwork, with any significant discrepancies in the data being noted and the map adjusted accordingly. Fieldwork is confined to accessible parts of the Site, public rights of way, the highway network and other publicly accessible areas.

9.095 The second stage is to produce a 'proposed' ZTV with the same base as the 'existing' ZTV. The Proposed Development is introduced into the model as either a representative spot height, or a series of heights, and a viewer height of 1.7m is used. The 'proposed ZTV' illustrates the visual envelope of the Proposed Development within the Site. For the purposes of this project the following heights have been assigned:

- Existing Buildings: represented by increasing the basic terrain model levels by 9m to simulate the additional height of two storey buildings.

- Woodlands: represented by increasing the basic terrain model levels by 12m to simulate the additional height of trees.
- Proposed Development: represented by increasing the ground levels by 9.6m above the basic terrain model to simulate the assumed height of a typical two-storey building, 11.5m above the basic terrain model for the assumed height of a typical two and a half storey building and 10m for the primary school and 12m for the secondary school buildings. The extent of the two, two and a half and three storey development is defined on the Parameters Plan (Drawing number 4857/114 Building Heights Parameters Plan).

9.096 The model is based on available data and fieldwork and therefore may not take into account all development or woodland throughout the study area, nor the effect of smaller scale planting or hedgerows. It also does not take into account areas of recent or continuous topographic change from, for instance, mining operations.

Limitations and Assumptions

9.097 No significant limitations were encountered during the assessment process. Views were assessed from both within the Site and from the surrounding area. Two site visits were made in March 2020. Weather conditions on the first visit were sunny with some cloud and intermittent showers and visibility was very good in all views. On the second visit it was overcast with very good visibility in all views.

Baseline Conditions

9.098 This section outlines the baseline conditions of the Site as recorded in March 2020.

Site Context

9.099 The Site lies to the south west of Milton Keynes. Milton Keynes was a planned new town designated in the 1960s which incorporated other towns including Bletchley, Wolverton and Stony Stratford, together with 15 other villages and the farmland in between them. Within its present landscape setting it is located to the north west of the Greensand Ridge which is encapsulated by an area of undulating Claylands. Since its inception, Milton Keynes has developed according to its characteristic grid pattern provided by key vehicular routes and the Milton Keynes 'redways' (cycle routes) with different neighbourhoods located within each grid square.

9.100 The A421 (Standing Way) runs adjacent to the northern Site boundary with 'Bottledump Roundabout' on the north western corner of the Site. Standing Way meets the B4034 at a roundabout which forms the northernmost tip of the Site. Beyond this is the industrial estate at Snelshall West, the Windmill Hill Golf Centre and Tattenhoe Valley Park and the recent residential development within it. Further to the north west, is an area of mixed agricultural land and woodland blocks near to the village of Whaddon. To the east, are a rectangular arable field and the existing built up area at the west of Bletchley.

9.101 Whaddon Road lies adjacent to the western boundary of the Site. Beyond Whaddon Road is agricultural land in mixed use, scattered with large blocks of woodland including Thrift Wood and Broadway Wood, and scattered agricultural buildings and associated residential properties. The disused railway (which is intended to come back into use as part of the plans for East-West rail) lies adjacent to the southern Site boundary. Further south is an area of agricultural land which is under mixed land use (both pastoral and arable) scattered with agricultural buildings and dwellings in between the disused railway and Newton Longville. The edge of Newton Longville lies approximately 500m from the southern Site boundary at its closest point. Approximately 1.5km southeast of the Site, beyond Newton Longville, lies the new district of 'Newton Leys' which covers an area to the south of Bletchley. This has been built out over the last 10-15 years and is nearly complete.

Designated Sites and Heritage Assets

- 9.102 The Site is not covered by any statutory or non-statutory designations for landscape character or quality. Surrounding designations are shown on the MAGIC Map Extract and Heritage Plan in Figure 9.C. There are several locations of archaeological interest which are detailed in Chapter 5 of this ES, which are to be protected by retaining them as green space within the Proposed Development.
- 9.103 The nearest landscape designation is the Whaddon-Nash Valley Local Landscape Area (LLA) which is located approximately 1.8km north west of the Site (at its closest point) beyond the woodland at Thinbare and Thickbare Wood. LLAs are a second tier designation within the Aylesbury Vale Local Plan (2004) below Areas of Attractive Landscape (AAL). The Whaddon-Nash Valley LLA is described in the Local Plan as:
- “Between Whaddon and Nash, north of the A421, in part of the area known as Whaddon Chase, the north-facing slope from the higher ground in the south towards the River Great Ouse is cut by tributaries of the river. The result is a varied and secluded landscape. The high quality landscape provides an attractive setting for the villages of Whaddon and Nash and is prominent when viewed from the north.”*
- 9.104 A limited number of designations have been identified that may be of relevance to the Application Site.
- Scheduled Monument - Fishpond in Water Spinney 600m SE of St Giles's Church Tattenhoe (500m from Site).
 - Scheduled Monument - Moated site, fishponds and deserted medieval village of Tattenhoe, 300m west of Home Park Farm (1km from Site).
 - Scheduled Monument - Snelshall Benedictine Priory: a moated priory site and fishponds north of Briary Plantation (1.8km from Site).
 - SSSI - Howe Park Wood, public access woodland (1.3km from Site).
- 9.105 The Newton Longville Conservation Area is approximately 1.1km away from the Site at its nearest point. There are only partial views out of the Conservation Area due to the surrounding built form.

Tree Preservation Orders ('TPO')

- 9.106 A desk-based search was undertaken using AVDC Protected Tree Search online on the 11th March 2020. This found that there are no TPOs covering any of the trees on or immediately adjacent to the Site within Aylesbury Vale District.
- 9.107 Within Milton Keynes, the tree survey and Arboricultural Impact Assessment found that there is one group TPO located north of the Site, incorporating Tattenhoe Roundabout (Appendix 9.4).

Public Rights of Way ('PROW')

- 9.108 The Site is crossed by several PROW. A restricted byway runs along Weasel Lane, in a west-east direction along the top of the ridge. This byway forms part of National Cycle Route 51. A public footpath runs north west to south east from Weasel Lane along a hedgerow boundary between two of the fields of the Site, before crossing the disused railway line and continuing south east towards Newton Longville. These paths form part of the Long Distance Walking Route ('LDWR'), the Milton Keynes Boundary Walk. There are several other public rights of way in the surrounding area.

Site Description

- 9.109 The Site has been divided into two parcels (A and B) for ease of description, as illustrated on Figure 9.B – Aerial Photograph. Altogether the Site extends to approximately 144.48ha and is predominantly in agricultural use as arable farmland. The Site lies over two sides of a gently sloping east-west ridge along the top of which runs Weasel Lane. Area A is the area of the Site that lies north of Weasel Lane, Area B lies south of Weasel Lane.
- 9.110 Area A is a broadly triangular area formed of approximately thirteen small to medium, rectilinear agricultural fields, predominantly in arable use that slope gently downwards in a northerly direction. These are separated by hedgerows of varying density and maturity, shallow drainage ditches and some blocks of woodland. The northern boundary of Area A runs broadly along the private track that runs parallel to the A421 (Standing Way) and alongside the B4034. This track has gates and bollards at either end and is not publicly accessible.
- 9.111 Area A also includes the Bottledump Roundabout, part of the A421 and the Tattenhoe Roundabout. These are planted with trees of various species and other shrub planting with typical highways character. New Leys Farmhouse (residential property) and its curtilage are indented into the northern boundary off the B4034. There is a high-power electricity line with large pylon towers located across Area A in a south west to north east alignment.
- 9.112 There is a small stream that runs through Area A separating the three most westerly fields from the easterly ones, running from Whaddon Road in a northerly direction to the small block of woodland adjacent to the private track beside the A421. The south-western boundary of Area A runs adjacent to Whaddon Road and is formed of a trimmed, dense hedgerow running alongside the road, with occasional gaps for farm access onto the fields. There are also occasional hedgerow trees included in this boundary. There is one agricultural building located within Area A, directly north east of Bletchley Leys Farm.
- 9.113 The south-eastern boundary of Area A and north-western boundary of Area B run along Weasel Lane which is bound on either side by hedgerows of varying height, density and frequency of hedgerow trees and runs along the local ridgeline. There are also occasional gaps allowing for farm access onto the fields in Areas A and B. The Leys Farmhouse, its outbuildings and curtilage are indented into the Site boundary off Whaddon Road and are excluded from the Site. Sections of National Cycle Route 51 and the Milton Keynes Boundary Walk (LDWR) run along Weasel Lane.
- 9.114 Within Area A, along Weasel Lane and the northern parts of Area B, the constant audible presence of traffic along the A421 and B4034 on the northern boundary of the Site and to some degree the traffic along Whaddon Road, is noticeable and gives these areas more of an urban edge character. The western parts of Area B are also influenced by the audible presence of Whaddon Road. In contrast, Area B is influenced by the built areas of Bletchley and Newton Longville, but generally relates slightly more to the surrounding rural landscape than Area A.
- 9.115 Area B is formed of five larger arable fields that slope downwards to the south to a low point where the disused railway runs in an east-west direction. These fields are divided by hedgerows of varying density, with gaps to allow for farm access and with some larger hedgerow trees alongside some shallow ditches. The eastern boundary of Area B abuts the existing built edge of Bletchley. A public footpath runs along the eastern side of the hedgerow boundary within the easternmost field of Area B. The footpath forms part of the Milton Keynes Boundary Walk.
- 9.116 There are two deeper ditches running along the field boundaries between the three most southerly fields in Area B that periodically have water running along them. They run in a generally north to south direction towards the southern boundary of Area B.

- 9.117 The southern boundary of Area B is formed of dense trees, hedgerow and scrub vegetation that grow along the embankment of the disused railway. The western boundary of Area B runs adjacent to Whaddon Road and is formed of trimmed hedgerows with some hedgerow trees, with a denser area of trees and hedgerow vegetation located towards its southern end next to the bridge over the railway. There is a large farm building located north of Whaddon Road, south east of Weasel Lane that is included in the Site boundary.

Topography

- 9.118 The Site is located over two sides of a gently sloping east-west ridge along the top of which runs Weasel Lane. The Site reaches a low point of approximately 95m alongside the disused railway which runs adjacent the southern Site boundary and a high point of approximately 120m along Weasel Lane. To the west and south west of the Site the land rises beyond the Ouzel Valley to a height of 150m AOD at Mursley. To the south east, the Greensand Ridge at Woburn is a prominent feature on the skyline.

National Landscape Character

- 9.119 Natural England has produced profiles for England's National Character Areas ('NCA'), which divides England into 159 distinct natural areas, defined by a unique combination of landscape, biodiversity, geodiversity, cultural and economic activity. The Site is located within NCA 88 Bedfordshire and Cambridgeshire Claylands.
- 9.120 The Bedfordshire and Cambridgeshire Claylands covers a large area that encompasses most of north and mid Bedfordshire and western Cambridgeshire, parts of east Buckinghamshire and Northamptonshire. It also encircles NCA 90 – Bedfordshire Greensand Ridge which runs from the south east of Milton Keynes in a north easterly direction to the north east of Sandy.
- 9.121 NCA 88 is described as a broad, gently undulating, lowland plateau which is dissected by shallow river valleys. There is variable, scattered woodland cover across the NCA with some clusters of ancient woodland. It is predominantly an open, arable landscape of regular fields bounded by open ditches and trimmed, often species-poor, hedgerows which contrast with other irregular shaped fields. It has several recreational assets. Those relevant to this assessment include the Marston Vale Community Forest, woodland and wetland sites, extensive rights-of-way network and two National Cycle Routes. Settlements within the NCA are largely located along major road and rail corridors with smaller settlement dispersed throughout.
- 9.122 Pressure for the expansion of Milton Keynes has been noted by the NCA profile: *'There are growth plans for all of the main towns and cities and Milton Keynes continues to expand.'*
- 9.123 The Environmental Opportunities for the area include, *'SEO3: Plan and create high-quality green infrastructure to help accommodate growth and expansion, linking and enhancing existing semi-natural habitats.'* Examples to achieve this are stated in the NCA profile and include:

'Supporting initiatives that include well-planned green infrastructure that will increase people's access to and contact with the natural environment to benefit their health and wellbeing.'

'Creating new woodland as appropriate on urban fringes to help screen and integrate new developments, and provide biodiversity and green infrastructure benefits.'

'Ensuring that any new developments incorporate well-designed green infrastructure, to include improved access and recreation opportunities for local communities and visitors.'

Local Landscape Character

- 9.124 The Aylesbury Vale Landscape Character Assessment ('AVLCA', 2008) considers the character of the landscape at a district level. The local landscape character areas defined by the study on the Site and the surrounding area are mapped on Figure 6.D in Appendix 9.2 of this Chapter.
- 9.125 The Site falls within the north western area of the 4.9 Newton Longville – Stoke Hammond Claylands Landscape Character Area ('LCA') which lies within the Landscape Character Type ('LCT') 4 Undulating Clay Plateau. Key characteristics of LCA 4.9 are as follows:
- Gently undulating to rolling landform
 - Heavy clay soils with mixed agricultural use
 - Nucleated settlement pattern
 - Parliamentary enclosures with thorn hedges
- 9.126 Overall, the condition of the landscape is considered to be moderate. There is scant woodland cover though trees are a feature within some hedgerows. The sensitivity of the LCA is considered to be 'low' with the sense of character considered to be weak, as assessed within the local landscape character assessment. The settlements of Newton Longville and Stoke Hammond have expanded significantly as a result of new housing development. The assessment also notes that new highway development at the LCA's fringes is eroding the cultural and functional integrity.
- 9.127 The assessment sets out a number of landscape guidelines for the LCA. Overall, the guideline is to enhance and reinforce. The specific guidelines for the area, relevant to the Site, include:
- *'Promote management of hedgerows by traditional cutting regimes and the establishment of new hedgerow trees;*
 - *Encourage the establishment of buffer zones of semi-natural vegetation along watercourses in arable areas to enhance biodiversity, interconnectivity and landscape quality;*
 - *Promote connectivity of habitats;*
 - *Conserve and enhance the distinctive character of settlements and individual buildings;*
 - *New housing and alterations to existing housing should be designed to reflect the traditional character of the area and be consistent in the use of locally occurring traditional materials;*
 - *Consider encouraging the establishment of new woodlands within the historic landscape pattern to provide some mitigation for the visually intrusive elements;*
 - *Encourage landowners to improve ecological diversity by maintaining varied land maintenance regimes to benefit landscape and habitats; and*
 - *Identify key views from publicly accessible locations and promote the management and enhancement of these viewpoints.'*
- 9.128 Adjacent LCAs to the Site are summarised below.
- 9.129 LCA 4.7- Whaddon Chase lies to the north west of the Site. Overall the condition of the landscape is considered to be very good. The area is particularly noted for the coherent pattern of elements, namely the relationship of steeper valleys, streams and woodland cover. Cultural integrity is good, represented by the remnant woodland, landscape features and archaeology of the historic Chase. The area is noted as a unique and rare landscape because of the surviving relics of Whaddon Chase. There is a strong sense of place. Overall the degree of sensitivity is high. Key Characteristics are described as follows:
- Incised valleys

- Settlement on local promontory
- Extensive woodland cover
- Irregular shaped field pattern
- Heritage of Whaddon Chase

9.130 LCA 4.8 – Horwood Claylands is located to the south west and west of the Site. Overall the condition of the landscape is considered to be good. The area covers an undulating clay plateau eroded by a network of local streams into a series of shallow valleys and broad flat ridges. The area maintains its distinctiveness due to its rural characteristics and the historic continuity of the area. Sense of place is considered to be moderate. Overall the degree of sensitivity remains moderate. Key characteristics are described as follows:

- Rolling clay landform
- Shallow valley and ridges
- Two distinctive water courses draining to the Claydon Brook
- Mixed farmland
- Irregular field pattern around settlements
- Loss of field pattern structure to east of the area

9.131 LCA 4.11 – Mursley-Soulbury Claylands is located south west of the Site beyond LCAs 4.8 and 4.9. Overall the condition of the landscape is considered to be very good. The area covers a shallow arc of land to the south of Newton Longville. The sense of place is considered to be moderate which is reflected in the intrinsic rural appearance of the landscape. Overall, the degree of sensitivity remains moderate. Key characteristics are described as follows:

- Rolling landform
- Clay soils with mixed agriculture use
- Springs and streams draining off the ridge
- Small dispersed pockets of woodland cover
- Area is exposed due to its elevation above surrounding areas
- Nucleated row settlements
- Parliamentary and pre-18th century fields.

9.132 The area to the immediate north and east lies within Milton Keynes Borough and is defined as an Urban Area and has not been assessed within the Milton Keynes Landscape Character Assessment.

9.133 From our own assessment of the Site and surroundings we would note that, in terms of the wider landscape character of the area, the Site is broadly representative of the AVDC LCA description of LCA 4.9 Newton Longville – Stoke Hammond Claylands. It is formed of agricultural land bordered by hedgerows which has a gently undulating rolling landform with a ridge broadly running along the centre of the Site. The settlement edge of Bletchley and Milton Keynes together with the overhead power line in Area A and the constant audible presence of the A421, B4034 and Whaddon Road influence the Site and contribute to its settlement edge character.

Landscape Quality and Sensitivity

9.134 The Site is located immediately adjacent to the south western settlement edge of Milton Keynes and Bletchley. It comprises undulating farmland which rises to a local ridgeline along Weasel Lane, falling gently northwards to the A421 and southwards towards the disused railway. The Site shares many of the characteristics of the wider Newton Longville – Stoke Hammond Claylands (LCA 4.9 in AVDC LCA). Both the Site and the

immediate landscape show little conspicuous signs of degradation and the features of the landscape are relatively intact. These conclusions align with the assessment within AVDC LCA which considers the overall condition of LCA 4.9 to be moderate.

- 9.135 In regard to landscape sensitivity, the AVDC LCA notes that the continuity of LCA 4.9 is disrupted and the strength of character is considered to be weak. AVDC LCA assesses the wider LCA to be of low sensitivity. However, against our own methodology, which takes into account the susceptibility of a landscape to absorb different types of development and the scale of the proposals, we consider LCA 4.9 to be of medium – low landscape sensitivity.
- 9.136 Our assessment of the sensitivity of the Site has concluded that Area A lies in close proximity to the existing settlement edge of Milton Keynes. Overall, Area B relates more closely to the rural surroundings of Milton Keynes than Area A with the exception of the most easterly field which lies directly adjacent to the existing built edge. Overall, the urban influence of Milton Keynes is apparent across the whole Site by its audible and visual presence. The Site has reasonable ability to accommodate the proposed type of change without being discordant with the surrounding landscape/townscape character. Overall, the Site is assessed as being of medium- low landscape sensitivity based on our assessment methodology.

Landscape Features

- 9.137 The landscape features of the Site are largely located along the Site's boundaries, internal field boundaries and along Weasel Lane. A tree survey has been undertaken for the Site, which grades the trees and hedgerows within and immediately adjacent to the Site, in terms of quality and life expectancy. None of the trees on the Site that lie within AVDC are covered by a Tree Preservation Order ('TPO'). This was confirmed by the Aylesbury Vale District Council online Protected Tree Search on 16th January 2019. The tree survey and Arboricultural Impact Assessment found that there is one group TPO located north of the Site, incorporating Tattenhoe Roundabout (Appendix 9.4). The tree survey found that the majority of trees and hedgerows on Site are Category B (medium quality) with a few trees and groups of Category A (high quality) and some of Category C (low quality) (Appendix 9.4).

There is one stream in Area A that runs from Whaddon Road in a northerly direction to the block of woodland adjacent to the private track alongside the A421. The stream runs along the field boundary between the three western most fields in Area A and the remainder of Area A. There are also two deeper ditches along the field boundaries separating the three most southerly fields in Area B, which periodically have water running in a southerly direction towards the southern boundary with the disused railway.

Landscape Value

- 9.138 The majority of the Site is not publicly accessible although a restricted byway and public footpath run across the middle of the Site along Weasel Lane and along one of the hedgerow field boundaries within Area B which leads south towards Newton Longville. These routes form part of the Milton Keynes Boundary Walk.
- 9.139 The Site exhibits characteristics of the Newton Longville – Stoke Hammond Claylands LCA, but is located in close proximity to the settlement of Milton Keynes and Bletchley. It is visible from the A421 on the western approach to Milton Keynes as well as the southern approach to the city along Whaddon Road. By virtue of the Site's proximity to Milton Keynes, it is influenced to varying degrees by its visual and audible relationship with the built up area.
- 9.140 There are no known cultural associations or National or Local landscape designations covering the Site and it is of relatively ordinary scenic quality. The Site is likely to be valued at a local level by users of the PROW on

the Site for its relative openness, and views of the farmland. Overall, the Site is assessed as being of medium-low landscape value and is not considered to be part of a valued landscape for the purposes of NPPF paragraph 170.

Night Time and Lighting Character

- 9.141 The Site is currently unlit, being formed of several arable fields of varying shape and size. The surrounding development has numerous light sources which have an influence on the character and visual amenity of the nearby areas. Milton Keynes creates a significant and wide reaching level of sky glow to the north and east, with secondary areas of light being generated by the A421. By comparison, Newton Longville produces much lower light levels.

Visibility

- 9.142 A ZTV has been produced and has been used to identify locations where development at the Site is likely to be most visible from the surrounding area. A baseline visual envelope has been produced using a digital terrain model (DTM). This visual envelope identifies the areas from which the Site is potentially visible when viewed from within the surrounding study area, considering potential obstacles to views including existing development and woodland. It does not take into account localised vegetation including hedgerows and trees.
- 9.143 The extent of the theoretical visual envelope is shown on the ZTV Maps at Figures 9.F and 9.G. The ZTV was used to inform the subsequent field work and to identify the key views from the surrounding area. The ZTV identified that there is high potential of views of the Site from the areas to the immediately west, around Newton Longville and to the southwest near Mursley. The ZTV also shows that there is some medium potential for longer distance views from some areas around Drayton Parslow, North End and Stewkley as well as in the east where the land rises towards the Greensand Ridge near to Great Brickhill and Little Brickhill. Due to the gently undulating topography of the surrounding landscape to the west, south and east, the ZTV shows that the Site is generally only visible where land rises to local high points or ridges and where there are few areas of intervening woodland and built form, as modelled from the 1:50,000 OS data.
- 9.144 From observations taken during the Site visit, it was noted that the level of vegetation cover surrounding the Site combined with the undulating landform provides a reasonable level of screening of the lower lying parts of the Site. The fields closest to Weasel Lane that slope away from this local ridgeline together with the trees and hedgerow that run along the Lane are generally the most visible parts of the Site in medium and longer distance views. There are relatively few residential receptors that have views of the Site, except for those indented within the Site boundary and adjacent to the Site. In the wider area, views from residential properties are generally limited to the residents on the northern edge of Newton Longville, residents at the hamlet of Chase Farm and residents of the row of houses on the western built edge of Bletchley. Other high sensitivity receptors include the users of Weasel Lane and the Milton Keynes Boundary Walk which cross through the Site.
- 9.145 Medium and longer distance views are limited from locations north of the Site due to the intervening built form and the plateau-like landform upon which Milton Keynes is located. Views are limited to glimpsed views in between intervening vegetation and blocks of woodland, with the Site only visible from areas where the land is slightly more elevated. From the south, views are intermittent from various public vantage points due to the rising ground, but Bletchley and Milton Keynes are already visible within these views. Medium and long distance views to the east are generally restricted by intervening built form, landform and vegetation. The ZTV shows two areas east of Newton Longville where there is the potential for views of the Site, however these areas are not publicly accessible.

- 9.146 Further to the east, where the land rises up to the Greensand Ridge near to Great Brickhill and Little Brickhill, there are some very distant glimpsed views of the Site, but due to the distance and the intervening villages, built form and woodland, the Site is almost undiscernible from the edge of Milton Keynes.
- 9.147 The following section describes the views of the Site from surrounding vantage points. An assessment of the key views is set out in the effects tables at the end of this Chapter and summarised below. All photographs were taken in winter months and therefore illustrate representative views from public vantage points when the screening potential of deciduous vegetation is at its least optimal (see **Appendix 9.2**). Within the assessment, consideration is also given to summer views, when vegetation will be in full leaf.

North

- 9.148 Users of the A421 approaching Milton Keynes from the west have their first view of the Site adjacent to the Bottledump Roundabout (**Photograph 01**), as Broadway Wood screens all views from further west. Users travelling on the B4034 (**Photograph 07**) from the east have their first view of the Site when the road emerges from the built area of Bletchley. Views from these roads where they are adjacent to the Site are heavily filtered by existing tree and shrub planting along the northern edge of the Site (**Photograph 11**), with only part of the Site north of Bletchley Leys Farm visible.
- 9.149 In the majority of Tattenhoe Park, views of the Site are screened by the intervening vegetation and by virtue of the low-lying landform of the Park behind Snelshall West. There are some very limited views of the elevated parts of the northern slopes and the vegetation along Weasel Lane from the northern parts of Tattenhoe Park along the route of the Milton Keynes Boundary Walk (**Photograph 12**). The power lines that cross the Site are visible on the skyline of these views.
- 9.150 Properties on the southern edge of the new residential development in Tattenhoe Park have middle distance views of the more elevated parts of the Site, but this is seen in context with the industrial development within Snelshall East and West, with the recently completed new school at Tattenhoe Park in the foreground (**Photograph 13** and reverse view **Photograph 04**).

East

- 9.151 Properties on the western edge of Bletchley closest to the Site, have filtered views through rear garden boundary vegetation and hedgerows on the Site boundaries and field boundaries, onto the southern slopes of the Site from upper and lower storeys (**Photograph 30** and **38** and reverse views in **Photographs 06, 39** and **40**). The majority of Area A is screened due to the ridgeline landform in the centre of the Site.
- 9.152 There are partial views of the most elevated parts of the Site including the hedgerow and trees along Weasel Lane from Bletchley Road, north east of Newton Longville above the intervening vegetation. The majority of the Site is screened from view by the hedgerow alongside Bletchley Road combined with the vegetation along the disused railway (**Photograph 21**).
- 9.153 Longer distance views from the east include those from locations within Great Brickhill South Conservation Area on the edge of the Greensand Ridge, and public rights of way near Little Brickhill. From Great Brickhill there are intermittent panoramic views across the farmland and villages south west of Milton Keynes, with the built form at Milton Keynes visible from certain locations in Great Brickhill where gaps in built form and vegetation allow. The Site is not readily discernible in these views due to distance (**Photograph 26**).
- 9.154 From bridleway 15 near Little Brickhill, there are medium distance views of the southern edge of Milton Keynes with the intervening farmland around Stoke Hammond and Newton Longville in the foreground of

views. In the far distance Salden Wood and Broadway Wood can be seen on the horizon with partial views of the most elevated parts of the Site forming a small part of the view. The Site is only discernible in these views in good weather (**Photograph 27**).

South

- 9.155 There are partial views of the Site from footpath NLO/18/1, south east of the Site which passes through an overgrown parcel of land adjacent to the Sewage Works. The dense vegetation along the disused railway and along the hedgerow extending northwards along the Milton Keynes Boundary Walk screen the lower parts of the Site, with small parts of the most elevated fields of the Site visible. The hedgerow and trees along the eastern part of Weasel Lane are also visible (**Photograph 18**).
- 9.156 There are partial views of the southern slopes of the Site visible from footpath NLO/16/1 as it emerges from Newton Longville. The lower parts of the slopes near to the disused railway line are screened by the intervening vegetation and landform with the hedgerow and trees along Weasel Lane visible on the skyline. These partial views of the Site are seen in context with the western built edge of Bletchley and built edge of Newton Longville (**Photograph 23**).
- 9.157 Views from the footpaths near to Salden Farm, south west of the Site are limited by the undulating, intervening landform and the dense woodland at Salden Wood and Middle Salden Wood. However, there are some small stretches of the paths where distant, partial views of the south facing slopes of the Site are visible. There are also glimpses of the edge of Milton Keynes together with the distinctive form of the Xscape Milton Keynes building from these footpaths (**Photographs 31 and 32**).
- 9.158 The Site forms a long horizontal strip along the horizon of views from bridleway MUR/16/1 and MUR/16/2 from the edge of Newton Longville to Cowpasture Farm with the hedgerow along Weasel Lane visible along the top of the ridge. The planting alongside the disused railway screens the lower slopes of the southern part of the Site. The Site is seen in context with the built edges of Newton Longville and Bletchley but forms a large part of the view in the medium distance (**Photograph 24, 25 and 33**).
- 9.159 The more elevated parts of the southern area of the Site near to Weasel Lane are visible from the playing fields on the northern edge of Newton Longville (Hammond Park Recreation Ground) with the lower slopes screened by the dense hedgerow and tree vegetation along the disused railway (**Photograph 17**).
- 9.160 Part of the Site south of Weasel Lane can be seen from Whaddon Road within Newton Longville Conservation Area in between the existing built form within the village. Properties along Whaddon Road can be seen alongside the Site in the middle distance. The barn at The Leys Farm can be seen at the top of the ridge, which marks the western boundary of the Site (**Photograph 22**).
- 9.161 The elevated parts of the south facing slopes of the Site and the hedgerow along Weasel Lane are visible along the skyline of views from residential streets and properties on the northern edge of Newton Longville. Depending on the density of rear garden vegetation there are views from some of the lower storeys of the properties. The Site forms a large part of the view on the horizon. The built development on the western edge of Bletchley is also visible in these views (**Photograph 19 and 20 and reverse view Photograph 05**).
- 9.162 Longer distance views from the south include those from Bletchley Road near North End. There are panoramic views over the intervening farmland and Newton Longville south west of Milton Keynes. The Site is not readily discernible in views due to distance, intervening hedgerow and tree vegetation on field boundaries and the rolling landform. The distinctive form of Xscape Milton Keynes together with other development in

Milton Keynes are visible in the far distance. The rising landform of the Greensand Ridge near Great Brickhill and Woburn is also visible in these views (**Photograph 28**).

West

- 9.163 The Site is visible from the elevated bridge over the disused railway on Whaddon Road (**Photograph 15**). From elsewhere along the road the dense vegetation along the disused railway and the hedgerow along Weasel Lane are the most obvious features of the Site, with glimpsed views of the groundplane of the Site where gaps in the hedgerow along Whaddon Road allow (**Photographs 08 and 09**). The barn at The Leys Farm on the western boundary of the Site can be seen from most locations along Whaddon Road due to its elevated position.
- 9.164 Although the Midshire and Swan's Way Long Distance Walking Path lies relatively close to the Site, the intervening trees and hedgerows on field boundaries and particularly alongside Whaddon Road and the western Site boundary act as an effective screen to most of the Site in views from these paths. However, there are some locations adjacent to Broadway Wood where there are views of Bletchley Leys Farm (**Photograph 35-37**).
- 9.165 Users of bridleway WHA/15/1, near the properties at Chase Farm have restricted views of the Site by virtue of the Broadway and Salden Woods which enclose the view to the north and south. The fields on the north facing slopes of the Site are only partially visible above the intervening hedgerows, with the remainder of the Site screened from view. The industrial development at Snelshall East and West on the southern edge of Milton Keynes detracts from the view, as do the overhead power lines which cross the Site (**Photographs 34**).
- 9.166 There are partial views of the Site from upper and lower storeys of the residential properties at Chase Farm. Broadway and Salden Woods enclose the view, with the intervening hedgerows and woodland screening the majority of the Site, with the most elevated parts of the fields on the north facing slopes visible. Development on the southern edge of Milton Keynes and the overhead power lines are detracting features in these views. **Photograph 29** shows the view taken from the access road to the properties.
- 9.167 There are hedgerows growing along both sides of the section of Weasel Lane that extends west of the Site, along with some tall trees. This serves to channel views along the path and restricts views to the adjacent countryside. The Site is screened from view, apart from when users are on Weasel Lane adjacent to Whaddon Road (**Photograph 14**).
- 9.168 Residential properties at Bletchley Leys Farm, located directly south west of Whaddon Road, have direct, close proximity upper storey views onto the western boundary of the Site as well as the north facing slopes. Views from lower storeys are filtered or screened (depending on vegetation density) by boundary vegetation on the curtilage of the properties and the western boundary of the Site (**Photographs 08 and 09**).

Views from within the Site

- 9.169 Views from the restricted byway (Weasel Lane) that runs broadly through the centre of the Site vary depending on the density of the vegetation. Along the western extents of the path, views across the Site are filtered by the tall hedgerow and tree vegetation on both sides of the path. Where there are gaps there are open views across the slopes of the Site towards the A421, Snelshall West Industrial Estate and the new residential development in Tattenhoe Park to the north (**Photograph 04**) and across the disused railway to Newton Longville in the south (**Photographs 05 and 41**). Further east along the path views become more open due to the lower height of the hedgerow vegetation and the wider farm accesses, which allow for more expansive views. The church tower in Newton Longville is visible in open views looking south.

- 9.170 There are open views across the most easterly field of Area B from the section of the Milton Keynes Boundary Walk which runs alongside one of the hedgerow field boundaries within this field. There are filtered views of the fields within the remainder of Area B through the hedgerow boundary. The hedgerow and vegetation along Weasel Lane is visible at the top of the ridge and prevents views into the northern part of the Site (**Photograph 39**). The built edge of Bletchley presents as a blunt edge to the settlement in views from this footpath (**Photograph 40**). The northern built edge of Newton Longville is visible in the middle distance in views from the northern parts of this footpath (**Photograph 06**).
- 9.171 The residential property 'The Leys Farmhouse', indented into the western Site boundary, has direct views onto the Site from upper storey windows. Views from the lower storeys are screened and heavily filtered by the boundary walls and dense hedgerow vegetation around its curtilage.
- 9.172 The residential property 'New Leys Farmhouse', indented into the northern Site boundary, has direct, close proximity views onto the northern parts of the Site and of the vegetation along Weasel Lane. Lower storey views are filtered by the boundary vegetation on the curtilage of the property.

Likely Significant Effects

- 9.173 The Application Site and the Proposed Development are described in Section 2 ES Volume 1 – Main Report.
- 9.174 The assessment of landscape and visual effects contained within this chapter is based on the parameters plans. It has also been informed by the Landscape Strategy Plan which shows the disposition of development and open space and the proposed mitigation measures which have been accommodated into the design (**Appendix 9.3**). The detail of the landscape proposals will be addressed at reserved matters stage.

Construction Phase

- 9.175 This section considers effects resulting from construction activity at the Site. The assessment of the likely landscape / townscape and visual effects of construction is set out in the tables at the end of this Chapter and summarised below. The anticipated construction activities are described within Chapter 2 of this ES. It is anticipated that the new permanent access routes into the Proposed Development and secondary internal roads will be included in the initial stages of construction and will be used for construction traffic routes as the Development is built. Construction effects will include the following:
- Arboricultural works – including the protection of trees/vegetation to be retained and removal of trees/vegetation where applicable;
 - Provision of protective fencing to retained vegetation before and during construction;
 - Fixed construction plant and mobile construction plant;
 - Soil stripping and excavations in areas of road and building development;
 - General clearance;
 - Installation of temporary surface water management measures;
 - Erection of protective hoardings on Site boundaries;
 - Localised re-grading within the Site to create level development platforms, excavation of foundations and installation of ground slabs;
 - Stockpile and material storage areas; and
 - Landscaping and reinstatement.

- 9.176 During the building phases construction activity will have some direct impacts on views from the surrounding area. In addition, there will be some indirect effects on landscape character resulting from construction activity and increased construction traffic on the surrounding road network. Construction will be phased and the effects will be predominantly temporary. There will also be a number of direct effects on some landscape features as a result of hedgerow and tree removal in order to provide access to and across the Site and to allow for the construction of the new areas of housing.

Direct Effects on Landscape Features

- 9.177 During the construction phase, the majority of the existing landscape framework on the Site boundaries, including field hedgerows and trees will be retained and protected for the duration of the works, providing some buffering to the building works.
- 9.178 The proposed accesses leading from the Standing Way (A421) and Buckingham Road (B4034) will be implemented as part of the initial construction works. This will result in the removal of sections of hedgerow and tree belts to facilitate construction of the internal road / circulation network. The loss of hedgerow and tree belts will result in a direct long term, permanent **moderate - slight** adverse effect. The process of construction of the new housing, employment areas, neighbourhood centre and care housing unit and the associated earthworks and presence of construction equipment, will result in the permanent loss of an area of arable farmland, resulting in a **substantial – moderate adverse** effect which is significant.
- 9.179 Part of the SUDs will be constructed during the infrastructure works to install temporary surface water management measures. The majority of the existing watercourses will be retained along their current alignment with some alterations to integrate them into the drainage scheme for the whole Site. Those in the south eastern and north eastern areas will be retained along their current alignment and connect to the proposed conveyance swales. Those in the north western area of the Site will be realigned around the proposed residential plots and integrated into a SuDS system for the whole Site. This will result in a **Moderate Adverse** effect which is significant.
- 9.180 Some ground modelling works will be required to regrade the Site to create level development platforms for the structures and the excavations for foundations. As far as possible these will work closely to the existing levels and elevations so that the fundamental structure and form of the undulating ground is retained. This will result in a **Slight Adverse** effect on the landform, which is not considered to be significant.
- 9.181 Construction activity will result in direct impacts on the existing restricted byway along Weasel Lane running broadly through the middle of the Site on the ridgeline in order to permit building works and to allow for the necessary surfacing works and proposed roads which will cross the restricted byway. The footpath that runs between Weasel Lane and the disused railway will also be directly impacted in order to permit the building works for the proposed roads which will cross the footpath into the proposed residential parcel of development at the proposed school. Therefore, the construction period will have a **substantial to moderate adverse** effect on both routes. These effects are considered to be significant but are temporary effects that will reduce once construction works have ceased.

Landscape Effects

- 9.182 The assessment found that there will be direct and indirect effects on the landscape character of the Site and the immediate area during the construction period, resulting from the loss of farmland and visible construction machinery and movement across the Site. This will extend the townscape of Milton Keynes outwards to the southwest, resulting in a **substantial adverse** temporary effect on the character of the Site and immediate area.

- 9.183 The assessment found that short term, indirect effects on the wider landscape resulting from the construction phase of the Proposed Development were limited to a **moderate to slight adverse** temporary effect on the northern part of LCA 4.9 Newton Longville – Stoke Hammond Claylands as a result of the loss of farmland at the edge of Milton Keynes. Only a small part of the Site, which includes Bottledump Roundabout, lies within LCA 4.7 Whaddon Chase (refer Figure 9.D). It is considered that the effects of the construction activities will be limited to indirect, temporary **slight adverse effects** on LCA 4.7.
- 9.184 LCA 4.8 Horwood Claylands lies west of the Site. The Site lies outside of the LCA and there is limited intervisibility. There will be limited, temporary **slight adverse**, indirect effects on LCA 4.8 as a result of the construction activity.
- 9.185 Overall, the direct landscape effects during construction will be restricted to the Site itself and the features within it with only indirect landscape effects on the immediately surrounding area.

Visual Effects

- 9.186 There will be some **substantial adverse** temporary effects on views from a limited number of locations as a result of construction and demolition activities. These are located on or very close to the Site. These include the following locations:
- Views from Milton Keynes Boundary Walk, within and south east of Site;
 - Views from Weasel Lane, crossing the Site, forming part of the Milton Keynes Boundary Walk;
 - Views from residential properties on the northern edge of Newton Longville;
 - Views from residential properties on the edge of Bletchley, including 'New Leys Farmhouse', indented into the northern Site boundary; and
 - Views from residential properties at Bletchley Leys Farm adjacent to the western Site boundary and 'the Leys Farmhouse', indented into the western Site boundary.
- 9.187 There will be some **moderate adverse** temporary effects on views from a number of locations as a result of construction and demolition activities. These include the following locations:
- Views from A421 and B4034, north of Site;
 - Views from Whaddon Road, west of Site;
 - Views from Weasel Lane, west of Site; and
 - Views from NLO/18/1, south east of the Site.
- 9.188 There are **moderate to slight adverse** effects on views from a number of locations as a result of construction and demolition activities. These include the following locations:
- Views from bridleway MUR/16/1 to Cowpasture Farm, south of Site;
 - Views from Hammond Park Recreational Ground, Newton Longville, south of Site;
 - Views from Bletchley Road, north of Newton Longville; and
 - Views from Whaddon Road within Newton Longville Conservation Area.
- 9.189 Elsewhere effects on views are limited to slight adverse and negligible effects.

Operational Phase

- 9.190 The key development principles are as follows:

- Up to 1,795 residential dwellings generally of 2-2.5 storeys in height as well as 60 extra care units, up to 3-3.5 storeys (C3);
- An area (2.07ha) of employment (B1) including potential to use up to 0.2ha for a 6GP surgery (D1), up to 3-3.5 storeys;
- A neighbourhood centre including retail (A1/A2/A3/A4/A5), community (D1/D2) and residential uses (C3);
- A new primary school up to 10m in height;
- A new secondary school up to 12m in height;
- A grid road reserve, together with one vehicular access off Whaddon Road, one left hand turn access only from Standing Way (A421), and new access roundabout and grid road reserve corridor from Buckingham Road (B4034);
- Sustainable drainage features to accommodate surface water run-off, provided within areas of public open space; and
- Up to 55.35ha of multi-functional green space including formal and informal recreation areas and green amenity spaces.

9.191 Through the design process an iterative approach has been adopted which has been informed by the initial landscape and visual appraisal work following site visits.

9.192 The Proposed Development has therefore sought to avoid direct conflict with existing landscape assets and areas identified for their visual amenity. The Proposed Development incorporates the following embedded mitigation measures:

- Tallest proposed built form located on parts of the Site that are closest to Milton Keynes and the existing large scale development at Snelshall West and East;
- Development limited to 2-2.5 storeys on the majority of the Site;
- Retain the majority of existing landscape features including the boundary hedgerows and trees that run across the Site; and
- Set back the proposed built form from the Site boundaries, respecting views from the roads on the entrances and exits to Milton Keynes and from the residential properties closest to the Site.

Landscape Effects

9.193 The quality of the landscape of the Site and the surrounding area has been assessed as part of the baseline conditions. The main landscape effects resulting from the Proposed Development are set out in the tables at the end of the chapter and are discussed below. The Site has no statutory or non-statutory designations for landscape character or quality. Overall, the Site is considered to be of medium landscape quality and of medium-low landscape sensitivity and value.

Direct Effects on Landscape Features

9.194 There will be direct effects on the character of the Site itself and the landscape features located within it.

9.195 All existing public rights of way will remain along their current alignment and incorporated into the proposed layout within areas of open space. The public footpath along Weasel Lane will be crossed by the internal road layout in a number of locations to facilitate access across the Site. Informal recreational footways will improve connectivity to the public rights of way network. This will result in a **Slight Adverse** effect on existing public rights of way.

- 9.196 The existing watercourses in the south eastern and north eastern areas of the Site will be retained along their current alignment with some minor alterations to ensure they are integrated into the proposed swales. The watercourses in the north western area will be realigned around the proposed residential plots. There will be numerous new swales and attenuation basins located across the Site that will be incorporated into new areas of publicly accessible open space. This will result in a **Moderate Adverse** effect on the watercourses within the Site at year 1, which is significant. As the proposed wetland habitats mature and settle, this will reduce.
- 9.197 In terms of the landform of the Site, this will be respected through the siting of new dwellings away from the most elevated parts of the Site. Where ground modelling is required it will be done so through cut and fill in localised areas so that the overall ridge and slope landform of the Site will remain. This will result in a **Slight Adverse** effect on the Site's landform, which is not significant.

Landscape Effects

- 9.198 There will be direct and indirect effects on the character of the Site and the immediate surrounding area due to the loss of farmland at the edge of Milton Keynes. The Proposed Development will extend the built envelope of Milton Keynes south westward and will follow the pattern of growth which has seen new grid squares built in the south west of the settlement in recent decades, following the distinctive, conceptual pattern of the settlement. The Proposed Development would not be uncharacteristic or incongruous to the existing edge of Milton Keynes and Bletchley that comprises a mix of industrial, leisure and residential uses. The tallest Proposed Development (employment uses) is located on land most closely related to the existing built edge of Milton Keynes, in the northern part of the Site. The remainder of the development is residential with some community and educational uses. It has been designed to be located within generous spines of public open space which incorporate the existing landscape framework of the Site, including the restricted byway along Weasel Lane.
- 9.199 The creation of new areas of public open space including new meadow grassland and amenity grassland will contribute to the sense of place and character of the new townscape, and will help to integrate the new development into the surrounding landscape. The proposed Green Infrastructure corridors on Site will help to break up development and supplement the existing landscape features. Overall, the Proposed Development will result in a **Substantial – Moderate Adverse** effect on the character of the Site and the immediate area at Year 1, which is significant.
- 9.200 Due to the undulating landform of the landscape to the south and the well wooded areas to the west and north west, long term landscape effects on the wider character of the surrounding LCAs will be limited. The development will physically alter the landscape character of a small part of LCA 4.9 Newton Longville – Stoke Hammond Claylands. Agricultural land will be changed to a mixed used development and an extensive new green infrastructure network. The development abuts the existing urban edge of Milton Keynes and Bletchley and would extend the existing settlement further to the south west. Indirect landscape effects would be experienced in the wider context of the LCA due to the changes in the perception of the qualities of the landscape. For a limited area in the north of the character area (where views are possible) the perception of the Site will change from views of an agricultural field to residential use. The proposals include measures of planting at the perimeter of Site. The existing key landscape features will be retained and landscape proposals will provide new landscape features which will complement the character of the LCA. Overall, the Proposed Development will result in a **Moderate – Slight Adverse** effect on this LCA. Effects on all other neighbouring LCAs will be **Slight Adverse** or **Negligible Adverse**. None of the effects on neighbouring LCAs are significant.
- 9.201 In summary, these landscape effects will diminish as the mitigation planting within the public open space and attenuation features establishes.

Visual Effects

- 9.202 The ZTV has been assessed for the Proposed Development and the results are illustrated on the ZTV plans Figures 9.F and 9.G showing the existing and proposed outcomes. The Proposed Development is located adjacent to the existing settlement edge and is generally contained to the west and east by a combination of landscape features either within the Site or the undulating landform, built form and woodlands located east and west of the Site.
- 9.203 To the west, the landform is also rolling meaning that there are some partial views possible from the most elevated ground above the intervening valleys. However, these are generally limited by the modest raised land that Newton Longville is located upon. The fieldwork reviewed and refined the ZTV to determine the actual visibility of the Site. The assessment has concluded that though there are views possible from further afield to the east and south, the distance and intervening elements in the landscape reduce the prominence of the Site in these views and the perceptibility of the Proposed Development.
- 9.204 A summary of the main visual effects, focusing on those that will be most affected by the Proposed Development, are discussed in the remainder of this section. The full visual effects are set out in Table 9.2 at the end of this chapter.
- 9.205 There will be near distance views of the Proposed Development from Whaddon Road on the Site's western Site boundary. These views will look onto the residential development along the western Site boundary which will be set back behind a generous area of public open space which will be planted with woodland belts, trees and hedgerows which will help to mitigate the effects over time. The Proposed Development will be seen in context with the residential dwellings on the rising land north of Tattenhoe Park. The new vehicular access will feature in transient views as users of the road pass by. The visual effect on users of this road will be **substantial to moderate adverse** on completion, which is considered to be a significant visual effect.
- 9.206 There will be near distance views of the Proposed Development from the Milton Keynes Boundary Walk within the Site. The route of the path will be retained along its current alignment with the proposed new road and roundabout in the eastern part of the Site, together with the residential development visible behind the retained hedgerow and new wide, contiguous grassland corridor. The potential route of a New Grid Road, if it eventually follows the proposed potential alignment, will also be visible in the foreground of these views. Views to the east from this path will look onto the new secondary school and residential development. There will be near distance views of the proposed attenuation feature when near to the southern end of the path and onto the allotments when at the northern end of the path within the Site. Further south along the route between the disused railway and Newton Longville, views will be partially screened by the retained vegetation along the disused railway line. Visual effects on users of these paths on completion will be **substantial adverse**, which is a significant effect.
- 9.207 There will be near distance views of the Proposed Development from along Weasel Lane as it passes through the centre of the Site. Receptors will have open views of built development on both sides, together with views of the new internal road network where it will cross the route. There will be some filtering provided by the retained hedgerow on some stretches of the route. The effect is assessed as **substantial adverse** on completion, which is a significant effect. The route will be set within a wide area of public open space with additional hedgerow, woodland and tree planting on either side, which will vary in density throughout the route.
- 9.208 Views of the Proposed Development from the residential properties on the northern edge of Newton Longville will vary depending on the density and presence of rear garden vegetation within the curtilage of the properties. In some places, the edge of Bletchley will also be visible in these views. There will be medium

distance views of the Proposed Development on the south facing slopes of the Site which will take up a large proportion of these views. The siting of the development within the existing landscape framework and proposed tree planting will help to break up these views over time. The visual effect of the Proposed Development on views from these properties is assessed to be **substantial to moderate adverse** on completion, which is a significant effect.

- 9.209 There will be direct views of the Proposed Development from the residential properties on the western edge of Bletchley, including 'New Leys Farmhouse', which is indented into the Site's northern boundary. New Leys Farmhouse will have near distance views onto the proposed allotments with the remainder of the proposed built form (residential, secondary school and employment) visible behind the roads and roundabout junction. The properties on the western edge of Bletchley will also have near distance views of the proposed road, roundabout, residential and employment development. However, the lower parts of the Proposed Development will be filtered by the retained existing hedgerow on the eastern Site boundary and the proposed hedgerow alongside the proposed residential area. The visual effect of the Proposed Development on views from these properties is assessed to be **substantial to moderate adverse** on completion, which is a significant effect.
- 9.210 Residential properties to the immediate east of the Site will have filtered views of the Proposed Development (the secondary school and some residential dwellings) behind the retained boundary vegetation and existing vegetation within the properties' curtilages. The Proposed Development will be set back from the Site boundary with public open space located closest to these properties. This public open space will have new tree planting which will further filter and soften views of the built form over time. The visual effect of the Proposed Development on views from these properties is assessed to be **substantial adverse** on completion which is a significant effect.
- 9.211 There will be direct, near distance views of the Proposed Development from the residential properties 'Bletchley Leys Farmhouse', adjacent to the western Site boundary, and 'The Leys Farmhouse' indented into the western boundary. The Proposed Development will be set back from the Site boundaries with public open spaces located closest to these properties. However, the Proposed Development will still result in a significant change to these views on completion. The visual effect is considered to be **substantial to moderate adverse** on completion which is significant.
- 9.212 There will be near distance, filtered views of the Proposed Development in the northern parts of the Site from the A421 and B4034 behind the retained vegetation on the northern Site boundary. The new roundabout access and left-hand turn junction, which will require some removal of the existing vegetation, will result in a significant change to short stretches of these routes and will appear in transient views. Due to the location of these roads on the edge of Milton Keynes with the existing large buildings in Snelshall West and nearby residential properties already visible in views, the Proposed Development will not appear incongruous in these views. Therefore, the visual effect of the Proposed Development on these views will be **moderate adverse** on completion which is a significant effect.
- 9.213 There will be partial and filtered views of the Proposed Development on the southern slopes of the Site from footpath NLO/18/1. Due to the route's elevation in relation to the ridgeline in the centre of the Site, the vast majority of the Proposed Development on the northern part of the Site will be screened by the intervening landform, with the exception of some of the employment buildings in the northeastern part which will be partially visible on the horizon. The residential development, primary and secondary school and sports pavilion will be visible in the middle of the view which will be partly filtered by the intervening vegetation south of the Site. The proposed tree planting within the public open spaces and within the development blocks will break up these views as they mature. Therefore, the visual effect of the Proposed Development on these views will be **moderate adverse** on completion, which is a significant effect.

- 9.214 There will be partial views of the Proposed Development from footpath NLO/16/1 which extends westward out of Newton Longville. Views will vary depending on the location of the user along the route. The residential development, primary school and sports pavilion on the south facing slopes of the Site will be the most visible elements of the development in these views. The taller buildings on the employment land will be visible behind and above the other development. The effects of the development on these views will be minimised by the retention of the majority of the existing landscape framework within the Site which will break up views of the development. The visual effect of the Proposed Development on these views is considered to be **moderate to slight adverse** on completion, which is not considered to be significant.
- 9.215 There will be partial and heavily filtered views of the Proposed Development on the southern slopes of the Site from Hammond Park Recreation Ground. The Proposed Development will form quite a large proportion of views looking north from these grounds. However, the Proposed Development will be seen in context with the built edge of Bletchley. The visual effect of the Proposed Development on views from this park will be **moderate to slight adverse** on completion, which is not considered to be significant.
- 9.216 There will be near distance, channelled, partial views of the Proposed Development in the western part of the Site from the section of Weasel Lane that runs west of the Site for approximately 100-200m. The Proposed Development will be seen protruding above the intervening vegetation in the first instance, but once the proposed woodland belts and trees along the western Site boundary establish, these views will be softened. The visual effect of the Proposed Development on views from this section of Weasel Lane are considered to be **moderate adverse** on completion, which is a significant effect.
- 9.217 There will be intermittent, framed views of the Proposed Development from Whaddon Road within Newton Longville Conservation Area. The Proposed Development will be seen in context with the other built form within Newton Longville. The retention of the majority of the Site's existing landscape framework will help to break up these views, which in combination with the proposed additional vegetation will help to mitigate effects over time. On completion, it is considered that the visual effect of the Proposed Development on these views will be **moderate to slight adverse**, which is not considered to be significant.
- 9.218 All other effects from other locations are considered to be slight adverse to negligible or neutral.

Night Time Effects

- 9.219 As outlined in the baseline conditions section of this chapter, the Site is currently unlit but adjoins the A421 and B3034 on its northern boundary and the residential area east of the Site, which are all lit with street lights and the domestic lighting associated within the existing dwellings. The proposals are for a mixed-use and mixed density development, and the lighting will be seen in the context of the existing ambient light in the vicinity of the Site. The Development is not anticipated to give rise to any abnormal lighting effects beyond those typically experienced from a mixed use scheme of which the majority is residential.

Mitigation Measures

- 9.220 Mitigation measures have been considered and employed throughout all stages of the planning and design of the Development. At the construction phase mitigation would include the erection of site hoardings and adherence to the approved CEMP. At the operational phase the Planning Layout and Landscape Strategy Plan demonstrate how potential landscape impacts can be addressed and provides a series of landscape enhancements. These include the following:

- Structural landscape proposals within the new areas of public open space as well as in between the blocks of new built form;
- Creation of significant areas of new green infrastructure and green corridors within and along the boundaries of the Site;
- Reinforcement of existing retained boundary hedgerows with new hedgerow, tree and woodland belt planting; and
- Replacement (where practicable) of lost sections of hedgerow along the boundaries of the Site both around the edges and internally.

9.221 Three levels of mitigation are described below. The Proposed Development has sought to avoid landscape impacts where possible, where this has not been possible, measures have been incorporated to reduce or compensate for any effects. This section also explains the proposed landscape enhancements which go beyond mere mitigation.

Avoidance

9.222 Avoiding direct landscape impacts by:

- Siting new built form away from the most elevated parts of the Site and dedicating these areas as public open space and new tree and hedgerow planting;
- Siting the tallest proposed built form in the areas of the Site that are most closely related to the large-scale industrial development at Snelshall East and West on the southern edge of Milton Keynes;
- Retention of PROW along their current alignment; and
- Setting back the proposed built form from the Site boundaries, Weasel Lane and the existing residential properties indented into the western and northern Site boundaries.

Reduction

9.223 Minimising effects of the Proposed Development by:

- Sensitively considering siting, scale, form, density and massing of the proposed buildings and the material used;
- New landscape proposals to the Site frontages with the A421 and Whaddon Road and on the periphery of the Site;
- Erection of site hoarding and adoption of a CEMP to minimise effects during the demolition and construction phase of the Proposed Development;
- Minimise impacts on existing trees and hedgerows through the sensitive design and location of Site accesses and internal roads; and
- The careful design of lighting to reduce light spillage.

Compensation and Enhancement

9.224 Where it is not possible to avoid a direct impact, such as the loss of existing farmland, losses can be compensated through new planting and environmental enhancements. The following measures can be secured through conditions within the planning consent or set out in a Section 106 agreement and implemented:

- Improved management of retained vegetation;

- New structural tree planting to augment existing field boundaries, particularly between the new residential blocks within the Site and along Weasel Lane;
- Appropriate and sensitive landscape proposals within surface water drainage features to be provided to accommodate run-off from the Proposed Development and to provide areas of ecological habitat;
- New amenity grassland and recreational walking routes;
- Allotments for community use providing sustainable food production together with recreational benefits; and
- Several new play areas to serve the Proposed Development including eight Local Equipped Areas of Play (LEAP); two Neighbourhood Areas of Play (NEAP); and two Multi-Use Games Areas (MUGA) together with several full size sports pitches to accommodate numerous different sports.

Residual Effects

- 9.225 The tables at the end of this chapter provide an assessment of the landscape and visual effects which will result from the Development during the construction and operational phases, the proposed mitigation measures and any residual effects which will remain, assumed to be at Year 15, once the proposed mitigation planting has established sufficiently.
- 9.226 The Proposed Development has been sensitively designed to retain as much of the existing trees and vegetation on the field and Site boundaries as practicable. Several sections of the Site's hedgerows will require removal in order to facilitate the new accesses into the Site, the internal road and areas of housing and built form. As the new areas of landscaping mature, they will add to the tree cover and green infrastructure network in the local area. The new woodland planting within the open spaces will contain the development parcels, helping to assimilate the proposed development into its wider context.
- 9.227 The proposals will bring a number of benefits to the prospective and current residents of the area. These include extensive new areas of public open space including several MUGAs, NEAPs and LEAPs, new pedestrian footways and cycleways linking to the existing public rights of way network, together with a new neighbourhood centre, school, employment and various full size sports pitches to accommodate various different sports.

Residual Landscape Effects

- 9.228 The residual landscape effects resulting from the Proposed Development after mitigation planting has established, will generally be no greater than **slight adverse**, which is not significant. There will be a **moderate adverse** landscape effect on the character of the Site and the immediate area, as the result of the loss of farmland for development, which is significant. There will also be some **slight beneficial** residual landscape effects arising from the substantial amounts of tree and hedgerow planting that will take place as part of the Proposed Development.

Residual Visual Effects

- 9.229 The residual visual effects resulting from the Proposed Development after mitigation planting is established, will generally reduce to **slight adverse** which are not considered significant. There will be some residual visual effects that are significant, which are confined to public vantage points within and near to the Site. These visual receptors will experience **moderate adverse** visual effects following mitigation. They are: users of Milton Keynes Boundary Walk within the southern part of the Site; and users of Weasel Lane crossing the Site. A number of residential properties on northern edge of Newton Longville, on the edge of Bletchley adjacent to the Site; and residential properties adjacent to the Site's boundaries to the west and north will also

experience moderate adverse residual effects. These effects are considered to be significant. However, views from private properties are not normally a material consideration in determining planning applications,

- 9.230 Those views from beyond the immediate vicinity of the Site will generally reduce to **negligible adverse** or **neutral** effects due to the distance from the Site and the intervening undulating landform and hedgerow vegetation.

Cumulative Effects

- 9.231 An assessment of the likely cumulative effects resulting from the identified committed schemes is set out below.
- 9.232 As defined in the GLVIA3, cumulative visual effects can be grouped into two categories, 'in combination' where the observer is able to see two or more developments from one viewpoint and 'sequentially' where the observer has to move to another viewpoint to see two or more developments.
- The implementation of the East West Rail project – no details of this are yet available, so the principle of this development alongside the Proposed Development will be considered;
 - The remainder of the Tattenhoe Park development (ref 17/00918/OUT), located north of the Site; and
 - The draft strategic allocation D-WHA001 Shenley Park as outlined within the Main Modifications versions of the VALP.
 - Application 13/00888/OUTEIS - Mixed Use Development at Newton Leys

Implementation of the East West Rail Project

- 9.233 Phase 2 of the route will make use of the alignment of the existing disused railway line and the intention is for the Bicester to Bedford section (Phase 2) of the project to be completed by the mid-2020s. Following public consultations, Network Rail prepared a Transport and Works Act Order ('TWAo') application which was submitted to the Secretary of State for Transport on 27 July 2018. The East West Rail Company website states that the current timetable is for this section of East West Rail to operate from the end of 2024.
- 9.234 The East West Rail Project will introduce a new major piece of infrastructure which will bisect a large area of land passing through several major towns. For parts of the route it will run along the route of previous railway lines which are now disused, including the section which will run directly south of the Site. In landscape terms, the route for the section closest to the Site is already partly established. Bringing the railway line back into use will extend the urban character of the edge of Milton Keynes and major infrastructure further to the south-west of the city. The proposals do not show any widening of the route, but they may require some removal of vegetation which would represent a loss of landscape features. This could, in the short-medium term, make the line more visible from the surrounding area. This, combined with the regular presence of trains will increase the prominence of this feature in views from the surrounding landscape. These effects will be permanent. The new East West Rail will be well related to the urban area and the Proposed Development. Cumulatively, they will not give rise to any cumulative landscape or visual effects over and above those associated with the Proposed Development in isolation.
- 9.235 The following receptors will experience changes in views. Users of Whaddon Road will have partial, filtered views of the two developments in conjunction with one another as they travel along the route. The clearest view possible will be when users pass over the railway bridge on Whaddon Road. Where users of the Milton Keynes Boundary Walk pass under Trenches Bridge (just to south of southern Site boundary), there will also be views of the two development in combination with one another. However, the width of the railway is not proposed to change, and the path will still pass under the bridge. Trains will pass through the view

intermittently representing a further urbanising influence on this route. From other public rights of way in the vicinity of the Site and the nearest residential properties on the northern edge of Newton Longville and on the western edge of Bletchley, the intermittent presence of trains will represent a change in views which will be seen in conjunction with the Proposed Development. The proposed development at the Site will result in a substantial change in views from these receptors, and it is not anticipated that the intermittent presence of trains will result in additional visual effects of significance. These effects will be permanent.

Application 17/00918/OUT – Residential Development at Tattenhoe Park of up to 1,310 dwellings, a mixed use local centre, site for primary school, community facilities, hotel and public house, public open space and associated landscaping and infrastructure

- 9.236 This development is located to the north of the Site covering a large area of land north of Tattenhoe Park, to be built out in 6 phases. Phase 1 is already complete together with the Primary School.
- 9.237 This development once fully built out, in conjunction with the Proposed Development, will result in the loss of a large area of agricultural and greenfield land to the south west and west of Milton Keynes, replaced with mixed use development. These development lie in close proximity to the edge of Milton Keynes. The proposals will result in a cumulative increase in the loss of farmland at the edge of Milton Keynes, and the effects will be experienced over a larger area. The Proposed Development will extend to the south of Tattenhoe Park and cumulative effect of development on the local landscape is assessed as moderate adverse, which is comparable to the level of effect assessed for the Site in isolation.
- 9.238 In visual terms, visual receptors in the immediate vicinity of both Sites would see the development in conjunction with one another. Receptors include users of the A421 who will experience heavily filtered views of both development either side of the road. Users of Shenley Road, along its southern extents, will have heavily filtered views of the Tattenhoe Park development which will, in time, screen views of the Proposed Development. Residents on the northern edge of Newton Longville will have views of both developments in conjunction with one another which will be screened to varying degrees by the levels of existing vegetation within their curtilages. It is likely that once complete the Proposed Development will screen views of the scheme at Tattenhoe Park. Residents on the western edge of Bletchley will initially have views of both the scheme at Tattenhoe Park and the construction work at the Proposed Development. However, once the Proposed Development is complete, views of the scheme at Tattenhoe Park will be screened.
- 9.239 In most of these instances, Phase 1 of the Tattenhoe Development (already complete) is located on the most elevated land within the development parcel and thus is already visible in these views. It is therefore considered that the cumulative effects of these two schemes will be limited as the remainder of the development will be located on lower lying land and will not be as prominent in views as Phase 1. As mentioned above, the Proposed Development will also screen views of the Tattenhoe Park scheme once it is complete. Furthermore, views of the Site from Tattenhoe Park (Bronte Avenue), at present will become screened by the intervening development once it is fully built out. Therefore, overall it is anticipated that the cumulative residual visual effect of both of these developments will be moderate to slight adverse (representing a non-significant effect) on views from the road to the north of the Site (Standing Way). These effects will be permanent. There will be very limited cumulative visual effects on the remaining visual receptors.

Strategic Allocation D-WHA001 Shenley Park (VALP Main Modifications version)

- 9.240 This strategic allocation extends to approximately 99ha and is located northwest of the Application Site (South West Milton Keynes). The allocation is to create a development of at least 1,150 homes, 110 bed care home, new primary school (if required this will be a secondary school), multi-functional green infrastructure, mixed

use local centre, SuDS, new link road between A421 Buckingham Road and H6 and H7 Childs Way/Chaffron Way, public transport and cycling and walking links. At present, there is no planning application submitted for this development. Therefore a complete assessment of the cumulative effects of developing both the Application Site and D-WHA001 cannot be made. We can, however, comment on the potential cumulative effects of the principle of both sites being developed as per the proposals and the intended type of development.

- 9.241 In visual terms, the inter-visibility between the two sites is relatively limited due to variations in the landform between these areas and the high levels of vegetation which exist alongside the A421. However, there would be sequential views of both developments as one travels along the A421. There is potential for some views of the developments in combination with one another from locations within Tattenhoe Park and the neighbouring public open space near the adjacent industrial area along the A421. However, the potential for these views would rely on the eventual design of the development within D-WHA001. For example, the placement of built form and any potential visual mitigation measures that are put in place as part of the design. Therefore, it is considered that both developments would not cause additional visual effects of significance in the long term.
- 9.242 The development of D-WHA001 once fully built out, in conjunction with the Proposed Development at the Application Site, will result in the loss of a large area of agricultural and greenfield land to the west and south west of Milton Keynes, replaced with mixed use development. The two sites lie within different and distinct LCAs as identified within the AVDC landscape character assessment, with the Site located in the Newton Longville-Stoke Hammond Claylands LCA, and Shenley Park within the Whaddon Chase LCA. These LCA have different characteristics and are separated by the intervening landform, and share few visual receptors with the exception of users of the A421. It is therefore considered that the landscape effects of developing both schemes in conjunction with one another would not cause any additional landscape effects of significance in the long term.

Application 13/00888/OUTEIS - Mixed Use Development at Newton Leys

- 9.243 This development is located approximately 1.5km southeast of the Proposed Development at the application site to the south of Bletchley Landfill Site. Its planning application was originally approved in 2005 (application reference 02/01337/OUT). In 2016 an application to extend the time limit for outline planning permission was approved (application reference) 13/00888/OUTEIS). Planning permission was granted for mixed use development, comprising housing (up to 1650 dwellings), employment area, shops, a combined school, community facilities, new park, playing fields, hotel or leisure facility and associated infrastructure, roads and parking.
- 9.244 At the time of the site visit for this assessment, this development had been largely built out save for some of the latter phases of residential and employment development in the northern parts of the Newton Leys Development. In visual terms, the inter-visibility between the two sites is relatively limited due to the varied landform of each of them and the relatively high levels of intervening vegetation on field boundaries and surrounding the adjacent landfill site. There will be some opportunities to glimpse both developments in conjunction with each other from a limited number of location along Weasel Lane in the centre of the Site. However, these views are expected to be limited to those glimpsed between the proposed school and housing in the southeastern part of the Application Site. From elsewhere in the surrounding landscape, there will be various locations where the two developments will be seen in conjunction with one another but due to the distance they are from one another and the dense woodland belt along the eastern edge of the Newton Leys development, these views will be limited.
- 9.245 The two developments will result in the loss of large areas of farmland on the southern and southeastern edges of Milton Keynes, replaced with mixed use development. However, because the two developments are

in different landscape character areas which have different characteristics and are separated by the intervening landform within the landscape and large landfill site, and share few visual receptors it is considered that the landscape effects of developing both schemes in conjunction with one another would not cause any additional landscape effects of significance in the long term.

Summary

- 9.246 The Site is located immediately adjacent to the south western settlement edge of Milton Keynes and Bletchley. It comprises undulating farmland which rises to a local ridgeline along Weasel Lane, falling gently northwards to the A421 and southwards towards the disused railway. The Site shares many of the characteristics of the wider Newton Longville – Stoke Hammond Claylands (LCA 4.9 in AVDC LCA). Area A is closely related to the existing settlement edge of Milton Keynes. Overall, Area B relates more closely to the rural surroundings of Milton Keynes than Area A due to it being located on a south facing slope with the exception of the easternmost field which abuts the built edge of Bletchley. However, the urban influence of Milton Keynes and Bletchley is apparent across the whole Site.
- 9.247 The Site has reasonable ability to accommodate the proposed type of change without being discordant with the surrounding landscape/townscape character. The Site is assessed as being of medium landscape quality and medium-low landscape value. Overall, the Site is assessed as being of medium-low landscape sensitivity.
- 9.248 The Site forms the allocation of a draft Policy D-NLV001 Allocation (Vale of Aylesbury Local Plan) to the south western edge of Milton Keynes which will form a large strategic urban extension.
- 9.249 The Proposed Development has been sensitively designed to retain as much of the existing trees and vegetation on the field and Site boundaries as practicable. Several sections of the Site's hedgerows will require removal in order to facilitate the new accesses into the Site, the internal road and areas of housing and built form. The proposals will bring a number of benefits to the prospective and current residents of the area. These include extensive new areas of public open space including several MUGAs, NEAPs and LEAPs, new pedestrian footways and cycleways linking to the existing public rights of way network, together with a new neighbourhood centre, school, employment and various full size sports pitches to accommodate various different sports.
- 9.250 The residual landscape effects resulting from the Proposed Development after mitigation planting has established, will generally be no greater than slight adverse, which is not significant. The loss of farmland within the Site will result in a moderate adverse landscape effect on the character of the Site and the immediate area, which is significant. There will also be some slight beneficial residual landscape effects arising from the substantial amounts of tree and hedgerow planting that will take place as part of the Proposed Development.
- 9.251 The residual visual effects resulting from the Proposed Development after mitigation planting is established, will generally reduce to slight adverse which are not considered significant. There will be some residual visual effects that are significant, which are confined to public vantage points within and near to the Site. These visual receptors will experience moderate adverse visual effects following mitigation. They are: users of Milton Keynes Boundary Walk within the southern part of the Site; and users of Weasel Lane crossing the Site. A number of residential properties on northern edge of Newton Longville, on the edge of Bletchley adjacent to the Site; and residential properties adjacent to the Site's boundaries to the west and north will also experience moderate adverse residual effects. These effects are considered to be significant. However, views from private properties are not normally a material consideration in determining planning applications,

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10. TRAFFIC AND TRANSPORT

Introduction

- 10.01 This chapter of the ES assesses the likely significant environmental effects of the development proposals in relation to traffic and transport. The accompanying Transport Assessment (TA), contained in **Appendix 10.1**, provides full details of the impact of the Proposed Development on the local and strategic highway network and should be read in conjunction with this chapter.
- 10.02 This chapter describes the assessment methodology for considering the environmental impacts of traffic and transport related to the Proposed Development; the baseline conditions at the Site and surrounding area; the nature of the impacts; the mitigation measures required to prevent, reduce or offset any significant adverse impacts; and the likely residual effects once the mitigation measures have been implemented.
- 10.03 The original planning application was accompanied by a Transport Assessment (TA) dated January 2015. This TA was superseded by an updated TA that accompanied the revised planning application in August 2016. The 2015 and 2016 TAs used data from the MK traffic model (MKTm), which has since been superseded by the Milton Keynes Multi Modal Model (MKMMM). The MKTM was underpinned with traffic data collected in 2009, which are now considered out of date. Hence the need to refresh the transport evidence base within the TA (Appendix 10.1) which should also be considered in conjunction with the evidence that supports the draft VALP and Plan:MK.

Legislative & Planning Policy Context

- 10.04 The Proposed Development accords with relevant national and local policies, including those from the following documents:
- Saved policies of Aylesbury Vale District Local Plan 2001-2011 (2004)
 - Plan: MK 2016-2031 (Milton Keynes Local Plan) (2019)
 - Buckinghamshire's Local Transport Plan 4 (LTP4) (2016-2036)
 - MKC Mobility Strategy 2036: Local Transport Plan 4 - 2018 to 2036
 - National Planning Policy Framework (2019)
 - Draft Vale of Aylesbury Local Plan (VALP) - 2013-2033 (2017)
 - Planning Practice Guidance (2014)
- 10.05 A full review of individual policies and the compliance of the scheme therewith is provided at Section 2 of the TA. There are certain themes running through both national and local policy that the proposed development responds to. Development proposals should be such that they encourage the use of sustainable modes of transport, which should be considered in the context of a specific area, give priority to pedestrian and cycle movements, and have access to high quality public transport facilities. This enables best use to be made of existing infrastructure.

Aylesbury Vale District Local Plan 2001-2011 (2004)

- 10.06 The Aylesbury Vale District Local Plan (AVDLP) was adopted in January 2004 and covered the period to 2011. The AVDLP proposed land for development and provided a framework of policies within which other proposals will be considered. After 27 September 2007, the policies in the AVDLP ceased to have effect

unless 'saved' by a Direction from the Secretary of State. Following an application from AVDC, the Secretary of State issued a direction on 24 September to save specified policies.

- 10.07 Section 4 of the AVDLP included general transport policies that applied across the District. However, the majority of those policies were not saved due to similar guidance being found within the national policy prevalent at the time. There are no saved transport policies relevant to the Proposed Development.

Plan: MK 2016-2031

- 10.08 Policy CT1 Sustainable Transport Network sets out requirements for how the Council will promote sustainable development:

- 'i. Promote a safe, efficient and convenient transport system
- ii. Promote transport choice, through improvements to public transport services and supporting infrastructure, and providing coherent and direct cycling and walking networks to provide a genuine alternative to the car
- iii. Promote improved access to key locations and services by all modes of transport and ensure good integration between transport modes
- iv. Manage congestion and provide for consistent journey times
- v. Promote and improve safety, security and healthy lifestyles
- vi. Continue to engage with relevant stakeholders along the East-West Rail line and Expressway to identify operational benefits, which provide additional support for a more sustainable transport strategy and/or economic growth of the city
- vii. Engage with the National Infrastructure Commission to set in place connections from Central Milton Keynes to surrounding communities, including a fifth track constructed between Bletchley and Milton Keynes Central
- viii. Promote the usage of shared transport schemes in the borough.'

- 10.09 Policy CT2 Movement and Access requires development proposals to:

'minimise the need to travel, promote opportunities for sustainable transport modes, improve accessibility to services and support the transition to a low carbon future.'

- 10.010 In relation to planning applications Policy CT2 states that development proposals will be permitted that:

- '(A)1 - Integrate into our existing sustainable transport networks and do not have an inappropriate impact on the operation, safety or accessibility to the local or strategic highway networks;
- 2 - Mitigate impacts on the local or strategic highway networks, arising from the development itself or the cumulative effects of development, through the provision of, or contributions towards necessary and relevant transport improvements including those secured by legal agreement;
- 6 - Do not result in inappropriate traffic generation or compromise highway safety;
- (B) - Development proposals that generate significant amounts of movement or impact on level crossings must be supported by a Transport Statement or Transport Assessment and will normally be required to provide a Travel Plan, with mitigation implemented as required.'

- 10.011 Policy CT3 Walking and Cycling states:

'The Council will support developments which enable people to access employment, essential services and community facilities by walking and cycling.'

- 10.012 Policy CT5 Public Transport states:

'Development proposals must be designed to meet the needs of public transport operators and users. In particular:

- i. Road layouts must include direct, convenient and safe public transport routes and be free of obstructive parking;
- ii. Public Transport priority measures must be implemented, where appropriate;
- iii. Where appropriate and necessary, all houses and most other developments must be no more than 400m from a bus stop;
- iv. Bus stops must have good pedestrian access, be open to public supervision and be sheltered where appropriate; and
- v. Specific consideration must be given to the provision of public transport services in planning new development.'

10.013 Policy CT6 Low Emission Vehicles requires new facilities for low emission vehicles to be integrated into major new developments. All new developments will be required to provide electric vehicle charging infrastructure in accordance with the Council's parking standards.

10.014 Policy CT8 Grid Road Network requires the following in respect of the Grid Road Network:

'Opportunities for extending the grid road system design and redway super network route into any major new development areas will be required to ensure that the grid continues to function effectively and sufficient land/corridors are safeguarded for future highway/transit links around the district to accommodate and manage increased travel demands changing and future travel demands.

The Council will also seek to extend grid roads and redway super network route to link with new cross-boundary developments. New grid roads should also include green infrastructure buffers to improve air quality, reduce noise and vibration and enhance the landscape and result in a net gain in biodiversity. New grid roads will be designed with the following characteristics:

- i. Grid roads will run in generous multi-functional green infrastructure reservations (which are designed to allow for future upgrading to dual carriageways if and when required);
- ii. Grid roads will also accommodate main services, and landscaping of appropriate road surfaces to protect adjacent development from the noise and visual intrusion of traffic and give a green character to the road. Where possible, grid roads will incorporate a bund providing additional protection;
- iii. Grid roads will also be designed for use by public transport and for alternative forms of transport if required [eg electric cars/driverless cars], with bus laybys at intersections with pedestrian bridges and underpasses and controlled crossings where appropriate;
- iv. Grid Road Reserves will be identified in order to safeguard further potential extension of the grid and enable future development to access the grid;
- v. Grid road reservations should be 80m in width where residential is on each side and 60m where other land uses occur;
- vi. Junction spacings will be set out as in MK Planning Manual. Redways should be setback 3m from the carriageway;
- vii. In order to improve pedestrian safety, in line with the Planning Manual, development incursions would be considered permissible within the grid road reserves at "points of connection", for example where redways pass underneath the grid road and at bus stops. This might include local centres and housing which should be designed to provide surveillance over the underpass or bus stop. This development should not however constrain the overall 60m width such that it prejudices future transport systems from being implemented. The overall green character and multi-functional green infrastructure of the grid road

reserves should also still be maintained. The effect should be a green corridor punctuated at “points of connection” by development. This development could also have the important benefit of assisting with wayfinding around the grid road system, especially for visitors;

- viii. There are cross-border locations where MK Council considers that the extension of the grid road network, as part of new or future development allocations, will provide benefits to both local communities in MK and those in the adjacent district, as well as provide much needed connections to the strategic road network. Milton Keynes Council will seek the safeguarding of grid road connections and extensions or reserves through joint working and consultation responses to neighbouring authorities’ local plan policy, or its response to planning applications in adjacent districts”; and
- ix. As MK’s Mobility Plan develops, it is possible that some areas will be designated for higher densities, with a different relationship to grid roads and public transport corridors. An appropriate specification for that relationship will be produced at that time. The specification will only apply to those designated areas.’

10.015 Policy SD15 provides guidance on the place-making principles for sustainable urban extensions in adjacent local authorities bordering Milton Keynes. The principles include:

- ‘6. Technical work should be undertaken to fully assess the traffic impacts of the development on the road network within the city and nearby town and district centres and adjoining rural areas, and to identify necessary improvements to public transport and to the road network, including parking.
- 7. A route for the future construction of a strategic link road(s) and/or rail link should be protected where necessary.’

Buckinghamshire Local Transport Plan 4 (LTP4) (2018)

10.016 The Local Transport Plan 4 (BLTP4) is designed to help realise the transport element of BC’s Strategic Plan and identifies four objectives:

- ‘Objective 1: Connected Buckinghamshire - Provide a well-connected, efficient and reliable transport network which links to key national and international destinations helping Buckinghamshire’s residents and economy to flourish while capitalising on external investment opportunities;
- Objective 2: Growing Buckinghamshire - To secure good road, public transport, cycle and walking infrastructure and service provision, working in partnership with local businesses, the community and district councils through a range of initiatives and taking advantage of new and emerging technologies to meet the (current and future) needs of our residents as Buckinghamshire grows;
- Objective 3: Healthy, Safe and Sustainable Buckinghamshire - Allow residents to improve their quality of life and health, by promoting sustainable travel choices and access to opportunities that improve health. Ensure transport systems are accessible by all, safe and allow people to make the most of Buckinghamshire whilst protecting its special environments;
- Objective 4: Empowered Buckinghamshire - Allow everybody to access the educational, work and social opportunities they need to grow. Increase opportunities for residents to support themselves and their communities by enabling local transport solutions.’

10.017 A total of 19 policies are identified within the document, each focused on mitigating a specific transport issue; four of these policies have been designed to actively promote the use of sustainable transport modes, as follows:

- Policy 12: Encouraging walking for shorter journeys:
‘Walking should be the best option for more of our short journeys. We will look to develop the walking network and encourage walking, to help ensure it becomes one of the most convenient ways to make short journeys.’

- Policy 13: Encouraging cycling:
'We will look to develop the cycling network through a combination of new infrastructure, maintenance and guidance. This will help cycling to become one of the most convenient and well used forms of transport for short journeys.'
- Policy 14: Car clubs, car sharing and taxis:
'We will work with partners to explore opportunities for car clubs, car sharing and taxi initiatives. This will provide an alternative to car ownership for some: encouraging people to consider other modes of transport; and helping people to access the opportunities Buckinghamshire has to offer.'
- Policy 16: Total Transport: the bus network Buckinghamshire needs:
'We will work with partners to ensure public transport services best meet the county's needs – now and in the future.'

10.018 There is a key focus on the development of transport throughout Buckinghamshire, particularly the promotion of sustainable modes of transport as an alternative to single use private vehicles. Policy 16 of BLTP4 is particularly relevant to the development of the Site and seeks to:

- Ensure developments are located near to good public transport or provide the right public transport (i.e. public transport services should be located where they address the impact of new developments and are able to flourish and meet Buckingham's needs). In this regard, the provision of a new/extended bus service would enhance the connectivity between the Site, Central Milton Keynes (CMK) and key social infrastructure;
- Help improve public transport information: the site-wide FTP will ensure that information is provided across social media platforms and through the introduction of Real Time Passenger Information (RTPI) systems;
- Introduce 'smart' ticketing and fares: the new/extended bus service would incorporate technology to enable the introduction of 'smart' ticketing;
- Provide bus priority measures: Within the Site, measures will be provided on the identified bus route(s) to ensure that services are given priority at key junctions;
- Improve public transport infrastructure: Safe and secure weatherproof shelters that would facilitate the provision of RTPI provided across the Site;
- Make public transport fully accessible; considering the needs of mobility impaired people and those with other specific needs. In this regard, tactile paving and high bus boarding platforms would be provided to enable greater accessibility.

Mobility Strategy for Milton Keynes 2018-2036 (LTP4) Mobility For All (2018)

10.019 The Milton Keynes LTP4 (MKLTP4) was adopted in March 2018 and sets out the Council's policies and programme for delivering local, sub-regional and national policy objectives between 2018 and 2036. This mobility strategy for Milton Keynes acts as the reference point for how the town wishes to maintain, improve and develop its transport system up to 2036.

10.020 It establishes both short term and long term (up to 2050) visions and demonstrates how it will connect to new infrastructure such as East West Rail and the Oxford to Cambridge Expressway as outlined in the National Infrastructure Commission's final report 'Partnering for Prosperity: a new deal for the Cambridge-Milton Keynes-Oxford Arc' and the council's 'First Last Mile' strategy.

10.021 The ambition for MKLTP4 is to:

- 'Stabilise average journey times and ensure they remain competitive while promoting the development of smart shared sustainable mobility for all;
- Provide a fully integrated and accessible public transport system - "Mobility as a Service" (MaaS)
- Develop and promote a 'First Last Mile' culture for future technologies such as autonomous and connected vehicles and sustainable connectivity
- Ensure transport infrastructure is configured to enable the city's future development and growth in travel demand to be accommodated based on the council's 'First Last Mile' Strategy'

10.022 Milton Keynes has established journey to work mode share targets for 2030 and 2050 to reduce car use to 60% and then 50% respectively in Central Milton Keynes, as set out in Table 2.1 of the TA.

10.023 A series of initiatives are outlined to help meet the targets. The initiatives are split by theme and by timescale (short, medium, long). The themes include maintaining current transport systems, improving public transport, travelling more sustainably and increasing use of public transport. The initiatives have been considered with reference to both strategic infrastructure schemes such as East-West Rail and the Oxford to Cambridge Expressway as well as Plan:MK. These initiatives are summarised in Table 2.2 of the TA.

10.024 MKC's Mobility Strategy sets out key transport objectives and outcomes² to accommodate the anticipated level of growth through to 2036 and beyond leading towards 2050. In this regard, development of the Site would include a range of measures to comply with these objectives and outcomes, inter alia:

- **Support growth and provide mobility for all:** the Site would facilitate a transport network that would cater for all road users to improve journey time reliability underpinned by a comprehensive Framework Travel Plan (FTP) that would apply to all the proposed uses. The provision of land to accommodate the extension of the grid road network southwards would also facilitate connectivity to the wider highway network;
- **Provide an effective Network:** to prioritise travel by public transport, cyclists and pedestrians. The Site would maximise the opportunity to enable 'fast track' bus services and provide an integrated network of routes for cyclists and pedestrians, linked to existing Public Rights of Way (PRoW) and the Redway system to the north. A new/extended bus service between the Site and Central Milton Keynes (CMK) would provide a high-quality sustainable travel option;
- **Maximise Travel Choice:** to provide integrated seamless ticketing enabling reliable and frequent transport to reduce the need for car ownership. Given the proximity of the Site to CMK and increasing Mobility as a Service (MaaS), presents an opportunity to reduce the need for car ownership;
- **Protecting Transport Users and the Environment:** to improve wellbeing, reduce emissions and ensure the safety of all travellers. The Site will include cycleways/footways that will enable Non-Motorised Users (NMUs) to travel safely throughout the Site and connect with the wider network of PRoWs, Redways and local bus nodes.

10.025 The Mobility Strategy also explains the contribution of public transport towards achieving the delivery initiatives³ and how MKC would seek to improve public transport services and associated infrastructure, comprising, inter alia:

- Park and Ride sites along corridors where there is a high trip demand;
- Premium bus network to provide high frequency services where there is high demand from early in the morning until late evening;

² MKC Mobility Strategy 2018-2036, Section 2, page 3

³ MKC Mobility Strategy 2018-2036, Section 3, page 6

- Expanding the local bus network and introduce bus priority along key access routes to encourage mode shift;
- Shuttle bus services from identified Park and Ride sites on selected corridors;
- *Ensure that social infrastructure (i.e. schools, hospitals) are fully accessible by public transport; and*
- *Optimise public transport/mass transit access in development areas, to include priority routes, signage and high-quality facilities.*

National Planning Policy Framework (NPPF), 2019

10.026 The Government's NPPF emphasises the importance of rebalancing the transport system in favour of sustainable transport modes, whilst encouraging local authorities to plan proactively for the transport infrastructure necessary to support the growth of major generators of travel demand.

Section 2 – Achieving Sustainable Development

10.027 Paragraph 7 of the NPPF states:

“At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

10.028 At the heart of the NPPF is the presumption in favour of sustainable development, set out in Paragraph 11 of the NPPF.

Section 9 – Promoting Sustainable Transport

10.029 Section 9 of the NPPF entitled ‘Promoting Sustainable Transport’ outlines the transport considerations for plan making and development proposals.

10.030 Paragraph 102 outlines that:

‘transport issues should be considered from the earliest of stages of plan making and development proposals’ in order to ensure that:

- ‘The potential impacts of the development on transport networks can be addressed;
- The opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated.
- Opportunities to promote walking, cycling and public transport use are identified and pursued;
- The environmental impacts of traffic and transport infrastructure can be identified, assessed and considered – including appropriate opportunities for mitigation and for net gains in environmental quality; and
- Patterns of movement, streets, parking and other transport considerations are integral to the design of schemes and contribute to making high quality places.’

10.031 Paragraph 103 states that:

“Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes.”

10.032 Paragraph 108 outlines the key considerations when assessing sites to be allocated for development in plans or specific development applications. There are:

- ‘Appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development applications and its locations;
- Safe and sustainable access to the site can be achieved for all users; and
- Any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

10.033 Paragraph 109 explains that development should only be prevented or refused on highway grounds if: *‘there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.’*

10.034 Paragraph 110 explains that applications for development should:

- ‘Give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible - to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;
- Address the needs of people with disabilities and reduced mobility in relation to all modes of transport;
- Create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards.
- Allow for the efficient delivery of goods, and access by service and emergency vehicles; and
- Be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.’

10.035 As outlined in Paragraph 111:

‘all developments that generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impact of the proposal can be assessed.’

Draft Vale of Aylesbury Local Plan (VALP) 2013-2033

10.036 The proposed development is identified as an allocation site within the Draft VALP (Policy D-NLV001) for the delivery of:

- up to 1855 new homes
- an employment area
- neighbourhood centre
- secondary school
- primary school
- grid road reserve

10.037 The policy identifies three points of access to serve the site along with a range of mitigation measures as agreed with BCC and in accordance with AVDC’s resolution to grant planning permission. The following highway improvements are identified as part of the draft policy:

- Highway Improvements by Condition(s):
 - Buckingham Road Access
 - Whaddon Road Access.
 - Highway Improvements by s106 agreement(s):
 - A421 Standing Way left in only junction and further detailed design;
 - Signalisation of the priority junctions of the A421/ Warren Road and A421/Shucklow Hill/Little Horwood Road.
 - In order to mitigate the potential impact in Whaddon a financial contribution is required towards road safety improvements on Coddimoor Lane and Stock Lane;
 - Newton Longville Traffic Calming Proposals. Currently this is an indicative scheme which may include enhanced gateway features on all roads leading into the village and raised junction tables and signing/lining.
 - Internal Road Network:
 - A new network of primary streets will form the principal circulation route for all vehicular traffic including a bus route. The route will connect with the existing highway network at the three access points. Plans should show that the primary street is to be at least 7.3m wide, with a footway/cycleway of 3m wide and will need to consider drop off provision, widened footways, crossing points, road signage and lining in relation to the proposed school site;
 - Grid Road:
 - Whilst the Site only requires a single carriageway road for access, a dual carriageway could be provided in the future. The land for the grid road is to be secured in the S106 Agreement for the future extension of Snelshall Street (V1) so that BC/MKC can develop and implement a scheme in the future;
- 16.1
- Public Transport Provision:
 - The enhancement of the existing bus service or provision of a new service to operate between the Site and CMK via the existing rail station will be required and included within the Framework Travel Plan;
- 16.2
- Public rights of way:
 - A number of improvements to the surfacing of the local footpaths will be required within the Site and be completed as part of the development and a financial contribution is to be secured as part of the S106 Agreement for those routes outside of the Site. The improvements within the Site include:
 - upgrade of footpath and resurface between Weasel Lane and the railway underpass; route to be dedicated as a public bridleway;
 - resurface Weasel Lane between B4034 Buckingham Road and Whaddon Road;

Summary

10.038 As detailed in Section 9 of the TA, the residual cumulative impact of the proposals on the road network would not be severe and the proposals would not have an unacceptable impact in terms of highway safety. Appropriate mitigation would be implemented as part of the proposals, which has previously been discussed with Buckinghamshire Council (BC) and Milton Keynes Council (MKC) as local highway authorities (LHA) to ensure that the residual cumulative impact of traffic generated by the Proposed Development is not severe.

10.039 Improvements are required by MKC and BC to accommodate background traffic growth forecasts (i.e. without the proposed development). In this regard, the proposed development is able to facilitate and act as a catalyst for implementing infrastructure improvements that have been identified in Local Plan policies and future mobility initiatives.

10.040 The TA demonstrates that the proposed development will accord with :

- Current and emerging Development Plan Policy;
- The NPPF and the Planning Practice Guidance (PPG); and
- the movement aspirations of BC and MKC.

Assessment Methodology

10.041 The methodology adopted in assessing the likely traffic and transport impacts is based upon the Institute of Environmental Assessment (now the Institute of Environmental Management and Assessment – ‘IEMA’) document ‘Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic’ (GEART), 1993, and in accordance with the Government’s planning policies for England, as set out in the NPPF.

10.042 Although the Guidance in GEART is over twenty years old, it is still relevant in that it has not been superseded or revoked. It therefore still provides guidance for the “*best current practice*” and is “*specifically designed to cover the aspects of road traffic associated with major new developments*” (GEART paragraph 1.6).

10.043 The trips generated by the Proposed Development when fully occupied are calculated using a robust, bespoke methodology which has been agreed with BC and MKC. The methodology is described in detail in Sections 5 and 6 of the TA.

Determining the Extent of the Assessment

10.044 The IEMA Guidelines (paragraphs 3.14 to 3.20) identify two broad rules to be used as a screening process in determining the scale and extent of the assessment as follows:

- Rule 1 - include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles will increase by more than 30%);
- Rule 2 - include any other specifically sensitive areas where traffic flows have increased by more than 10% (i.e. locations would include accident black-spots, conservation areas, hospitals, links with high pedestrian flows etc).

10.045 In regard to Rule 1, the Guidelines state (in para 3.16):

“Traffic forecasting is not an exact science and the accuracy of projections is open to debate. It is generally accepted that accuracies greater than 10% are not achievable. It should also be noted that the day-to-day variation of traffic on a road is frequently at least some + or -10%. At a basic level, it should therefore be assumed that projected changes in traffic of less than 10% create no discernible environmental impact.”

10.046 The Guidelines identify that the most discernible environmental impacts of traffic are noise, severance, pedestrian delay and intimidation and provide additional information on how those impacts should be assessed (para 3.17):

“At low flows, increases in traffic of around 30% can double the delay experienced by pedestrians attempting to cross a road (DOT, 1983). Whether this is significant in absolute terms requires further consideration (see 3.19). Severance and intimidation are, however, much more sensitive to traffic flow and the Department for Transport, in its MEA, has assumed that 30%, 60% and 90% changes in traffic levels should be considered as “slight”, “moderate” and “substantial” impacts respectively.”

10.047 In order to undertake a relative assessment of the increase in road traffic and its subsequent impact, the criteria outlined in Tables 10.1 to 10.3 below have been used to determine the magnitude of impact and receptor sensitivity respectively. However, consideration should also be given to the local characteristics, such as the volume of traffic, footway widths and the availability of crossing facilities. It should be noted that assessments of air quality and noise impacts arising from the proposed development have been undertaken and the results included in Chapter 11 and Chapter 12 within this ES.

Potential Impact

10.048 The guidance suggests that an increase in traffic associated with a development has the potential to result in impacts relating to the following matters during both the construction and operational phases of development:

- Collisions and Safety
- Driver Delay
- Severance
- Fear and Intimidation
- Pedestrian and Cyclist Amenity and Delay
- Dust and Dirt

Collisions and Safety

10.049 An increase in traffic volume has the potential to increase the risk of collisions and / or delay to drivers. Where schemes are expected to result in a change in the character or volume of the traffic on the local road network, such as a change in the volume of HGVs, the IEMA guidelines (paragraph 4.42) state that specific local circumstances would require professional judgement to determine the potential significance of collision risk. This includes a review of local road collision data in order to identify any underlying road safety issues within the study area.

10.050 The IEMA Guidelines (paragraph 4.42) state that an assessment of road safety on the highway network should be undertaken based on collision records. Personal Injury Collision (PIC) data have been obtained for the study area from STATS19 Road Safety Data for a five-year period to the end of December 2019 and the assessment is summarised in the baseline conditions section of this ES chapter. Professional judgement is used to determine the significance of the Proposed Development on collisions and safety.

Driver Delay

10.051 Driver Delay can be determined through the analysis of junction capacity assessments contained within the TA, which will be measured in terms of change in delay per vehicle (in seconds) when compared with the baseline situation. This criterion is considered to be applicable to all modes of vehicular transport using the public highway; namely, cars, motorcycles, pedal cycles and buses.

10.052 Time values for delay are based upon computer junction assessment programs: LINSIG for signalised junctions; JUNCTIONS9 for roundabouts and for priority junctions. JUNCTIONS9 and LINSIG v3 have been utilised within the TA.

10.053 The IEMA Guidelines (paragraph 4.34) state that delays are only likely to be significant when the traffic on the network surrounding the development is already at, or close to capacity.

Severance

10.054 Severance can apply to residents, motorists and pedestrians and is the perceived division that can occur within a community as consequence of development. For example, severance may result from issues in crossing a heavily trafficked road, or the barrier created by the road itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities.

10.055 The IEMA Guidelines (paragraph 4.28) state that marginal changes in traffic flow are unlikely to have an impact in terms of severance, although consideration should also be given to factors such as road width, traffic flow and speeds, the availability of crossing facilities and the usage of the affected route. Consideration should also be given to more vulnerable groups such as the elderly and young children. The Guidelines suggest that changes in traffic flows of 30%, 60% and 90% may be considered as producing 'slight', 'moderate' and 'substantial' changes in severance respectively, although these thresholds should be used cautiously, and the assessment of severance should have regard to specific local conditions. The DMRB⁴ sets out criteria for assessing the sensitivity and magnitude of severance, as set out in Table 10.1.

Table 10.1 Criteria for Assessing Sensitivity and Magnitude of Impact of Severance

Sensitivity		Magnitude	
Low	WCH (Walking, Cycling, Horse-riding) at-grade crossing (located at carriageway level) of road carrying below 4000 vehicles per day (Average Annual Daily Traffic (AADT))	Negligible	Less than 50m increase (adverse) or decrease (beneficial) in WCH journey length.
Medium	WCH at-grade crossing of road carrying 4000- 8,000 vehicles per day AADT	Minor	Between 50m - 250m increase (adverse) or decrease (beneficial) in WCH journey length.
High	WCH at-grade crossing of a new road carrying between 8,000-16,000 vehicles per day (AADT) in the opening year	Moderate	Between 250m - 500m increase (adverse) or decrease (beneficial) in WCH journey length.
Very High	WCH at-grade crossing of a new road carrying over 16,000 vehicles per day (AADT) in the opening year	Major	Over 500m increase (adverse) / decrease (beneficial) in WCH journey length

Fear and Intimidation

10.056 The level of fear and intimidation experienced by pedestrians is governed by traffic volumes, including the level of HGV activity, along with factors such as traffic speeds and the level of separation from traffic and / or

⁴ LA112

footway widths for example. There are no commonly agreed thresholds against which the significance of this effect is determined although special consideration should be given to areas where there are likely to be particular issues, such as high-speed sections of roads with narrow footways and areas where a high level of turning manoeuvres are undertaken. Consideration should also be given to areas subject to high levels of use by more vulnerable people such as school children and the elderly. The IEMA Guidelines (paragraph 4.41) therefore suggest thresholds based on 18-hour daily flow and vehicle speeds, as shown in **Error! Reference source not found..**

Table 10.2 Criteria for Assessing Magnitude of Impact of Fear and Intimidation

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

Pedestrian and Cyclist Amenity and Delay

10.057 The importance of walking and cycling in contributing towards sustainable travel patterns is outlined in the NPPF, which places focus on the roles that walking and cycling can play as both the main modes of transport or as part of a longer journey by public transport. The IEMA Guidelines (paragraph 4.39) broadly defines amenity as:

“the relative pleasantness of a journey, and is considered to be affected by traffic flows, traffic composition and pavement width/separation from traffic”.

10.058 An indicative threshold for changes in pedestrian amenity is where traffic flows are halved or doubled. The traffic flow changes that are presented in the TA are utilised to assess the changes in pedestrian amenity across the study area during the operational phase of the Proposed Development.

10.059 The IEMA Guidelines (paragraph 4.37) recommend that rather than relying on thresholds for pedestrian and cycle delay the assessor should use judgement to determine whether there will be a significant impact.

10.060 Increases in traffic levels as a consequence of a development are likely to lead to increased delay to pedestrians and cyclists wishing to cross roads. The degree of pedestrian and cycle delay therefore corresponds to the level of severance.

10.061 Pedestrian amenity is broadly defined as the relative pleasantness of a journey and can be affected by traffic flow, including composition of traffic, along with matters such as separation from vehicular traffic / footway widths. The IEMA guidelines (paragraph 4.39) note that changes in pedestrian amenity may be considered significant where the traffic flow is halved or doubled, with the former leading to a beneficial effect and the latter an adverse effect.

Dust and Dirt

10.062 Construction HGVs have the potential to distribute dust and dirt from construction sites on to the local highway network. Such effects would be most pronounced in the immediate vicinity of the site entrance.

10.063 The TA considers the transport and traffic impact of the Proposed Development in detail and reference should be made to that document for full details of the various impacts and the potential infrastructure improvements associated with the development.

Assessing the Sensitivity of Receptors

10.064 The criteria outlined in Table 10.3 have been used to assess the sensitivity of receptors, however professional judgement is also applied to the local characteristics, such as the volume of traffic, pavement widths and availability of crossing facilities.

Table 10.3 Criteria for Assessing Sensitivity of Receptors

SENSITIVITY	RECEPTORS
Very High	Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident black spots, retirement homes, urban/residential roads without footways that are used by pedestrians.
High	Traffic flow sensitive receptors including: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, unsegregated cycle ways, community centre, parks, recreational facilities.
Medium	Receptors with some sensitivity to traffic flow: places of worship, public open space, nature conservation areas, listed buildings, tourist attractions and residential areas with adequate footway provision.
Low	Receptors with low sensitivity to traffic flow and those with sufficient distance from affected roads and junctions.

Determining the Significance of Effect

10.065 The magnitude of change and sensitivity of the receptor can then be considered together to determine the overall traffic effect significance, as shown in Table 10.4.

Table 10.4 Matrix for Determining the Significance of Effect

SENSITIVITY OF RECEPTOR	Very High	Major	Major	Moderate	Minor	No impact
	High	Major	Moderate	Minor	Negligible	
	Medium	Moderate	Minor	Negligible	Negligible	
	Low	Minor	Negligible	Negligible	Negligible	
	16.3	Major	Moderate	Minor	Negligible	No Impact
		MAGNITUDE OF IMPACT				

10.066 The potential effects are, therefore, considered to be of either major, moderate, minor or of negligible significance. Effects of major and moderate significance are considered to be significant in EIA terms, as explained in Chapter 4 of the ES.

Baseline Conditions

Local Highway Network

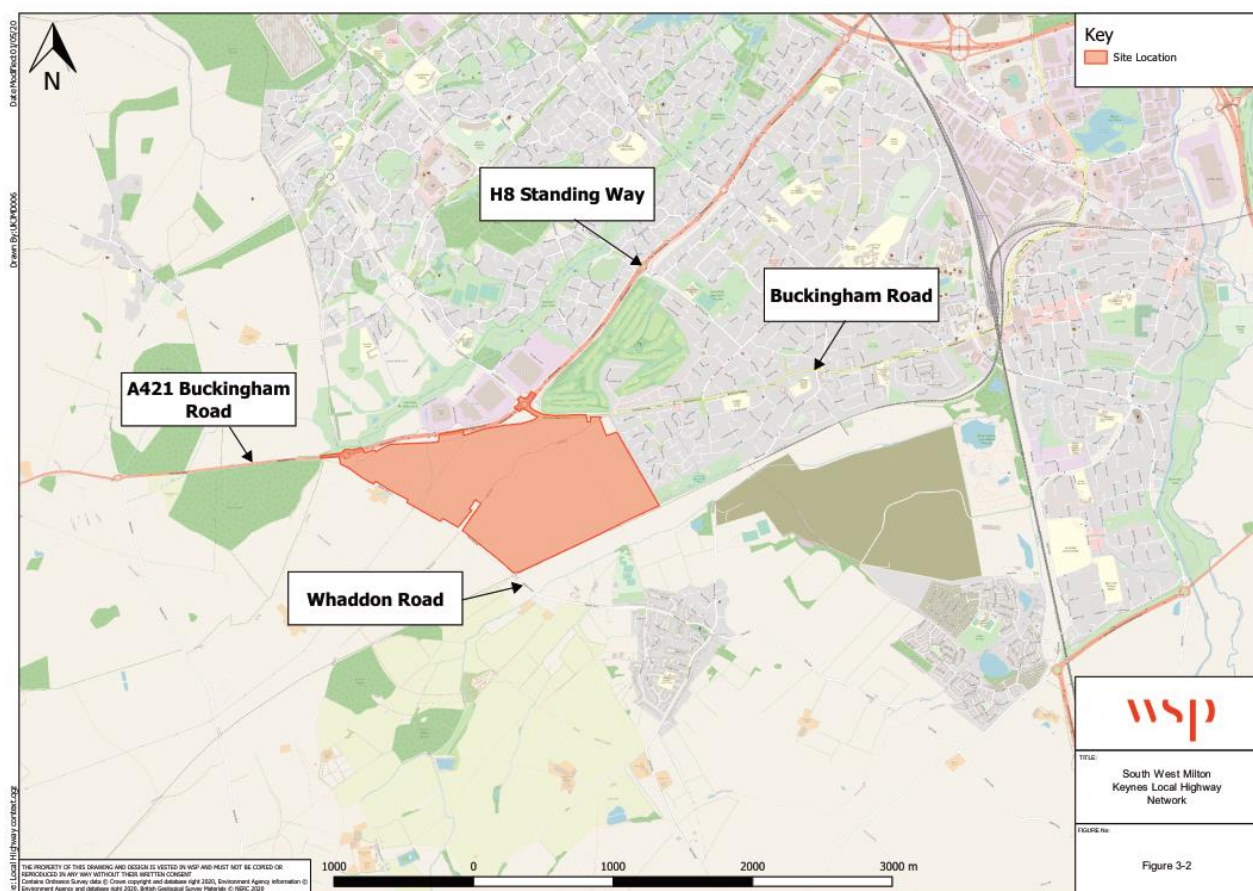
10.067 The Site is well connected on a local, sub-regional and regional scale. A421/H8 Standing Way runs in a north easterly direction towards A5, providing connections to the Bletchley, Emerson Valley and Furzton areas. A roundabout at the junction of H8 Standing Way and V6 Grafton Street (Bleak Hall Roundabout) allows access to Redmoor Roundabout which interchanges with A5. To the east of A5, A421 Standing Way provides access through the Beanhill, Netherfield, Monkston, Kents Hill and Brinklow areas to Junction 13 on the M1 Motorway and also north into Bedford.

10.068 To the west, A421 provides links to Buckingham and A43. A421 extends west from Bottle Dump Roundabout in the north-west corner of the Site and has a number of junctions along its length providing links to minor roads that serve the surrounding villages. A421 continues west and meets A413 at a roundabout to the east of Buckingham, some 12.5km west of the Site, before continuing to the south of Buckingham, north of the Buckingham Industrial Estate. A421 continues west from Buckingham, bypassing Tingewick to the south before joining the A43 approximately 4km south of the centre of Brackley.

10.069 Whaddon Road runs in a south easterly direction along the western edge of the Site, over the disused railway, and into the village of Newton Longville. Within the village, Whaddon Road gives way to Bletchley Road/Drayton Road at a four-arm priority junction before continuing as Stoke Road. Stoke Road provides access to A4146 Stoke Hammond bypass to the south, of which A4146 provides a southern bypass to Leighton Buzzard before joining A505. A505 joins A5 Watling Street at a roundabout junction to the north west of Houghton Regis.

10.070 Figure 10.1 provides the context of the Site in relation to the immediately surrounding roads.

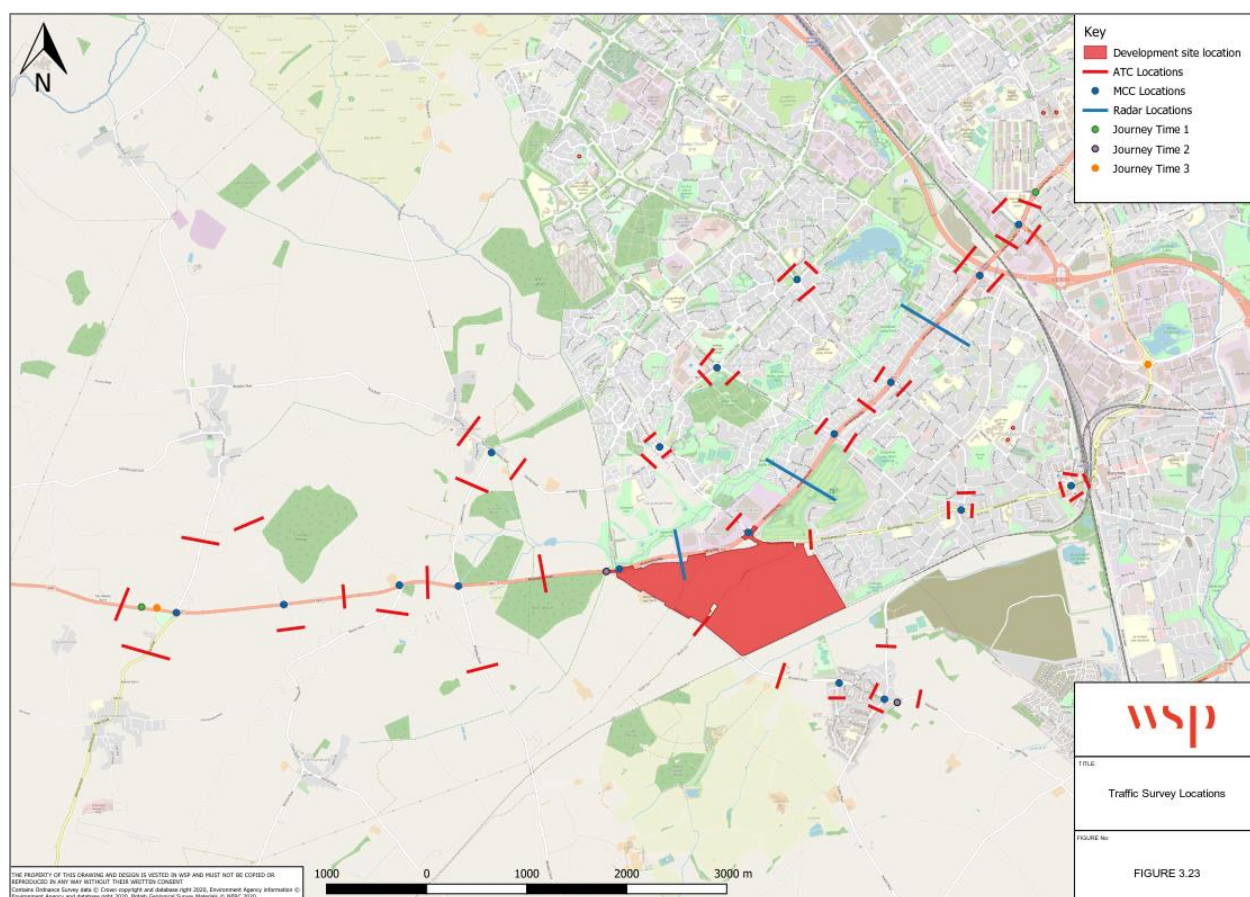
Figure 10.1 – Local Highway Network Immediately Surrounding the Site



Traffic Data

10.071 A comprehensive traffic data collection exercise was undertaken in February 2020 (Figure 10.2) to provide an up to date study area baseline for consideration as part of the TA and EIA. The following figure provides details of the data collection completed. The study area was agreed with BCC and MKC and comprises the links which area anticipated to be most affected by the Proposed Development, on routes leading into Central Milton Keynes and Bletchley, towards Buckingham, and towards the Strategic Road Network (SRN) of A5 and M1.

Figure 10.2 – Traffic Survey Study Area – February 2020



10.072 A total of 18 Manual Classified Turning Count (MCTC) surveys of local junctions were completed, alongside 55 Automatic Traffic Counter (ATC) surveys of local roads, three journey time surveys and three radar surveys. The MCTCs were undertaken on three separate weekdays to reduce any uncertainty regarding daily fluctuations in traffic flow. The ATCs and radar surveys were conducted over 14 days to provide two weeks of data.

10.073 The survey data identified that across the 18 junction turning counts, weekday network peak hours of 07:45-08:45 and 17:00-18:00 were identified.

10.074 A series of 'static' junction models have been developed to assess the potential impact of traffic over a wide area. The models include traffic survey data collected in February 2020 as a base and have been used to assess the future impact of the development on the local highway network in 2033 within both BCC and MKC.

10.075 The methodology accounts for traffic growth to 2033 based on assumptions from TEMPRO, including a review to ensure that the planning assumptions within TEMPRO are broadly consistent with the forecast number of households and jobs within Aylesbury Vale. The traffic growth applied to 2020 base data therefore includes for committed and allocated developments expected in the area prior to the assessment years. The completion of the development at Tattenhoe Park/Kingsmead South within Milton Keynes has also been included within the future traffic flow forecasts. Similarly, the additional allocation of residential development at Shenley Park in AVDC has been accounted for within the traffic growth forecasts for the study area.

10.076 The two-way AADT flows for 2020 and 2033 in the base scenario along key corridors in the vicinity of the Proposed Development are provided in Table 10.5.

Table 10.5 AADT Base Scenarios

Road	2 Way AADT	
	2020 Base	2033 Forecast Base
Whaddon Road (between Bottle Dump Roundabout and Site access)	6322	7788
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	25024	30093
Whaddon Road through Newton Longville	5183	6322
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	25392	30491
Buckingham Road	8015	10450

Public Transport Network

- 10.077 Access to public transport is measured with reference to the number of services accessible within a reasonable walking distance. For bus based public transport a reasonable level walking distance between a home/place of employment and a bus stop is generally regarded to be around 400m.
- 10.078 The nearest bus stops that are served by a regular bus service are on Chepstow Drive in Far Bletchley around 900m to the east of the Site boundary (i.e: circa.2km from the centre of the Site). The existing bus stops on Chepstow Drive are currently served by Route 28 operated by Red Rose Travel. Between Monday and Saturday, an hourly service operates between Central Milton Keynes and Bletchley Bus Station.
- 10.079 The nearest bus stops to the Site that provide a more frequent level of service are around 950 metres walking distance from the Site boundary on Whaddon Way and 2km from the centre of the Site. These stops are currently on Route 4, operated by Arriva which provides a 10-minute frequency service from 6am to midnight between Milton Keynes City Centre and Bletchley. Routes 30 and 604 also service at this stop but only for school travel.
- 10.080 Bletchley Railway Station is located approximately 3.4km to the east of the site and accessible by bicycle or by Bus Route 4. Bletchley Railway Station has 628 parking spaces with 29 for use by the mobility impaired. There is also sheltered parking for 58 bicycles at the station.
- 10.081 The station, operated by London Northwestern Railway, is located on the West Coast Main Line, providing connections to Milton Keynes Central and Birmingham New Street to the north, and Watford and Euston to the south. The station also provides links to local stations, including Leighton Buzzard. Southern Trains operates an hourly service which terminates at East Croydon, to the south of London.

Pedestrian Network

- 10.082 The existing site is served by a network of existing pedestrian footways and Public 'Rights Of Way' (PROW). Whilst Whaddon Road to the west of the Site does not feature any formal pedestrian infrastructure both Standing Way and Buckingham Road do provide pedestrian and cycle facilities. Standing Way features a

shared cycle/footway to the north of the carriageway segregated by a wide grass verge. The path forms part of Milton Keynes' Redway Network, a network of pedestrian and cycle across the Borough. A subway is provided adjacent to Steinbeck Crescent that provides access to the southern side of the carriageway where a lay-by is provided. The subway also provides a connection to a disused carriageway that runs parallel and to the south of Standing Way along the northern boundary of the site.

10.083 The 'Redway' on Standing Way runs between the Bottledump roundabout and the urban centre of Milton Keynes. Grade separated provision is provided at the Buckingham Road roundabout providing a safe connection to a further 'Redway' route that runs along Buckingham Road to Caernarvon Crescent where Chestnuts Primary School is located. The 'Redway' on Standing Way continues into Milton Keynes along the southern side of the carriageway with subway connections to Tattenhoe and other residential areas to the north.

10.084 Buckingham Road features a shared footway/cycleway on the northern side of the carriageway segregated from the carriageway by a grass verge.

10.085 The following PROWs run through or adjacent to the site:

- Bridleway WHA/16 extends south from A421 (approximately 150m west of Bottle Dump Roundabout) to Whaddon Road (Mursley) and beyond Whaddon Road to the west as LHO/19.
- Weasel Lane, a restricted byway, runs through the Site on a south west to north east axis between Whaddon Road and Buckingham Road where it terminates. In the west it continues across Whaddon Road and connects with Salden Lane.
- Footpath NLO/19 extends from Weasel Lane (250m west of Buckingham Road) south to Whaddon Road, Newton Longville, opposite Westbrook End. The footpath passes under the currently disused route of the East West rail line via an existing underbridge.

Cycle Network

10.086 National Cycle Route (NCR) 51 runs south-west through the Site, along Weasel Lane from Buckingham Road, crossing Whaddon Road before re-joining the road network on a small farm track, east of Lower Salden Farm. Weasel Lane is a restricted byway, with the following PROW classifications:

- NLO/25 at the north eastern end (between Buckingham Road and footpath NLO/19 – around 250metres) with a metalled surface around 4m in width and with verges both sides;
- NLO/20 between footpath NLO/19 and the parish boundary – around 1150m in length generally metalled and with a similar width of around 4m and verges to both sides; and
- MUR/15 between the parish boundary and the track to Lower Salden Farm – around 550m, with width and surface generally as for NLO/20.

10.087 The route is sign-posted throughout as NCR51, providing connections to Bicester and Oxford to the south-west, and Bedford and Huntingdon to the north-east.

10.088 The Milton Keynes cycle network (i.e: the Redway system) commences west of Bottle Dump roundabout before continuing eastbound, north of A421 Standing Way, reaching Tattenhoe Roundabout where it passes under the Snelshall Street and A421 Standing Way arms of the roundabout via subways. At this point, the Redway splits in three. A route can either be followed north-east alongside A421 Standing Way towards the City Centre and Central Milton Keynes Railway Station, or to the south east alongside Buckingham Road, and to the north alongside Snelshall Street.

10.089 The Redway network can be accessed from the Site via:

- Whaddon Road, immediately south of Bottle Dump roundabout;
- The subway under A421, east of Steinbeck Crescent; and
- Buckingham Road, south east of Tattenhoe Roundabout.

Community Facilities

10.090 In line with the guidance within NPPF, the Site should be accessible by a variety of transport modes allowing a reduction in the reliance on the private car. Access to local amenities has been considered by examining the number of services and facilities available within a reasonable walking and cycling distance of the Site. The distances that are typically considered acceptable by these modes of travel are as follows:

- Walking - up to 2km (equivalent to a 25-minute walk); and
- Cycling - up to 5km (equivalent to a 20-minute cycle).

10.091 A range of amenities including retail, medical facilities, leisure centre and both primary and secondary education are accessible within either a 25-minute walk or a 20-minute cycle. Full details of the accessibility of the Site to local amenities are provided within the TA.

Personal Injury Collision Data

10.092 Personal injury collision data have been obtained from both BCC and MKC. The area of interest in BCC's administrative area is from A421 Whaddon Crossroads in the west, along A421 up to and including Bottle Dump Roundabout, Whaddon Road into Newton Longville and Stoke Road to the roundabout at the northern end of A4146 Stoke Hammond bypass. The data covers the period from 1st January 2015 to 31st December 2019.

10.093 Personal injury collision data obtained from MKC covers a large area of interest including the following roundabouts and the road links between them; Bottle Dump, Tattenhoe, Kingsmead, Westcroft, Furzton, The Bowl, Elfield Park, Emerson and Windmill Hill. The collision data covers the 5-year period, 1st January 2015 to 31st December 2019.

10.094 The collision data from both BCC and MKC are assessed within Section 3.9 of the TA. Table 10.6 provides an overview for the roads in the immediate vicinity of the Site as this is where the greatest impact of traffic is likely to be.

Table 10.6 5-year Personal Injury Collision Data

Location	Number of PIAs		
	Slight	Severe	Fatal
Whaddon Crossroads	5	1	0
Whaddon Road/Stoke Road through Newton Longville	8	0	0
Bottle Dump and Tattenhoe Roundabouts	4	0	0
H8 to Windmill Hill Roundabout	6	0	0

Likely Significant Effects

10.095 The impacts of the Proposed Development are described in detail in Section 7 of the TA, with a summary provided herein.

Construction Stage

10.096 It is envisaged that the Site will be developed over a period of 9-10 years. Subject to planning approval it is anticipated that infrastructure construction would start in 2021/2022 with completion in 2031. In terms of working hours, it is envisaged that construction will be undertaken between 0800 and 1900 on Monday to Friday and between 0800 and 1300 on Saturday.

10.097 The number of vehicle movements associated with the demolition and construction works (i.e. deliveries, removal of waste, construction staff vehicles etc), has been predicted based on informed assumptions provided by Taylor Wimpey. Full details of the construction trip generation are provided in Section 5.9 of the TA.

10.098 Table 10.7 sets out the 2020 base AADT and 2020 base with construction traffic to assess the impact of construction traffic associated with the Site during the anticipated busiest construction phase. The base year of 2020 has been used for the purpose of assessing the significance of the impact as it would represent the highest percentage increase in traffic as a result of construction activities.

Table 10.7 Impact of Construction Traffic

Road	2020 Base		2020 Base + Construction Traffic		% increase (All Vehicles)	% increase (HGVs)
	AADT (All Vehicles)	AADT (HGVs)	AADT (All Vehicles)	AADT (HGV)		
Whaddon Road (between Bottle Dump Roundabout and Site access)	5183	531	5535	573	6.8%	7.9%
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	25024	2396	25062	2406	0.15%	0.4%
Whaddon Road through Newton Longville	5183	531	5201	531	0.3%	0%
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	25392	2130	25708	2162	1.2%	1.5%
B4034 Buckingham Road	8015	724	8047	724	0.4%	0%

- 10.099 Whaddon Road will provide the main Site access for use by construction traffic and therefore a greater increase in flow is predicted on A421 and the northern end of Whaddon Road. In this regard, A421 (between Whaddon Crossroads and Bottle Dump Roundabouts) currently has an Average Annual Daily Traffic (AADT 24hr) flow of 25,024 vehicles, whilst A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts) currently has an AADT flow of 25,392 vehicles. Buckingham Road and Whaddon Road have much lower AADT flows, at 8015 and 5183 vehicles respectively. The IEMA Guidelines (para 3.14-3.20) state that where a predicted increase in traffic flows is lower than 30% the effects can be stated to be low or insignificant
- 10.100 Table 10.7 shows that the predicted increase in traffic flows is far below 30%, with the maximum increase shown on A421 Standing Way, with an increase of traffic flow of 1.2%. As such, the traffic impact associated with the construction of the Proposed Development would be negligible.
- 10.101 Construction traffic is likely to increase the number of HGV movements along these roads and again the IEMA Guidelines state in paragraphs 3.14-3.20 that where the predicted increase in the number of HGVs is less than 30% the effects can be stated to be low or insignificant, and between 30-60% as minor. A421 Standing Way is predicted to have the greatest increase in HGV movements. Currently A421 (between Whaddon Crossroads and Bottle Dump Roundabouts) carries 2396 HGVs per day. There is predicted to be an increase of 10 HGVs per day along this link associated with the construction stage, equating to an increase of 0.4%. A41 Standing Way currently carries 2130 HGVs per day. This is predicted to rise to 2162 HGVs per day, equating to an increase of 1.5%.

10.102 As such, the traffic impact associated with HGVs from the construction of the Proposed Development will be negligible and following Rule 1 and Rule 2 of the GEART does not need to form part of the assessment within this ES. As a result, no further assessment of construction traffic is provided within this ES.

Operational Stage – Completed Development

10.103 The trips generated by the Proposed Development when fully occupied are calculated using a robust, bespoke methodology which has been agreed with BC and MKC. The methodology is described in detail in Sections 5 and 6 of the TA.

10.104 This section considers the impact of the Proposed Development upon the future conditions of the local area during the operational stage. The change in peak hour traffic flows as a result of the Proposed Development is shown by comparing the 'Base' (without development) traffic flows with the 'Base + Development' (with development) in Table 10.8 and Table 10.9, with the change in AADT traffic presented in Table 10.10.

Table 10.8 2033 Peak Hour Traffic Flows (Two-way)

Road	2033			
	AM Peak		PM Peak	
	(07:45 - 08:45)		(17:00-18:00)	
	Base	Base + Dev	Base	Base + Dev
Appendix 1: Whaddon Road (between Bottle Dump Roundabout and Site access)	Appendix 2: 807	Appendix 3: 997	Appendix 4: 753	Appendix 5: 912
Appendix 6: A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	Appendix 7: 285 3	Appendix 8: 296 4	Appendix 9: 271 9	Appendix 10: 28 41
Appendix 11: Whaddon Road through Newton Longville	Appendix 12: 73 9	Appendix 13: 80 9	Appendix 14: 69 9	Appendix 15: 77 7
Appendix 16: A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	Appendix 17: 29 07	Appendix 18: 33 14	Appendix 19: 27 72	Appendix 20: 31 20
Appendix 21: B4034 Buckingham Road	Appendix 22: 97 5	Appendix 23: 11 55	Appendix 24: 12 55	Appendix 25: 14 71

Table 10.9 Percentage Change in Peak Hour Traffic Flows (Two-way)

Road	2033	
	AM Peak	PM Peak
	(07:45 - 08:45)	(17:00-18:00)
Whaddon Road (between Bottle Dump Roundabout and Site access)	23.5%	21.1%
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	3.9%	4.6%
Whaddon Road through Newton Longville	9.5%	11.2%
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	14.0%	12.5%
B4034 Buckingham Road	18.5%	17.2%

Table 10.10 Change in AADT Traffic Flows (Two-way)

Road	Two-way AADT		
	Base 2033	Base + Dev 2033	% Change
Whaddon Road (between Bottle Dump Roundabout and Site access)	6322	7788	23.2%
A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	30093	31033	3.1%
Whaddon Road through Newton Longville	6287	6885	9.5%
A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	30491	33774	10.8%
B4034 Buckingham Road	10450	12126	16.0%

10.105 The IEMA Guidelines state (paragraph 3.15) that where a predicted increase in traffic flow is lower than 30% (or 10% on specifically sensitive links), the effects can be stated to be low or insignificant. Only the 'Whaddon Road through Newton Longville' link can be considered to be specifically sensitive in regard to Rule 2 of the GEART for determining the extent of the assessment network as a result of the conservation area within the village. An increase in traffic flows over 10% on that link should therefore be assessed further

within this Chapter. None of the other links are accident black-spots, they do not provide access to conservation areas or hospitals, and they do not have high pedestrian flows. None of the other links assessed fall under Rule 2, and should therefore be assessed using the 30% significance criteria contained in Rule 1.

10.106 Table 10.9 and Table 10.10 show that none of the links surrounding the Site are predicted to have an increase in traffic flows at or above 30% in either the Peak Hours or as an AADT. Whaddon Road through Newton Longville has an increase in AADT and in AM peak hour flows of below 10%, but an increase in PM peak hour flows of 11.2%. The effects of the Proposed Development are therefore insignificant on all local roads in the surrounding the Site with the exception of Whaddon Road through Newton Longville in the PM peak hour. As such, Whaddon Road through Newton Longville is the only link to be 'scoped in' to the study area, with an assessment of the impact of the development included below. The TA contains a wider study area within which all links/junctions, including those that fall below the 30% IEMA threshold, have been assessed against the NPPF tests of safety and severity.

Junction Capacity Assessments

10.107 An assessment of junction capacity at the Newton Longville Crossroads junction has been completed with the results comparing the Base⁵ and Base + Development model scenarios presented within the TA in Appendix W.

10.108 Operational modelling was undertaken using industry standard software JUNCTIONS9. In 2033, the junction is predicted to operate over capacity with a Ratio of Flow to Capacity (RFC) of 1, with a queue of 45 vehicles in the AM peak and 28 vehicles in the PM peak on the Stoke Road arm. With the inclusion of the Proposed Development, the queues increase to 50 vehicles in the AM peak and 42 vehicles in the PM peak. An overall summary of the junction operation assessment is included in Table 10.11 **Error! Reference source not found..**

Table 10.11 Summary of Junction Operation Assessment in 2033 at Newton Longville Crossroads

Arm Description	AM			PM		
	Queue (Veh)	Delay (s)	RFC	Queue (Veh)	Delay (s)	RFC
2033 Base + Committed Development + Shenley Park						
A- Bletchley Road	0.1	7.15	0.07	0.1	7.32	0.13
B-Stoke Road	44.6	338.76	1.17	28.1	210.29	1.09
C-Drayton Road	0.1	7.12	0.06	0.0	6.96	0.03
D-Whaddon Road*	1.7	25.88	0.63	1.2	19.86	0.55
2033 Base + Committed Development + Shenley Park + Proposed Development						
A- Bletchley Road	0.1	7.18	0.07	0.1	7.36	0.13
B-Stoke Road	49.7	387.76	1.2	42.1	313.74	1.16
C-Drayton Road	0.1	7.12	0.06	0	6.96	0.03
D-Whaddon Road*	2.6	38.13	0.74	1.5	23.52	0.6

⁵ Including committed development and the draft allocation at Shenley Park

10.109 The RFC on the Stoke Road arm of the Newton Longville Crossroads junction increases as a result of the Proposed Development, by 0.03 in the AM peak and 0.07 in the PM peak. All other arms operate satisfactorily with an RFC below 0.85. . The junction is operating over capacity (RFC over 1) in the Base scenario therefore professional judgement is required to determine the impact of the development in relation to change in RFCs. In this regard, it is considered that the magnitude of the impact on RFC is negligible in both the AM and PM peaks. The receptor is of High sensitivity as a result of the congested nature of the junction, therefore the overall significance of the effect is Negligible.

Driver Delay

10.110 The delay to drivers as a result of the Proposed Development will increase at the Newton Longville Crossroads junctions as shown in Table 10.11, with a modelled increase of 79 seconds in the AM peak and 134 seconds in the PM peak on the Stoke Road arm. As described in para 10.109, the junction is operating over capacity (RFC over 1) in the Base scenario therefore whilst the junction is still able to operate it would be more sensitive to changes in queuing and delay. Based on the increase in delay results presented, the magnitude of the impact of the development is considered to be Major prior to mitigation at the junction. The sensitivity of the junction is High, therefore the significance of the effect is Major prior to mitigation.

Severance

10.111 Severance, as assessed against IEMA (para 4.28) and DMRB criteria (see Table 10.2 above), is unlikely to occur in the local area as a result of the Proposed Development. As discussed in Chapter 4 of the TA, the Proposed Development incorporates measures to support pedestrians and cyclists both within and external to the Site. Due to the location and nature of the greenfield Site on the existing urban edge, it is unlikely that pedestrian journeys would currently cross the Site hence, there will be no increase in journey distances as set out in the criteria in Table 10.1.

10.112 The inclusion of improvements in connectivity and permeability for pedestrians and cyclists will likely encourage use of the routes within the Proposed Development and will not act as either a hindrance or deterrent to journeys.

10.113 Benefits are likely to be experienced by pedestrians and cyclists as a result of the Proposed Development as access to new community facilities, shops and schools will be provided within the Site. Additional crossing points have been proposed for locations on both Buckingham Road and Whaddon Road that would enhance the access to local facilities and amenities.

10.114 In accordance with the DMRB criteria (LA112), roads with a Base AADT of between 4,000-8,000 vehicles are of low sensitivity to severance. Whaddon Road through Newton Longville has a 2033 Base AADT of 6,287 vehicles and therefore is of low sensitivity. There is no increase or decrease in pedestrian and cyclist journey length, therefore the magnitude of the effect is Low.

10.115 In accordance with the IEMA guidelines, as the increase in traffic flow is less than 30% through Newton Longville, the magnitude of the effect is negligible (>30% would be slight).

10.116 The sensitivity of Whaddon Road through Newton Longville is High, therefore the overall effect on existing severance in Newton Longville is Negligible and not significant.

Pedestrian and Cyclist Amenity and Delay

10.117 It is anticipated that the number of pedestrian and cycle journeys on the network in the vicinity of the Proposed Development will increase. Taking into account the upgraded connection through the Site along Weasel Lane, the overall impact for pedestrians and cyclists is expected to be positive. In this regard, there

would be a benefit to the pedestrian and cycle environment on Buckingham Road with two new controlled crossing points. A new footpath and cycleway would also be provided along Whaddon Road, thereby creating a new route for pedestrians and cyclists between Weasel Lane and Bottle Dump Roundabout, with a connection via the existing subway under A421 with the Redway network into Tattenhoe Park to the north.

- 10.118 The IEMA Guidelines define pedestrian and cyclist amenity as the relative pleasantness of a journey and can include fear and intimidation if they are relevant. Amenity is influenced by traffic volumes and composition along with footway width and pedestrian activity. The IEMA Guidelines suggest tentative thresholds of significance would be where the traffic flow is halved or doubled (see paragraph 4.39 of the Guidelines).
- 10.119 The Proposed Development will positively impact the pleasantness of journeys on either foot or by bicycle, by introducing new controlled crossings over Buckingham Road and Whaddon Road and a new shared footway/cycleways, separated from vehicle traffic.
- 10.120 Furthermore, none of the road links in the vicinity of the Proposed Development experience a doubling of traffic flows and therefore the significance of the impact on pedestrian and cyclist amenity is assessed to be negligible.
- 10.121 There will be embedded mitigation in the form of improvements to the PRow network as a result of the Proposed Development, with enhanced surfacing on Weasel Lane and improvements to the route towards Newton Longville to the south. These improvements will have a beneficial impact on the local area.
- 10.122 The Proposed Development will generate increases and decreases in the number of vehicle movements on the local road network. In general, increases in traffic levels can also lead to increases in delay to pedestrians seeking to cross roads. The IEMA Guidelines recommend that the effects on pedestrian delay are unlikely to be material if a road has two-way traffic flow of less than 1,400 vehicles per hour.
- 10.123 As detailed in Table 10.8, two roads within the study area will see an increase in traffic and have a consistent flow of over 1,400 vehicles per hour. These are A421 Standing Way and A421 Buckingham Road. Pedestrian underpasses on the Redway network are provided on A421 Standing Way therefore pedestrian and cyclist delay will not increase as a result of the increase in traffic. A421 Buckingham Road has no footway provision with no pedestrians expected to use the road, hence the increase in traffic will not increase pedestrian delay on A421 Buckingham Road. Using professional judgement, as advised by IEMA Guidelines, it is considered that there will not be a significant impact on pedestrian delay.
- 10.124 NMUs will benefit from better access to community facilities as a result of the Proposed Development, with facilities provided in the neighbourhood centre located within the Site. Access to employment, convenience shopping and schools will be improved as the Proposed Development offers an alternative to existing local facilities accessed from high-quality pedestrian and cycle routes. Based upon the analysis set out above and application of professional judgement, it is considered that there will be a beneficial impact upon pedestrian and cyclist amenity and delay as a consequence of the Proposed Development.

Collisions and Safety

- 10.125 The TA assesses the most up to date five-year collision records that are available. An assessment has been completed using COBALT to understand the impacts on collisions as a result of the increase in traffic on the local highway network related to the Proposed Development. The full assessment is presented in Section 7 of the TA.

- 10.126 As a result of the increase in traffic flows on the local highway network, there are predicted to be on average an additional 2.2 collisions per year with 3.2 casualties per year, over a 60 year appraisal period⁶. The increase in fatalities is predicted to be 0.05 per year, with 0.03 serious casualties and 2.8 slight casualties per year. This level of increase in collisions and casualties is not considered to be significant.
- 10.127 Safety on the local highway network will be improved as a result of the Proposed Development in respect of the reduced speed limit along Whaddon Road. Improved facilities for pedestrians and cyclists, including additional off-road routes and controlled crossing points all seek to improve the safety of the network.
- 10.128 Utilising the PIC analysis set out above and professional judgement, it is considered that there will be a minor beneficial effect from the Proposed Development in relation to enhanced safety around the network.

Fear and Intimidation

- 10.129 There will be an increase in traffic associated with the operational stage of the Proposed Development on Whaddon Road through Newton Longville, as shown in Table 10.12 along with the impact classification of the link in line with the IEMA Guidelines. All roads within the study area have actual speeds over 20mph which are unlikely to reduce to below 20mph as a result of development. Speed has therefore been discounted from this assessment as it will remain a constant impact in all scenarios.

Table 10.12 2033 (18-hour daily) average hourly flow (AM and PM) - Fear and Intimidation

Road	2033						Pedestrian Protection Measures
	Base		Base + Dev		Change		
Whaddon Road through Newton Longville	386	Minor	468	Minor	No Change		None Required

- 10.130 It can be seen from Table 10.12 that Whaddon Road through Newton Longville will see no change in fear and intimidation as a result of the Proposed Development.
- 10.131 However, as detailed in paragraph 10.56, fear and intimidation also needs to be assessed on the proximity of the link to pedestrians and/or lack of protection caused by factors such as narrow pavement widths.
- 10.132 Within the Proposed Development all primary roads will have separate shared use footway/cycleways with a 0.5m (minimum) safety strip protecting pedestrians from vehicles. Whaddon Road will provide a new shared footway/cycleway (i.e. within the Site curtilage), between the Site access and Bottle Dump Roundabout, and Buckingham Road will also have new footways to connect the access with the existing provision. None of the links on the local highway network will have an increase in fear and intimidation that is considered to be significant.

⁶ 60 year appraisal period is set out in the DfT TAG Unit A1.1 guidance as a standard appraisal period for transport schemes

10.133 With regard to traffic speed, all of the links assessed will include traffic over 20mph therefore all links will be classed as 'extreme' for fear and intimidation in both the Base and Base + Development scenarios. With the classification of links unchanged between the Base and Base + Development scenarios, it is considered that the influence of speed as a result of the Proposed Development will not have a significant effect on fear and intimidation.

10.134 Based upon the analysis completed above and professional judgement, it is considered that there will be no significant adverse effects in relation to fear and intimidation.

Mitigation Measures

10.135 The mitigation proposed as part of the development is described and assessed in detail in Section 7 of the TA, with a summary provided herein.

Construction Stage

10.136 In order to minimise construction traffic impacts, the key embedded mitigation measure will be the implementation of a Construction Traffic Management Plan as part of the CEMP which will be secured by an appropriate planning condition, with an agreed route for construction traffic as associated with each phase. Provision will also be made for wheel wash facilities and road sweeping, in order to minimise any impacts from dust and dirt.

10.137 There will be a dedicated point of contact for enquiries/complaints, whereby neighbours and the local authorities will be kept fully informed of the construction programme and associated activities.

10.138 No additional mitigation measures are considered necessary however this will be monitored throughout the construction stage and in liaison with the local highway authorities.

Operational Stage - Completed Development

10.139 A package of embedded and additional mitigation measures will be provided by the Proposed Development to ensure that the residual cumulative impact will not be severe and that there will be no unacceptable impacts on road safety, in accordance with the NPPF.

10.140 The South West Milton Keynes Consortium is committed to the implementation of the Travel Demand Management Strategy for the Proposed Development. The strategy aims to minimise the impact of generated traffic with the implementation, maintenance and monitoring of Travel Plans for all the proposed land uses.

10.141 The Framework Travel Plan (FTP) submitted as part of the planning application includes details of the initial targets that will be set with regard to modal shift and details of the appropriate measures. The Public Transport Strategy is also a key element of the mitigation strategy as is the focus on providing excellent linkages and provision for pedestrians and cyclists.

10.142 Improvements to the local highway network would be secured by way of a s278 Agreement at the following locations:

- Whaddon Road - new access junction and shared footway/cycleway within the development curtilage;
- Buckingham Road - new access roundabout with associated footway/cycleway and Toucan Crossing link to existing Redway;
- A421 Standing Way - new access junction (left-in only);

- Bottle Dump Roundabout - Pegasus crossing to the south of Pearce Recycling; and
- Resurfacing of a section of the PROW at Weasel Lane throughout the Application Site and to the west of Whaddon Road.

10.143 Junction capacity improvements on the local highway network would also be implemented by BC and MKC on behalf of the Applicant through a financial contribution secured by a s106 planning obligation towards the following junctions or the MK Mobility Strategy 2036:

- B4034 Buckingham Road / Sherwood Drive / Water Eaton Road;
- A421 Tattenhoe Roundabout;
- A421 Emerson Roundabout;
- A421 Bleak Hall Roundabout;
- A421 Elfield Park Roundabout;
- A421 Windmill Hill Roundabout.

10.144 Further financial contributions secured as a s106 planning obligation will also be provided by the Applicant for the following improvements:

- Traffic calming measures through Newton Longville;
- Either a new bus service or extension of existing services, to connect the Application Site to Central Milton Keynes Station; and
- Provision of additional cycle parking at Bletchley Station.

10.145 As a result of introducing traffic calming features along the 'Whaddon Road through Newton Longville' link, it is considered that an increase in delay following would provide a beneficial effect by reducing vehicle speeds and discouraging 'through' traffic.

Residual Effects

10.146 It is acknowledged that there will be an increase in traffic generation as a result of the Proposed Development, however the increase in traffic is considered to be insignificant in EIA terms. The impact of additional traffic will be mitigated by the provision of the Travel Demand Management Strategy including the implementation, monitoring and maintenance of Travel Plans for various land uses and by the proposed highway/sustainable travel improvements.

10.147 The impact of the Proposed Development on severance, fear and intimidation, driver delay, pedestrian and cyclist amenity, and collisions and safety are not significant following the implementation of the proposed mitigation

10.148 Therefore, the residual cumulative impact of the Proposed Development (i.e. following the implementation of the proposed mitigation measures), would be minimal and will therefore not be significant in EIA terms.

Cumulative Effects

10.149 The assessment within this Chapter includes the cumulative development effects of the scheme in conjunction with the implementation of the East West Rail project and the proposed allocation of land at Shenley Park for 1,150 residential units and new a grid road towards Milton Keynes.

Summary

- 10.150 A worst case assessment of the transport network has been undertaken that considers the impacts of the Proposed Development on all modes during both the construction and operational phases. Due consideration has also been given to impacts on surrounding villages, highway safety and the strategic road network, as set out within this Chapter and within the TA.
- 10.151 A package of 'off-site' highway measures has been developed to mitigate the impact of the Proposed Development on the local highway network. At some locations, where there is considerable background traffic growth due to planned development in 2033, the benefit of the proposed mitigation is more limited. However, at these locations, the impact of wider growth in the area must also be considered and an appropriate solution identified. A proportionate, cost effective contribution towards the MK Mobility Strategy 2036 in lieu of physical improvement works at junctions would therefore contribute towards a more holistic and sustainable transport solution to be implemented by MKC in accordance with their Mobility Strategy 2018-2036.
- 10.152 Overall, the residual cumulative impacts of the development are not considered to be severe, and there would be no unacceptable impacts on highway safety. The assessment of the likely environmental effects of traffic generated by the Proposed Development has demonstrated that overall, there would be insignificant effects, both during the construction and operational phases of the Proposed Development.

References

- Ref. 10.1: National Planning Policy Framework – Department for Communities and Local Government, March 2018;
- Ref. 10.2: Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic' (GEART) – Institute of Environmental Assessment, 1993

11. AIR QUALITY

Introduction

- 11.1 This Chapter describes the potential air quality impacts associated with the Proposed Development. The Proposed Development is described in **Chapter 2**. The development will lead to some increase in traffic on local roads, which may impact upon air quality at existing residential properties. The new residential properties will also be subject to the impacts of road traffic emissions from the adjacent road network.
- 11.2 Air pollution in urban areas and close to roads is dominated by emissions from vehicles. The main pollutants emitted from road traffic, which are of concern to human health, are nitrogen dioxide (NO₂) and fine particulates (PM₁₀ and PM_{2.5}). These pollutants are most likely to approach their respective air quality objectives in proximity to major roads and in congested urbanised areas. As such, emissions of NO₂, PM₁₀, and PM_{2.5} associated with vehicles utilising roads nearby to the Proposed Development form the focus of this assessment.
- 11.3 There is also the potential for the construction activities to have an impact on air quality at both existing and new properties. The main pollutants of concern related to construction activities are dust and PM₁₀.
- 11.4 This report describes existing local air quality conditions at the Application Site and the predicted air quality in the future both with and without the Proposed Development. The assessment of traffic-related impacts focuses on the assessment years of 2026 and 2033, in line with the Transport Assessment submitted in support of the planning application and **Chapter 10** (Transport). 2026 represents the original completion year of the Proposed Development adopted for the 2015 application and has been included within ES for comparison purposes. 2033 represents the revised completion year for the Proposed Development that has been adopted to align with the timescales for the Aylesbury Vale District Council (AVDC) Local Plan. In reality it is anticipated that the Proposed Development will be fully built out by 2031. The assessment of construction impacts is for the duration of the whole construction period.
- 11.5 This report has been prepared taking into account all relevant local and national planning policy, guidance and regulations.
- 11.6 This chapter is supported by the following appendices:

Appendix 11.1 – Glossary of Terms;

Appendix 11.2 – IAQM Construction Dust Assessment Methodology;

Appendix 11.3 – Dispersion Model Approach and Verification;

Appendix 11.4 – Summary of Operational Traffic Data used in the Assessment;

Appendix 11.5 – Summary of Background Concentrations used in the Assessment;

Appendix 11.6 – Atmospheric Dispersion Modelling Results;

Appendix 11.7 – Construction Stage Dust Mitigation Measures; and,

Appendix 11.8 – Figures.

Legislation and Planning Policy Context

- 11.7 The legislation and planning policies relevant to this assessment address the local and national priorities with respect to air quality, dust and the protection of human health and ecological features. Their aim is to control the activities and sources that are likely to lead to, directly or indirectly, the deterioration of air quality.

Legislation and Regulation

EU Directive on Ambient Air Quality Directive (2008/50/EC)

- 11.8 The European Union (EU) Directive on ambient air quality (2008/50/EC) (**Ref. 11. 1**) is the primary driver for managing and improving air quality for each member state of the EU. The Directive sets legally binding limit values for concentrations in ambient (outdoor) air of pollutants that can impact public health, including NO₂ and particulates (PM₁₀, PM_{2.5}).
- 11.9 EU limit values are set for individual pollutants and comprise a concentration value, an averaging time over which it is to be measured, the number of allowed exceedances per year (if any), and a date by which it must be achieved. Some pollutants (e.g. PM₁₀) have more than one limit value covering different averaging periods.
- 11.10 The UK formally left the EU on 31st January 2020; however, the UK is currently in a period of transition until the end of 2020. It is expected that a review of the air quality legislation will be completed during this transition period and new air quality legislation for the UK will be brought forward.

Air Quality Regulations

- 11.11 The EU Directive has been transposed into English law through a series of Air Quality Regulations (**Ref. 11. 2**, **Ref. 11. 3** and **Ref. 11. 4**) the most recent iteration being the Air Quality Standards (Amendments) Regulations 2016 (**Ref. 11. 5**). Equivalent regulations exist in the other national administrations; Scotland, Wales, and Northern Ireland.
- 11.12 The responsibility for meeting the prescribed air quality limit values is devolved to the national administrations. In England, the Secretary of State for Environment, Food, and Rural Affairs has responsibility for adhering to the limit values, whilst the Department for Environment, Food and Rural Affairs (Defra) co-ordinate the assessment of compliance with limit values and development of Air Quality Plans for the UK (last updated in 2017).
- 11.13 Under the 2017 Air Quality Plan (**Ref. 11. 6**), certain local authorities are required under the Environment Act to undertake feasibility studies to identify options to deliver compliance with EU limit values in the shortest possible timeframe. Milton Keynes Council (MKC) is not identified in the plan as having to undertake a feasibility study.

Environment Act 1995 and the National Air Quality Strategy

- 11.14 Under the Environment Act 1995 (**Ref. 11. 8**), the UK Government and the devolved administrations are required to prepare and publish a national Air Quality Strategy (AQS). The most recent version of the Strategy was published in 2007 (**Ref. 11. 7**) and provides a framework for reducing air pollution within the UK with the aim of meeting the requirements of EU legislation. The AQS establishes the UK's air quality standards and objectives for a number of key air pollutants, to protect human health, vegetation and ecosystems. In addition, the AQS provides guidance, where needed, on air quality action planning at national, regional and local scales.
- 11.15 Air quality standards are concentrations recorded over a given averaging period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutants on health and the

environment. The air quality standards are based on levels recommended by the Expert Panel on Air Quality Standards (EPAQS) and the World Health Organisation (WHO). An objective is the target date on which exceedances of a standard must not exceed a prescribed number.

- 11.16 Local authorities in England are required to review air quality within their jurisdiction, under Part IV of the Environment Act 1995, and designate Air Quality Management Areas (AQMAs) where air quality standards are not being met and/or where air quality improvement is needed. Local authorities are then required to work towards achieving the national AQS objectives and standards, as prescribed in the Air Quality Standards Regulations 2010.
- 11.17 An Air Quality Action Plan must be established by the local authority outlining the measures to improve air quality and achieve the air quality limit values within the designated AQMA.

Relevant UK Air Quality Objectives & EU Limit Values

- 11.18 The UK has specific ratified objectives in relation to air pollutants transposed through EU and UK legislation in line with the Local Air Quality Management (LAQM) regime prescribed by Defra. The UK objectives vary from the targets recommended for policy makers in the World Health Organisation (WHO) Air Quality Guidelines published in 2005 (**Ref. 11. 9**), which do not have ratified legal status in the UK. For the purpose of this assessment the UK objectives have been used.
- 11.19 The national air quality objectives and EU limit values that the UK must comply with, for the pollutants considered in this Chapter, are presented in **Table 0.5**. The respective UK objective and EU limit value concentration standards and averaging periods are numerically identical for each of these pollutants and are based on air quality standards set for the protection of human health. The term 'objective' is used throughout this Chapter when referring to the objectives, limit values and air quality assessment levels.

Table 0.5 National Air Quality Objectives/EU Limit Values Set for the Protection of Human Health

Pollutant	Applies to	Objective	Measured as	Date to be achieved by and maintained thereafter	European Obligations	Date to be achieved by and maintained thereafter
Nitrogen Dioxide (NO₂)	UK	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005	200µg/m ³ not to be exceeded more than 18 times a year	01.01.2010
	UK	40µg/m ³	annual mean	31.12.2005	40µg/m ³	01.01.2010
Particulate Matter (PM₁₀)	UK (except Scotland)	40µg/m ³	annual mean	31.12.2004	40µg/m ³	01.01.2005
	UK (except Scotland)	50µg/m ³ not to be exceeded more than 35 times a year	24-hour mean	31.12.2004	50µg/m ³ not to be exceeded more than 35 times a year	01.01.2005

Pollutant	Applies to	Objective	Measured as	Date to be achieved by and maintained thereafter	European Obligations	Date to be achieved by and maintained thereafter
Particulate Matter (PM_{2.5})	UK (except Scotland)	25µg/m ³	annual mean	2020	Limit value 25µg/m ³	2010

- 11.20 The Defra Local Air Quality Management Technical Guidance (LAQM.TG16) (**Ref. 11. 8**) advises that exceedances of the 1-hour mean NO₂ objective are unlikely to occur where annual mean concentrations are below 60µg/m³, and it provides guidance on the approach that should be taken if either measured or predicted annual mean NO₂ concentrations are 60µg/m³ or above.
- 11.21 The Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) joint publication (**Ref. 11. 10**) and Defra guidance provides an approach to assessing the relationship between annual mean and 24-hour mean concentrations of PM₁₀. Potential exceedances of the 24-hour objective are more likely where the annual mean concentration is over 32µg/m³.

The Clean Air Strategy

- 11.22 Defra published the Government's Clean Air Strategy in 2019 (**Ref. 11. 11**). This document sets out measures aimed at tackling all sources of air pollution, making air healthier to breathe, protecting nature and boosting the economy. The strategy sits alongside three other UK government strategies: The Industrial Strategy, the Clean Growth Strategy and the 25 Year Environment Plan.
- 11.23 The strategy proposes tough new goals to cut public exposure to particulate matter pollution, as per the recommendation by the WHO. Comprehensive action is required from all parts of government and society to participate in order to meet these goals. In particular, the Clean Air Strategy states:

"New legislation will create a stronger and a more coherent framework for action to tackle air pollution. This will be underpinned by new England-wide powers to control major sources of air pollution, in line with the risk they pose to public health and the environment, plus new local powers to take action in areas with an air pollution problem. These will support the creation of Clean Air Zones to lower emissions from all sources of air pollution, backed up with clear enforcement mechanism."

The Environmental Protection Act 1990 - Control of Dust and Particulates Associated with Construction

- 11.24 Section 79 of the Environmental Protection Act 1990 (**Ref. 11. 12**) gives the following definitions of statutory nuisance relevant to dust and particles:
- "Any dust, steam, smell or other effluvia arising from industrial, trade or business premises or smoke, fumes or gases emitted from premises so as to be prejudicial to health or a nuisance"; and*
- "Any accumulation or deposit which is prejudicial to health or a nuisance".*
- 11.25 Following this, Section 80 says 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.

- 11.26 There are no statutory objective 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.

Local Policy

Milton Keynes Local Plan

- 11.27 MKC adopted a new Local Plan in March 2019, known as 'Plan:MK' (**Ref. 11. 13**), which contains the following policy relevant to air quality:

"Policy NE6 Environmental Pollution

Air Quality

Prevailing air quality and potential impacts upon air quality arising from air borne emissions, dust and odour associated with the construction and operation of a proposal (including vehicular traffic) will be considered when determining planning applications. Proposals that would result in or be subject to unacceptable risk to human health and the natural environment from air pollution, or would prejudice compliance with national air quality objectives, will be refused.

An Air Quality Assessment that demonstrates how prevailing air quality and potential impacts upon air quality have been considered, and how air quality will be kept to an acceptable standard through avoidance and mitigation, will be required for major and minor development proposals if any of the following apply:

The development is likely, due to the nature of the proposal, and through in-combination effects, to give rise to significant pollution;

The site is within an Air Quality Management Area;

The site is within 50 meters of a major road or heavily trafficked route;

The site is within proximity to a source of air pollution which could present a significant risk to human health; and/or

The type of development would mean its occupiers would be particularly sensitive to air pollution, such as schools, health care establishments or housing for older people."

Vale of Aylesbury Local Plan

- 11.28 AVDC is currently in the final stages of preparing a new Local Plan. The Plan has been submitted to the Government and is expected to be adopted in 2020. The Proposed Submission Draft of the plan (**Ref. 11. 14**) has the following policy relevant to air quality:

"NE6 Pollution, air quality and contaminated land

Air quality

Developments requiring planning permission that may have an adverse impact on air quality will be required to prove through a submitted air quality impact assessment that:

e. The effect of the proposal would exceed the National Air Quality Strategy Standards (as replaced) or

f. The surrounding area would not be materially affected by existing and continuous poor air quality.

Potentially polluting developments will be required to assess their air quality impact with detailed air dispersion modelling and appropriate monitoring. Air quality impact assessments are also required for development proposals that would generate an increase in air pollution and are likely to have a significantly adverse impact on biodiversity. Required mitigation will be secured through a planning condition or Section 106 agreement.”

- 11.29 As this draft Local Plan has not yet been adopted, the saved policies of the Aylesbury Vale District Local Plan (**Ref. 11. 15**) remain in existence. This Plan contains relatively little in terms of air quality. However, Paragraph 4.61 does state the following with regard to new development:

“New development may generate increased levels of traffic. This can affect local congestion levels, pollution levels and road safety. An integral element of the Plan is a concern to maintain and enhance the safety, amenity and accessibility of all those using highways. It is important, therefore, that roads, footways and cycleways in new developments are designed and maintained to a standard that provides a safe, convenient and accessible environment.”

National Policy and Guidance

National Planning Policy Framework

- 11.30 The Government’s overall planning policies for England are set out in the National Planning Policy Framework (NPPF) (**Ref. 11. 16**). The core underpinning principle of the Framework is the presumption in favour of sustainable development, defined as:

“... meeting the needs of the present without compromising the ability of future generations to meet their own needs.”

- 11.31 One of the three overarching objectives of the NPPF is that planning should “*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.*”

- 11.32 In relation to air quality, the following paragraphs in the document are relevant:

Paragraph 54, which states “*Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition.*”;

Paragraph 103, which states “*Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions and improve air quality and public health.*”;

Paragraph 170, which states “*Planning policies and decisions should contribute to and enhance the natural and local environment by: ...e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans.*”;

- Paragraph 180, which states “*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution*

on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.”; and,

- Paragraph 181, which states *“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.”.*

Guidance

- 11.33 A summary of the publications referred to in the undertaking of this assessment is provided below.

Local Air Quality Management Review and Assessment Technical Guidance

- 11.34 Defra has published technical guidance for use by local authorities in their review and assessment work. This guidance, referred to in this document as LAQM.TG16 (**Ref. 11. 8**), has been used where appropriate in the assessment presented herein.

Guidance on land-use planning and development control: Planning for air quality

- 11.35 EPUK and the IAQM have published guidance (**Ref. 11. 10**) that offers comprehensive advice on: when an air quality assessment may be required; what should be included in an assessment; how to determine the significance of any air quality impacts associated with a development; and, the possible mitigation measures that may be implemented to minimise these impacts.

Guidance on the assessment of dust from demolition and construction

- 11.36 This document (**Ref. 11. 17**) published by the IAQM was produced to provide guidance to developers, consultants and Environmental Health Officers on how to assess the impacts arising from construction activities. The emphasis of the methodology is on classifying sites according to the risk of impacts (in terms of dust nuisance, PM₁₀ impacts on public exposure and impact upon sensitive ecological receptors) and to identify mitigation measures appropriate to the level of risk identified.

National Planning Practice Guidance – Air Quality

- 11.37 This guidance (**Ref. 11. 18**) provides a number of guiding principles on how the planning process can take into account the impact of new development on air quality and explains how much detail air quality assessments need to include for proposed developments, and how impacts on air quality can be mitigated. It also provides information on how air quality is taken into account by local authorities in both the wider planning context of Local Plans and neighbourhood planning, and in individual cases where air quality is a consideration in a planning decision.

Assessment Methodology

- 11.38 This section provides details of the data and information supplied for the purposes of undertaking the air quality assessment. It also describes the adopted methodology for assessing and appraising the potential air quality impacts associated with the Proposed Development.

Scope of the Assessment

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

Review of AVDC and MKCs' latest review and assessment reports (**Ref. 11. 19** and **Ref. 11. 20**) and air quality data for the area surrounding the Proposed Development, including data from both AVDC and MKC, Defra, and the Environment Agency (EA);
 Desk study to confirm the locations of nearby existing receptors that may be sensitive to changes in local air quality;
 Review of the masterplan for the Proposed Development to establish the location of new sensitive receptors;
 and
 Review of the traffic data provided by WSP.

- 11.40 The scope of the assessment includes consideration of the potential impacts on local air quality resulting from:

Dust and particulate matter generated by on-site activities during the construction stage;
 Increases in pollutant concentrations as a result of exhaust emissions arising from construction traffic and plant; and
 Increases in pollutant concentrations as a result of exhaust emissions arising from traffic generated by the Proposed Development once operational.

- 11.41 In addition, the potential exposure of future residents of the Proposed Development to air quality will also be considered.

Consultation

- 11.42 Details of the consultation undertaken specific to this Chapter are included in **Table 0.6**.

Table 0.6 Consultation

Body/Organisation	Contact	Date and Form of Consultation	Summary
Aylesbury Vale District Council	Debbie Ferady Pollution Control Officer	WSP consultation letter, 30 March 2020. AVDC response 22 April 2020, email correspondence	AVDC confirmed that the methodology outlined within WSP consultation document meets AVSC approval.
Milton Keynes Council	David Parrish Senior Practitioner - Environmental Health	WSP consultation letter, 30 March 2020. MKC response 08 April 2020, email correspondence	MKC confirmed that WSP methodology using IAQM guidance and modelling is what they would normally recommend leaving the technical details up to the consultant.

Construction Stage Assessment

- 11.43 Dust comprises particles typically in the size range 1-75 micrometres (μm) in aerodynamic diameter and is created through the action of crushing and abrasive forces on materials. The larger dust particles fall out of the atmosphere quickly after initial release and therefore tend to be deposited in close proximity to the source of emission. Dust therefore, is unlikely to cause long-term or widespread changes to local air quality; however, its deposition on property and cars can cause 'soiling' and discolouration. This may result in complaints of annoyance through amenity loss or perceived damage caused, which is usually temporary.
- 11.44 The smaller particles of dust (less than $10\mu\text{m}$ in aerodynamic diameter) are known as particulate matter (PM_{10}) and represent only a small proportion of total dust released; this includes a finer fraction, known as $\text{PM}_{2.5}$ (with an aerodynamic diameter less than $2.5\mu\text{m}$). As these particles are at the smaller end of the size range of dust particles, they remain suspended in the atmosphere for a longer period of time than the larger dust particles and can therefore be transported by wind over a wider area. PM_{10} and $\text{PM}_{2.5}$ are small enough to be drawn into the lungs during breathing, which in sensitive members of the public could have a potential impact on health. However, it is worth noting that, according to the IAQM Construction Dust guidance (**Ref. 11. 17**), the majority of fugitive particulate emissions arising from construction sites are expected to relate to the coarser fractions (i.e. $\text{PM}_{2.5-10}$) with just 10-15% expected to comprise $\text{PM}_{2.5}$. The IAQM Construction Dust guidance therefore focusses on PM_{10} for the purposes of assessment.
- 11.45 An assessment of the likely significant impacts on local air quality due to the generation and dispersion of dust and PM_{10} during the construction stage has been undertaken using: the relevant assessment methodology published by the IAQM; the available information for this stage of the Proposed Development provided by the Consortium and Project Team; and, professional judgement.
- 11.46 The IAQM Construction Dust guidance methodology (**Ref. 11. 17**) assesses the risk of potential dust and PM_{10} impacts from the following four sources: demolition; earthworks; general construction activities and trackout. It takes into account the nature and scale of the activities undertaken for each source and the sensitivity of the area to an increase in dust and PM_{10} levels to assign a level of risk. Risks are described in terms of there being a low, medium or high risk of dust impacts. Once the level of risk has been ascertained, then site specific mitigation proportionate to the level of risk is identified, and the significance of residual effects determined. A summary of the IAQM Construction Dust guidance assessment methodology is provided in **Appendix 11.2**.
- 11.47 In addition to impacts on local air quality due to on-site construction activities, exhaust emissions from construction vehicles and plant may have an impact on local air quality adjacent to the routes used by these vehicles to access the Application Site and in the vicinity of the Application Site itself.
- 11.48 Indicative information on the number of vehicles associated with the various phases of site preparation and construction were provided by the Consortium. These showed that the Proposed Development is expected to generate a maximum of 43 Heavy Duty Vehicle Annual Average Daily Traffic (HDV AADT) movements and 371 Light Duty Vehicle (LDV) AADT movements during the construction stage. This is below the IAQM Planning guidance (**Ref. 11. 10**) indicative screening criteria and therefore detailed modelling of construction traffic has not been carried out. Instead, a qualitative assessment of their impact on local air quality has been undertaken using professional judgement and by considering the following:

The number and type of construction traffic and plant likely to be generated by this stage of the Development;
The number and proximity of sensitive receptors to the Application Site and along the likely routes to be used by construction vehicles; and

The likely duration of the construction stage and the nature of the construction activities undertaken.

Operational Stage Assessment

- 11.49 For the prediction of impacts due to emissions arising from road traffic during the operational stage of the Proposed Development, the dispersion model ADMS Roads (version 5.0.0.1) has been used. This model uses detailed information regarding traffic flows on the local road network, surface roughness, and local meteorological conditions to predict pollutant concentrations at specific receptor locations, as determined by the user. A detailed description of the approach to the modelling is provided in **Appendix 11.3** and a summary is provided below.

Model Scenarios and Traffic Data

- 11.50 The operational stage assessment has focussed on the following scenarios:

Baseline Year (2019);
Future Year 'Without' Proposed Development (2026 & 2033); and
Future Year 'With' Proposed Development (2026 & 2033).

- 11.51 2019 is the current baseline year and the year adopted for the purposes of model verification. As noted previously, 2026 represents the original opening year considered in the 2015 application and has been included to ensure consistency with the Transport Assessment. The 2026 traffic data therefore accounts for a fully completed development and represents a worst-case assessment. 2033 represents the assessed completion year for the Proposed Development and has been adopted to align with the timescales for the AVDC Local Plan, as agreed for the purposes of the Transport Assessment. In reality it is anticipated that the Proposed Development will be completed by 2031. The 2033 traffic flows will include a greater level of background traffic growth compared to 2031 and will therefore represent a conservative approach to the assessment, especially since background pollutant concentrations and emissions factors are not available beyond 2030, as described below in paragraph 11.56.
- 11.52 A summary of the traffic data provided by the project transport consultants (WSP) for each of the scenarios described in paragraph 11.50 is presented in **Appendix 11.4**. It includes details of the AADT flows, vehicle speeds (kph) and the percentage of HDVs applicable to the local road network in all assessment years considered.
- 11.53 The traffic flows for the 'Without Proposed Development' scenarios include flows from future committed developments in the locality of the Proposed Development but do not include any contribution to road traffic from the Proposed Development itself. The traffic flows for the 'With Proposed Development' scenarios include traffic contributions associated with the Proposed Development itself as well as those from future committed development.
- 11.54 The following committed developments are accounted for within the traffic flow data:
- Tattenhoe Park;
 - Kingsmead South; and
 - Shenley Park.

Vehicle Emissions inventories

- 11.55 The traffic data were used to develop emissions inventory databases for each pollutant (NO_x, PM₁₀ and PM_{2.5}) and scenario using Defra's Emissions Factors Toolkits (EFT) v9.0 (**Ref. 11. 21**). The EFT is used to calculate emissions factors arising from road traffic for all years between 2017 and 2030. In doing so, it considers various traffic flow characteristics, including:
- Road type (e.g. urban, rural, motorway);
 - Total vehicle flow by link (AADT);
 - Percentage of Heavy-Duty Vehicles (HDVs) per link; and
 - Average link speed (kph).
- 11.56 For the prediction of future year emissions, the toolkit takes into account factors such as anticipated advances in vehicle technology and fleet composition, such that vehicle emissions are assumed to reduce over time. As vehicle emission factors cannot be calculated for a future assessment year of 2033, and to ensure a conservative approach to the assessment, 2026 emissions have been adopted for all future year scenarios.
- 11.57 The EFT outputs for each respective scenario provided road link-specific pollutant emission rates (g/km/s), which were input to the ADMS-Roads model to enable prediction of pollutant concentrations at identified sensitive receptor locations. In addition, the following model inputs were required:
- Geometry of each affected road link;
 Hourly sequential meteorological data obtained from Bedford meteorological station for 2019; and
 Coordinates of each identified sensitive receptor at which the model calculated pollutant concentrations.
- 11.58 The Department for Transport (DfT) averaged national traffic count profile was applied to generate a diurnal profile representing the change in flow throughout a day. The profile was applied to the emissions within the air quality dispersal model in order to better account for the real world increases and decreases in emissions throughout a diurnal cycle.

Baseline Air Quality

- 11.59 Information on existing air quality has been obtained by collating the results of monitoring reported in Annual Status Reports published by AVDC and MKC as well as from monitoring data provided directly by AVDC's Environmental Health Officer. This covers both the study area and surrounding area; the latter being used to provide context for the assessment. The background concentrations across the study area have been defined using the national pollution maps published by Defra (**Ref. 11. 22**). These cover the whole country on a 1km x 1km grid and are available for all years between 2017 and 2030. To ensure consistency with the aforementioned approach to vehicle emission factors, 2026 background concentrations have been adopted for all future year assessment scenarios.
- 11.60 The Trunk A road component of the Defra national pollution maps was subtracted from the background concentrations during analysis using the sector removal approach (**Ref. 11. 23**), to avoid double counting of the modelled road emissions within the appropriate grid square.
- 11.61 Current and future projections of the annual mean EU limit value for roadside NO₂ in the study area have been identified using the concentrations published by Defra for 2019 and 2026. These are the maps, generated using Defra's Pollution Climate Mapping (PCM) model (**Ref. 11. 24**) and used by the UK Government, to report exceedances of the annual mean objectives to the EU.
- 11.62 The most recent report on Air Pollution in the UK 2018 (September 2019) (**Ref. 11. 25**) published by Defra reported that predicted roadside PM₁₀ and PM_{2.5} concentrations show no exceedances of the objective values anywhere in the UK.

Model Verification

- 11.63 Verification of the ADMS-Roads model outputs was undertaken through comparing the annual mean NO₂ base year (2019) model outputs with MKC's NO₂ monitoring results at their roadside diffusion tube monitoring site 'WER'. This enabled an appropriate model adjustment factor, derived with reference to LAQM.TG16 (**Ref. 11. 8**), to be calculated before being applied to model outputs to ensure the performance of the dispersion model was suitable.
- 11.64 Further detailed information of the modelling process, input data, and the model verification and adjustment procedure are presented in **Appendix 11.3**.

Assessing the Sensitivity of Receptors

- 11.65 Sensitive receptor locations are places where the public or sensitive ecological habitats may be exposed to pollutants resulting from activities associated with the Proposed Development. These will include locations sensitive to an increase in dust deposition and PM₁₀ exposure as a result of on-site construction activities, and locations sensitive to exposure to gaseous pollutants emitted from the exhausts of construction and operational traffic associated with the Proposed Development.

Construction Stage

- 11.66 The study area for the construction dust assessment was identified using the following screening criteria outlined in the IAQM Construction Dust guidance (**Ref. 11. 17**):
- 'Human receptors' within 350m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s); and/or,
- 'Ecological receptors' within 50m of the site boundary, or within 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s).
- 11.67 It is within these distances that the impacts of dust soiling and increased particulate matter in the ambient air will have the greatest impact on local air quality at sensitive receptors. There are human receptors within the defined distances. There are no statutory designated ecologically sites located within 50m of the Application Site boundary; however, ancient woodlands are present within the defined distances and have therefore been included as receptors within the assessment.

Operational Stage

- 11.68 In terms of locations that are sensitive to pollutants emitted from vehicles on the local road network, these will include places where members of the public are likely to be regularly present over the period of time prescribed in the Air Quality Strategy. For instance, on a footpath where exposure will be transient (for the duration of passage along that path), comparison with a short-term standard (i.e. 1-hour mean) may be relevant. At a school or adjacent to a private dwelling, where exposure may be for longer periods, comparison with a long-term standard (such as 24-hour mean or annual mean) may be more appropriate.
- 11.69 To complete the assessment of operational stage impacts, a number of 'receptors' representative of locations of relevant public exposure were identified at which pollution concentrations were predicted. Receptors have been identified adjacent to the roads that are likely to experience the greatest change in traffic flows or composition, and therefore the greatest impact in terms of NO₂, PM₁₀, and PM_{2.5} concentrations, as a result of the Proposed Development.

- 11.70 In terms of ecological receptors, the impact of vehicle emissions at designated sites (including Sites of Special Scientific Interest, Special Protection Areas, Special Areas of Conservation and Ramsar sites) within 200m of an affected road link should be considered within the air quality assessment, as stipulated by IAQM/EPUK Planning guidance (**Ref. 11. 10**). However, there are no nationally or internationally designated sites within 200m of the Proposed Development nor within 200m of links that meet the indicative screening criteria set out by the IAQM/EPUK Planning guidance, thus ecological receptors did not need to be included within the operational traffic assessment.
- 11.71 Details of the identified sensitive human health receptors included in the operational stage assessment are summarised in **Table 0.7** and depicted on **Figure 11.1 (in Appendix 11.8)**. All receptors were modelled at the standard “breathing height” of 1.5m above the ground level (LAQM.TG16). Receptors R1 to R23 represent existing sensitive receptors within the air quality study area, with receptors R101 to R106 representing locations of proposed residential units and community facilities, based on the masterplan for the Proposed Development.

Table 0.7 Receptor Locations included in the Local Air Quality Assessment

Receptor	Description/Address	Grid Reference	
		X	Y
R1	16, 17, 18 Penlee Rise, Tattenhoe, Milton Keynes	483916	233417
R2	Woodpond Farm, Buckingham Road, Whaddon, Milton Keynes	481704	232642
R3	14 Kelsey Close, Tattenhoe, Milton Keynes	482943	233546
R4	Giles Brook Primary School, Holborn Crescent, Tattenhoe, Milton Keynes	483046	233451
R5	34 Thrisk Gardens, West Bletchley, Bletchley, Milton Keynes	484312	232976
R6	89 Windmill Hill Drive, West Bletchley, Bletchley, Milton Keynes	484331	233017
R7	1 Ascot Place, Bletchley, Milton Keynes	484746	233051
R8	11-18 Knaresborough Court, Bletchley, Milton Keynes	484841	233087
R9	New Leys, Newton Longville, Milton Keynes	483941	232908
R10	Dangall House, Bletchley, Milton Keynes	484118	232932
R11	86 Whaddon Road, Newton Longville, Milton Keynes	484167	231584
R12	38 Whaddon Road, Newton Longville, Milton Keynes	484414	231576
R13	1A Church End, Newton Longville, Milton Keynes	484866	231428
R14	2 Newton Road, Bletchley, Milton Keynes	485600	233246
R15	140 Buckingham Road, Milton Keynes	485662	233286
R16	1a Cottingham Grove, West Bletchley, Bletchley, Milton Keynes	486507	233415
R17	31 Cropwell Bishop, Emerson Valley, Milton Keynes	484362	234072

Receptor	Description/Address	Grid Reference	
		X	Y
R18	41 Quantock Crescent, Emerson Valley, Milton Keynes	484873	234530
R19	23 Elmhurst Close, Furzton, Milton Keynes	485709	235603
R20	Thrift Farm, Buckingham Road, Milton Keynes	480841	232511
R21	The Bungalow, Bletchley Road, Milton Keynes	479956	232511
R22	Crossroads Bungalow, Buckingham Road, Little Horwood, Milton Keynes	478933	232355
R23	Hillside Cottage, Buckingham Road, Little Horwood, Milton Keynes	477583	232260
R101	Dev 1 – Future Receptor	483375	231949
R102	Dev 2 – Future Receptor	482661	232452
R103	Dev 3 – Future Receptor	482454	232594
R104	Dev 4 – Future Receptor	482972	232737
R105	Dev 5 – Future Receptor	483834	232603
R106	Dev 6 – Future Receptor	483675	232821

Determining the Significance of Effect

Construction Stage

- 11.72 The IAQM Construction Dust guidance assessment methodology recommends that significance criteria are only assigned to the identified risk of dust impacts occurring from a construction activity with appropriate mitigation measures in place. This guidance states that the application of effective mitigation should prevent any significant effects occurring to sensitive receptors and therefore the residual effect will normally be negligible.
- 11.73 For the assessment of the impact of exhaust emissions from plant used on-site and construction vehicles accessing and leaving the Proposed Development on local concentrations of NO₂ and particulate matter, the significance of residual effects have been determined using professional judgement and the principles outlined in the EPUK/IAQM Planning guidance (**Ref. 11. 10**), which are described below.

Operational Stage

- 11.74 The results of the local air quality impact assessment have been evaluated with reference to the guidelines published in the EPUK/IAQM Planning guidance (**Ref. 11. 10**). The matrix of impact descriptors, adapted from the EPUK/IAQM Planning guidance, that was used for annual mean concentrations is given in **Table 0.8**. This provides the basis to assess the potential significance of the Proposed Development on local air quality.
- 11.75 The EPUK/IAQM Planning guidance describes the magnitude of incremental change (Without Development versus With Development) in the pollutant concentration at each individual sensitive receptor as a proportion of a relevant air quality objective.

- 11.76 The incremental change at each receptor is examined in the context of the total predicted annual mean concentration and its relationship with the air quality objective (see **Table 0.8.**). This allows an impact descriptor to be assigned to each receptor, with overall significance of the effects of any impacts assigned by professional judgement.
- 11.77 For the hourly mean NO₂ objective, the LAQM.TG16 (**Ref. 11. 8**) states that exceedances are unlikely to occur when the annual mean is below 60µg/m³.

Table 0.8 Impact Descriptors for Individual Receptors

Annual Mean Concentration at Receptors in Assessment Year	Percentage Change in Concentration Relative to Air Quality Objective			
	1%	2-5%	6-10%	>10%
75% or less of objective	Negligible	Negligible	Slight	Moderate
76-94% of objective	Negligible	Slight	Moderate	Moderate
95-102% of objective	Slight	Moderate	Moderate	Substantial
103-109% of objective	Moderate	Moderate	Substantial	Substantial
110% or more of objective	Moderate	Substantial	Substantial	Substantial

Notes

Where the %change in concentrations is <0.5%, the change is described as 'Negligible' regardless of the concentration.

When defining the concentration as a percentage of the air quality objective, 'without development' concentration should be used where there is a decrease in pollutant concentration and the 'with development;' concentration where there is an increase.

Where concentrations increase, the impact is described as adverse, and where it decreases as beneficial.

- 11.78 The following terms have been used in this Chapter to define the significance of the effects identified and are applied to both beneficial and adverse effects.
- **Substantial effect:** where the Proposed Development could be expected to cause a substantial magnitude of change (either beneficial or adverse) to annual mean NO₂, PM₁₀ or PM_{2.5} concentrations at existing sensitive locations (such as residential dwellings or schools);
 - **Moderate effect:** where the Proposed Development could be expected to cause a moderate magnitude of change (either beneficial or adverse) to annual mean NO₂, PM₁₀ or PM_{2.5} concentrations at existing sensitive locations;
 - **Minor effect:** where the Proposed Development could be expected to cause a slight magnitude of change (either beneficial or adverse) to annual mean NO₂, PM₁₀ or PM_{2.5} concentrations at existing sensitive locations; and,
 - **Negligible:** where no discernible effect is expected because of the Proposed Development on receptors (e.g., a negligible magnitude of change to annual mean NO₂, PM₁₀ and PM_{2.5} concentrations at existing sensitive locations).

- 11.79 Effects that are classified as moderate or above are considered to be significant. Effects classified as below moderate are considered to be not significant, as explained in **Chapter 4**.

Limitations and assumptions

- 11.80 There are uncertainties associated with both measured and predicted concentrations. The model (ADMS-Roads) used in this assessment relies on input data (including predicted traffic flows), which also have

uncertainties associated with them. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS-Roads model will not take into account.

- 11.81 To reduce the uncertainty associated with predicted concentrations, model verification has been carried out following guidance set out in LAQM.TG16. As the model has been verified against local monitoring data and adjusted accordingly, there can be reasonable confidence in the predicted concentrations. See **Appendix 11.3** for more detail on the model verification completed for this study.
- 11.82 Model verification was undertaken using one roadside diffusion tube site operated by MKC within the modelled air quality study area. At the time of the assessment, 2019 bias-adjusted data was not available from the MKC administrative area. As such, the 2018 data from the roadside diffusion tube has been annualised forward to 2019 to correspond with the assessment base year and meteorological data, following the methodology provided by Defra in LAQM.TG16. It should be noted, as there is limited monitoring undertaken by MKC within the study area, it was originally intended that additional data from a site-specific monitoring study would also be used to inform the model verification process. However, due to the COVID19 pandemic, it has not been possible to complete the monitoring survey.
- 11.83 At present, the technical assessment tools provided by Defra for the calculation of future year vehicle emission factors and background pollutant concentrations do not enable predictions beyond the year 2030. For the purposes of the assessment, 2026 background concentrations and emission factors have been adopted for all future year scenarios, including the assessed completion year of 2033. As background concentrations and emission factors are expected to improve up to and beyond 2030, the approach to the assessment is considered conservative.

Baseline Conditions

- 11.84 The majority of the site is located within AVDC's administrative area (see **Figure 11.2** in **Appendix 11.8**). However, it shares a border with the MKC administrative area. As such air quality information from both local authorities has been considered.

Air Quality Management Areas

- 11.85 There are no Air Quality Management Areas (AQMAs) situated within 18km of the Proposed Development within the jurisdiction of AVDC or MKC.

Local Authority Monitoring

- 11.86 AVDC operates one continuous automatic air quality monitor and MKC operates three, all of which monitor NO₂ and one of which monitors PM₁₀. However, none of these monitoring sites are in proximity to the Application Site and as such results from these locations will not be representative of conditions at the site.
- 11.87 Both Councils undertake diffusion tube monitoring at various locations throughout each district. Annual mean concentrations from diffusion tubes within 5km of the Application Site are shown in **Table 0.9** and **Figure 11.2** (in **Appendix 11.8**), all of which are operated by MKC. AVDC does not undertake diffusion tube monitoring at any location within 5km of the Application Site. At the time of writing, 2019 diffusion tube monitoring data was not available from MKC.

Table 0.9 Annual mean NO₂ Data from Diffusion Tubes within 5km of the Application Site

Site ID	Type	OS Grid Reference		Distance from Application Site (km)	Annual Mean NO ₂ Concentration (µg/m ³)		
		X	Y		2016	2017	2018
WER1 WER2	Roadside	487395	233174	3.3	-	20.9	20.0
MM1 MM2	Urban Background	486332	236228	4.0	24.1	25.7	22.6
DD1 DD2	Roadside	488118	233814	4.1	22.6	20.7	22.8
Annual mean objective						40	
-Indicates that the monitoring site had not yet been commissioned.							

- 11.88 The data from **Table 0.9** shows that the objective for annual mean NO₂ was not exceeded at any monitoring sites within 5km of the Application Site between 2016 and 2018.

Background Air Quality Data

- 11.89 Background pollutant concentrations for NO₂, PM₁₀ and PM_{2.5} were obtained from Defra's national background maps (**Ref. 11. 22**) for the 1km x 1km grid square encompassing the Application Site. Data were obtained for 2019 and 2026, as summarised in **Table 0.10**. Full details of the background concentrations used within this assessment can be found in **Appendix 11.5**. As Defra's background maps are only available up until the year 2030, 2026 values have therefore been adopted for the assessment year 2033 to ensure a conservative assessment. All the annual mean background pollutant concentrations are well below the relevant objectives for each of the assessment years.

Table 0.10 Background Concentrations (µg/m³)

Pollutant	2019	2026
Defra Backgrounds without Sector Removal		
NO ₂ (µg/m ³)	8.8 – 14.5	6.5 – 7.2
PM ₁₀ (µg/m ³)	13.6 – 16.0	12.7 – 15.0
PM _{2.5} (µg/m ³)	9.2 - 10.9	8.4 – 10.0
Defra Backgrounds with Sector Removal		
NO ₂ (µg/m ³)	8.5 – 13.7	6.8 – 10.7
PM ₁₀ (µg/m ³)	13.6 – 16.0	12.7 – 16.0
PM _{2.5} (µg/m ³)	9.1 – 10.8	8.4 – 10.0

National Pollution Climate Model Links

- 11.90 The Defra Pollution Climate Mapping (PCM) (**Ref. 11. 24**) model is used to fulfil the UK's requirements to report on the concentrations of particular pollutants in the atmosphere to the EU. The PCM model contains key road sources across the UK for which projected representative roadside pollutant concentrations are published.
- 11.91 To assess the status of UK air quality, Defra run a PCM model for each pollutant within the EU Air Quality Directive as a base year model and as future year projection models. The PCM provides outputs as a 1km x 1km grid of the UK background air pollutant concentrations and at approximately 9,000 roadside locations.
- 11.92 The latest national modelling undertaken by Defra to assess compliance with EU limit values (**Ref. 11. 22**) includes a section of the A421 (Standing Way), 1.2km to the northeast of the Proposed Development. The annual mean NO₂ concentrations adjacent to this road for the baseline scenario (2019) and 2026 assessment year are presented in **Table 0.11** below.

Table 0.11 Defra National Modelling Results for Roadside Annual Mean NO₂ Concentrations (µg/m³)

Road	Census ID	Annual Mean NO ₂ Concentration (µg/m ³)	
		2019	2026
A421	17827	29.4	20.6

- 11.93 The results from **Table 0.11** show that annual mean concentrations are predicted to be below the annual mean objective in the baseline year. Concentrations are then expected to decrease year on year, remaining below the annual mean objective by 50% in the assessment year of 2026. Therefore, no further assessment of the potential impact of the Proposed Development upon PCM compliance is required.

Summary of Baseline Conditions

- 11.94 The Proposed Development is not located within or near any AQMAs. Both AVDC and MKC operate an extensive network of continuous monitors and passive diffusion tubes, however, few of these are in proximity to the Application Site. Data presented in **Table 0.9** demonstrates that annual mean NO₂ concentrations from monitors closest (within 5km) to the Application Site are all below the respective annual mean objective.

Likely Significant Effects: Construction Stage

Potential Dust Emission Magnitude

- 11.95 The IAQM Construction Dust guidance assessment methodology has been used to determine the potential dust emission magnitude for the following four different dust and PM₁₀ sources: demolition; earthworks; construction; and, trackout⁷. The findings of the assessment are presented below.

Demolition

- 11.96 The Application Site is primarily a greenfield site. There are anticipated to be no demolition activities on-site aside from the removal of a single agricultural structure; demolition activities will therefore be minimal. As the total volume of buildings to be demolished will be <20,000m³, the potential dust emission magnitude will be 'small' for demolition activities.

Earthworks

⁷ The transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network.

- 11.97 The Application Site covers an area substantially greater than 10,000m² and most of this will be subject to earthworks, involving the levelling and preparation of the site for construction. The earthworks will last approximately six to twelve months, and dust will arise mainly from vehicles travelling over unpaved ground and the handling of dusty materials. There will be between 5 and 10 heavy earth moving vehicles active at any one time and between 20,000 and 100,000 tonnes of material will be moved. Therefore, the potential dust emission magnitude is considered to be 'large' for earthwork activities.

Construction

- 11.98 The Proposed Development will involve construction of up to 1,795 dwellings, 60-unit care home, employment land uses (B1), a neighbourhood area comprising retail and community use, a GP centre and a primary school, community space and all associated infrastructure. Total building volume will therefore exceed 100,000m³. Construction materials will comprise a mixture of brick or block, concrete, metal cladding and timber. Dust will arise from vehicles travelling over unpaved ground, the handling and storage of dusty materials, and from the cutting of concrete. However, no on-site concrete batching or sandblasting will be undertaken. The dust emission magnitude class for construction is therefore considered to be 'large'.

Trackout

- 11.99 It is estimated that there will be between 10 and 50 outward HDV movements associated with the construction stage on any given day, travelling over potentially dust surface material within the site (i.e. soil with a high clay content) and an estimated unpaved road length >100m. The site access for vehicles during the construction stage will be via the new Whaddon Road access and the new Buckingham Road access. Construction vehicles are expected to travel from the site to the A421 with 75% travelling east towards Milton Keynes and the remaining 25% travelling west toward Buckingham. The dust emission magnitude class for trackout is considered to be 'large'.
- 11.100 A summary of the potential dust emission magnitude for each construction activity is presented in **Table 0.12**.

Table 0.12 Potential Dust Emission Magnitude

Activity	Dust Emission Magnitude
Demolition	Small
Earthworks	Large
Construction	Large
Trackout	Large

Sensitivity of the Area

- 11.101 A wind rose generated using 2019 meteorological data from the Bedford meteorological site (**Appendix 11.3**) shows that the prevailing wind direction is from the south west. Therefore, receptors located to the northeast of the Application Site, such as those on Wentworth Way and in the south west corner of Bletchley (see **Figure 11.3 in Appendix 11.8**), are more likely to be affected by dust and particulate matter emitted and re-suspended during the construction stage.

- 11.102 **Figure 11.3** (in **Appendix 11.8**) shows the area of the site and all land uses within a 350m radius and the intermediary distances considered within the IAQM Construction Dust guidance (i.e. 20m, 50m and 100m). It also illustrates receptors within 50m of the construction traffic routes, up to 500m of the site access points.
- 11.103 Under low wind speed conditions, it is likely that the majority of dust would be deposited in the area immediately surrounding the source. As shown in **Figure 11.3** (in **Appendix 11.8**), there are less than 10 high sensitivity receptors (i.e. residential properties) within 20m of the site boundaries, with the majority of high sensitivity receptors located over 100m from the Application Site boundary. **Figure 11.3** (in **Appendix 11.8**) also illustrates that there is an ancient woodland within 20m of the north western boundary of the Proposed Development and within 20m of the route construction traffic will take along the A421 westbound towards Buckingham.
- 11.104 Due to the scale of the Proposed Development, it will be constructed in phases over a period of approximately ten years. Therefore, properties constructed in the earlier phases are likely to become occupied prior to completion of the Proposed Development and may also be sensitive to impacts associated with on-going construction activities within the Application Site. However, the location of dust-generating activities will vary throughout the construction stage and therefore not all receptors will be affected at all times. Furthermore, it is anticipated that all earthworks activities will be completed prior to first occupation, and therefore will not have an adverse effect on proposed human health receptors.
- 11.105 With the exception of the demolition works (which are minimal) the overall sensitivity of the surrounding area (including proposed receptors within the site) to dust soiling is considered to be 'medium'.
- 11.106 With regards to the human-health effects of PM₁₀, given the background concentrations for the local area are <24µg/m³, the overall sensitivity of the surrounding area to changes in PM₁₀ is considered to be 'low'.
- 11.107 Regarding trackout, no human health receptors were identified within 20m of the routes taken by construction vehicles on the public highway up to 500m from the construction site access points with the exception of one high-sensitivity residential receptor to the north east located approximately 50m from the proposed A421 haulage routes, within 500m of the site access points on Penlee Rise, Bletchley.
- 11.108 Ancient woodlands are categorised as receptors of low sensitivity to construction dust.
- 11.109 Taking the above into account and following the IAQM Construction Dust guidance assessment methodology, the sensitivity of the area to changes in dust and PM₁₀ has been derived for each of the construction activities considered. The results are shown in **Table 0.13**.

Table 0.13 Sensitivity of the Study Area

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

Risk of Impacts

11.110 The predicted dust emission magnitude has been combined with the defined sensitivity of the area to determine the risk of impacts during the construction stage, prior to mitigation. **Table 0.14** below provides a summary of the risk of dust impacts for the Proposed Development. The risk category identified for each construction activity has been used to determine the level of mitigation required.

Table 0.14 Summary Dust Risk Table to Define Site Specific Mitigation

Potential Impact	Sensitivity of the Surrounding Area			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Negligible	Medium	Medium	Low
Human Health	Negligible	Low	Low	Low
Ecological	Negligible	Low	Low	Low

11.111 The results of the dust risk assessment indicate that there is a **medium to low** risk of off-site impacts on local air quality during construction of the Proposed Development. Taking the highest rating for potential impact, mitigation measures for a medium risk construction site are deemed appropriate to manage potential dust impacts on the surrounding area (see paragraphs 11.140, 11.141 and 11.142).

Construction Vehicles & Plant

11.112 The greatest impact on air quality due to emissions from vehicles and plant associated with the construction stage will be in the areas immediately adjacent to the site access.

11.113 Final details of the exact plant and equipment likely to be used on site will be determined by the appointed contractor, it is considered likely to comprise forklift, excavators, dozer, soil compactors, dumpers, asphalt paver, HIAB loader crane, road wagon, a permanent road marking machine and trucks. The number of plant and their location within the construction site are likely to be variable over the construction period.

11.114 It is anticipated that construction traffic will access the site at two locations. The first is the Whaddon Road site access via the priority junction to the west of the Application Site. The second site access is located on the B4034 Buckingham Road to the north east of the Application Site. Construction vehicles will travel on to the A421 where 75% of vehicles will travel east towards Milton Keynes and 25% will travel west towards Buckingham. Due to the size of the Proposed Development and nature of construction works; construction traffic volumes will be low within the context of existing traffic flows on these roads.

11.115 Future background levels of relevant pollutants (NO₂, PM₁₀ and PM_{2.5}, see **Table 11.5**) are predicted to be well below the respective annual mean objectives. Based on the current local air quality in the area, the proximity of sensitive receptors to the roads likely to be used by construction vehicles, the likely numbers of construction vehicles discussed in paragraph 11.48 and plant that will be used, and professional judgement, the local air quality impact associated with emissions from construction vehicles and plant are expected to be **negligible** and the effects therefore, **not significant**.

Likely Significant Effects: Operational Stage

11.116 This section presents a summary of the assessment results. The predicted pollutant concentrations for each scenario at all modelled discrete sensitive receptor locations are tabulated in **Appendix 11.6**.

11.117 The summary is presented separately for the existing sensitive receptor locations identified off-site and the receptors identified within the Proposed Development representative of potential future exposure to air pollution.

Existing Sensitive Receptors

Annual Mean NO₂ Concentrations

11.118 The air quality objective for annual mean NO₂ concentrations is 40µg/m³. The results of the assessment show that in the 2019 baseline year predicted concentrations do not exceed the annual mean objective at any of the modelled receptors. The highest predicted concentration is 29.0µg/m³ at receptor R15, which is located at 140 Buckingham Road.

11.119 In 2026 and 2033, in both the 'With' and 'Without' Proposed Development scenarios, there are predicted to be no exceedances of the annual mean objective for NO₂. In all future scenarios, the highest annual mean NO₂ concentrations are predicted to occur in the 'With Development' scenarios at receptor R15 (140 Buckingham Road) and are 19.4µg/m³ in 2026 and 19.8µg/m³ in 2033 respectively.

11.120 The greatest increase in annual mean NO₂ concentrations, as a result of the Proposed Development being in operation, is predicted to occur in 2026 at receptor R7 which is located at 1 Ascot Place, Bletchley. This increase is 1.5µg/m³ and equates to a **negligible** impact on local air quality with reference to **Table 0.8**.

11.121 Similarly, in 2033 the maximum predicted increase in NO₂ of 1.4µg/m³ is predicted to occur at receptor R7 (1 Ascot Place, Bletchley), which equates to a **negligible** local air quality impact.

11.122 Overall, the predicted impact of the changes in vehicle emissions associated with the operation of the Proposed Development on annual mean NO₂ concentrations at all modelled receptors locations is **negligible**. Therefore, the operation of the Proposed Development on local annual mean NO₂ concentrations **will not be significant**.

Hourly Mean NO₂ Concentrations

11.123 The annual mean NO₂ concentrations predicted by the model in all scenarios were all below 60µg/m³, and therefore hourly mean NO₂ concentrations are unlikely to cause a breach of the hourly mean objective (200µg/m³).

11.124 The impact of the Proposed Development on hourly mean NO₂ concentrations at existing sensitive receptors will be **negligible**. Consequently, the effect of the Proposed Development on local hourly mean NO₂ concentrations will be **not significant**.

Annual Mean PM₁₀ Concentrations

11.125 The air quality objective for annual mean PM₁₀ concentrations is 40µg/m³. The results of the assessment show that in the 2019 baseline scenario, predicted concentrations are well below the annual mean objective at all of the modelled receptors. The highest predicted annual mean PM₁₀ concentration is 18.2µg/m³ at receptor R15 (140 Buckingham Road).

11.126 In 2026 and 2033, in both the 'With' and 'Without' Proposed Development scenarios, there are predicted to be no exceedances of the annual mean objective for PM₁₀. The highest annual mean concentration is predicted to occur at receptor R15 (18.2µg/m³) in the 'with' Proposed Development scenario for 2033.

- 11.127 The greatest increase in annual mean PM₁₀ concentrations in 2026, of 0.5µg/m³, as a result of the Proposed Development being in operation, is predicted to occur at receptor R7 located at 1 Ascot Place, Bletchley. This magnitude of increase equates to a **negligible** impact on local air quality with reference to **Table 0.8**.
- 11.128 Similarly, the maximum predicted increase in annual mean PM₁₀ in 2033, of 0.4µg/m³, is predicted to occur at receptor R7, which equates to a **negligible** local air quality impact.
- 11.129 Overall, the predicted impact of the operation of the Proposed Development on annual mean PM₁₀ concentrations is **negligible**. Consequently, the predicted effect of the Proposed Development on local annual mean PM₁₀ concentrations will be **not significant**.

Daily Mean PM₁₀ Concentrations

- 11.130 The air quality objective for daily mean PM₁₀ concentrations is 50µg/m³ to be exceeded no more than 35 times a year. The results of the dispersion modelling indicate that the highest number of exceedance days was predicted at receptor R15 (140 Buckingham Road) where 2 exceedance days were predicted in the 2033 'with' Proposed Development scenario.
- 11.131 The increased emissions associated with the Proposed Development result in either no changes, or an increase of 1 day, to the number of days experiencing concentrations greater than 50µg/m³ in both 2026 and 2033. As such, the impact on daily mean PM₁₀ concentrations is thus also **negligible**. Consequently, the predicted effect of the Proposed Development on local daily mean PM₁₀ concentrations will be **not significant**.

Annual Mean PM_{2.5} Concentrations

- 11.132 Predicted annual mean concentrations of PM_{2.5} are all well below the objective of 25µg/m³ in all modelled scenarios. The highest predicted concentration is 12.1µg/m³, which is predicted at receptor R15 (140 Buckingham Road) in the 2019 baseline scenario.
- 11.133 The greatest increase in annual mean PM_{2.5} concentrations, of 0.3µg/m³, as a result of the Proposed Development being in operation, is predicted to occur at receptor R7 in 2026 and 2033. The magnitude of the predicted increases equates to a **negligible** impact on local air quality (see **Table 0.8**).
- 11.134 Overall, the predicted impact of the changes in vehicle emissions associated with the operation of the Proposed Development on annual mean PM_{2.5} concentrations at all selected sensitive receptors is **negligible** and the effects are **not significant**.

Sensitive Receptors within the Proposed Development Site

- 11.135 The predicted concentrations of NO₂, PM₁₀ and PM_{2.5} are all well below the relevant air quality objectives at each of the proposed receptors located within the Application Site boundary.
- 11.136 The highest predicted annual mean NO₂ concentration within the Site is 12.8µg/m³ in 2019, with the highest predicted annual mean PM₁₀ and PM_{2.5} concentrations being 15.7µg/m³ and 10.0µg/m³, respectively in 2019 at the same location.

Potential impacts on nearby committed developments

- 11.137 Receptor R2 (Woodpond Farm) is located on the southern boundary of the Shenley Park development and is therefore representative of a worst-case location for future receptors.
- 11.138 Predicted concentrations at receptors R3 (14 Kelsey Close) and R4 (Giles Brook Primary School) will be indicative of those that can be expected to occur on the eastern boundary of the Tattenhoe Park and Kingsmead South development. These developments are understood to be due for completion in 2025 and 2019 respectively.
- 11.139 The predicted concentrations of NO₂, PM₁₀ and PM_{2.5} are all well below the relevant air quality objectives at each of these receptor locations in all modelled scenarios. In addition, the magnitude of change at these receptors between the 'With' and 'Without Proposed Development' scenarios is **negligible**. Consequently, it is expected that the effect of the Proposed Development on nearby committed developments will be **insignificant**.

Mitigation Measures

Construction

- 11.140 Measures to mitigate dust and PM₁₀ emissions will be required during the construction stage of the development in order to reduce impacts upon nearby sensitive receptors.
- 11.141 The Application Site has been identified as a medium risk site. The IAQM Construction Dust guidance (**Ref. 11. 17**) details measures that should be employed, as appropriate, to reduce the impact of construction impacts on local air quality. This reflects best practice and has been used, together with the professional experience of the consultant and the findings of the dust impact assessment, to draw up a set of mitigation measures that should be incorporated into the specification for the works. These measures are described in **Appendix 11.7**.
- 11.142 The mitigation measures will be written into a Dust Management Plan (DMP) as required in the Construction Environmental Management Plan (CEMP). Where mitigation measures rely on water, it is expected that only sufficient water will be applied to damp down the material. There should not be any excess to potentially contaminate local watercourses.

Operational

- 11.143 The change in pollutant concentrations attributable to traffic emissions associated with the operation stage of the Proposed Development (i.e. impacts on local air quality) are **negligible**. Furthermore, the modelled pollutant concentrations at future receptors within the Application Site are well below the relevant objectives for NO₂, PM₁₀ and PM_{2.5}. As such, future residents will be exposed to unacceptable air quality and no operational stage mitigation measures are proposed.

Residual Effects

Construction

- 11.144 The IAQM Construction Dust guidance is clear that, with appropriate mitigation in place, the residual effect will normally be '**not significant**'. The mitigation measures set out in **Appendix 11.7** are based on the IAQM Construction Dust guidance.

- 11.145 The residual effects of dust and PM₁₀ generated by construction activities following the application of the mitigation measures set out in **Appendix 11.7** and good site practice are negligible (**not significant**).
- 11.146 The residual effects of emission to air from construction vehicles and plant on local air quality are negligible (**not significant**).

Operational

- 11.147 The residual effects of the Proposed Development on air quality will be **negligible (not significant)** for all pollutants considered within the assessment.

Cumulative Effects

Construction

- 11.148 There is potential for concurrent construction activities to occur at the Proposed Development site and on adjacent land allocated for residential land use, notably Shenley Park, Kingsmead South and Tattenhoe Park, which are located to the north and north west of the site. This could potentially result in cumulative dust effects, including amenity and human health, at identified sensitive receptors in the absence of appropriate mitigation.
- 11.149 In addition, cumulative effects may also arise where construction traffic associated with each site travel along the same routes on the local road network. Where sensitive receptors are located along routes shared by construction traffic, they may be exposed to a temporary increase in pollutants associated with the exhaust emissions.
- 11.150 However, with the provision of the aforementioned construction stage mitigation measures (**Appendix 11.7**), and assuming any adjacent allocated site adopts a similarly good site practice approach to construction mitigation, the cumulative effects of any concurrent construction activities are expected to be **insignificant**.

Operational

- 11.151 Traffic flows from other committed developments were included in the 'With Proposed Development' scenario in 2026 and 2033. As such, the potential cumulative air quality effects associated with additional vehicle flows generated by other developments, combined with the Proposed Development, have been accounted for in this assessment. Based on the results of the assessment, the cumulative effects on local air quality will be **negligible (not significant)**.

Summary

- 11.152 The construction works have the potential to generate dust and particulates. During construction it will therefore be necessary to apply a package of mitigation measures secured within the CEMP to minimise dust and particulate emissions. With these measures in place, it is expected that any residual effects will be **not significant**. Mitigation will be secured through the application of appropriate planning conditions.
- 11.153 A quantitative assessment of the potential impacts attributed to the operational stage of the Proposed Development was undertaken using the ADMS-Roads atmospheric dispersion model. The model was used to predict the changes in NO₂, PM₁₀ and PM_{2.5} concentrations resulting from traffic associated with the Proposed Development.

- 11.154 The results show that the Proposed Development would cause **negligible** increases in pollutant concentrations at all identified sensitive receptors in the local area and would not cause any exceedances of the statutory objectives. Furthermore, the results reported at receptors within the Application Site demonstrate that future occupants will not be exposed to elevated levels of air pollution. Thus, the Proposed Development is considered suitable for the proposed land uses.
- 11.155 Based on the assessment significance criteria, the residual effects of the Proposed Development are predicted to be negligible for all pollutants assessed and the environmental impact is **not significant**.
- 11.156 The Proposed Development complies with national and local policy for air quality.

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12. NOISE AND VIBRATION

Introduction

- 12.1 This Chapter reports the outcome of the assessment of likely significant noise and vibration effects arising from the Proposed Development upon the local environment and assesses the suitability of the Site's existing noise environment for the Proposed Development. In particular it considers the potential effects of noise and vibration during the construction and operational phases.
- 12.2 The Chapter describes the assessment methodology, the baseline conditions at the Site and in the surrounding area, any primary mitigation adopted for the purposes of the assessment, a summary of the likely significant effects, the further mitigation measures required to prevent, reduce or offset any significant adverse effects, and the likely residual effects after these measures have been employed.

Legislative and Planning Policy Context

- 12.3 Planning policy at the national and local level and its relevance to environmental design and assessment is confirmed in Chapter 1: Introduction of the ES and the Planning Statement which accompanies the application and examines the merits of the Proposed Development against the relevant planning policy.

16.5

Legislation and Regulation

Control of Pollution Act 1974, Part III (Ref 12.1)

- 12.4 Sections 60 and 61 of the Control of Pollution Act 1974 provide the local authority special powers for controlling noise arising from construction and demolition works, regardless of whether a statutory nuisance has been caused or is likely to be caused. These powers may be exercised either before works start or after they have started.

Environmental Protection Act 1990, Part III (Ref 12.2)

- 12.5 Section 79 of the Environmental Protection Act 1990 declares a number of matters to be statutory nuisances, one of which is noise, the term being defined to include vibration. Under the provisions of the Act, the local authority is required to inspect its area periodically to detect any nuisance and, where a complaint of a statutory nuisance is made by a person living within its area, to take such steps as are reasonably practicable to investigate the complaint. Should it be satisfied of the existence of a statutory nuisance, the local authority is obliged to serve an abatement notice

Local Planning Policy

Aylesbury Vale District Local Plan

- 12.6 The existing Aylesbury Vale District Council (AVDC) Local Plan (Ref. 12.3) contains relatively little in terms of noise. Paragraph 4.61 does comment on the consequence of increased traffic, however, the policy that this text supports is not saved and so does not form part of the development plan. Paragraph 4.61 of the Local Plan's explanatory text provides that:

"New development may generate increased levels of traffic. This can affect local congestion levels, pollution levels and road safety. An integral element of the Plan is a concern to maintain and enhance the safety, amenity and accessibility of all those using highways. It is important, therefore, that roads, footways and

cycleways in new developments are designed and maintained to a standard that provides a safe, convenient and accessible environment.”

Milton Keynes Local Plan

- 12.7 MKC adopted a new local plan in March 2019 known as Plan:MK (Ref. 12.4). The local plan contains the following policies relevant to noise:

‘EH7’

“Milton Keynes Council is committed to reducing health inequalities, increasing life expectancy and improving quality of life of the Borough. Proposals should be designed to achieve the aspirations below:

v. Seeking to improve air quality and reduce noise by locating and designing pollution generating land uses and roads to avoid adverse impacts on sensitive land uses and securing necessary mitigation measures to make development acceptable.”

‘NE5’

“Where development in the open countryside is acceptable in principle under other policies in this plan, it will need to be undertaken in a manner that respects the particular character of the surrounding landscape. In particular, development proposals will need to demonstrate that the following aspects of landscape character have been conserved and where possible enhanced through sensitive design, landscape mitigation and enhancement measures:

- *Tranquillity and the need to protect against intrusion from light pollution, noise, and motion.”*

‘NE6’

“When considering development proposals, the Council will adopt the approach set out below to ensure that pollution will not have an unacceptable impact on human health, groundwater, general amenity, biodiversity or the wider natural environment.

C. Noise and Vibration

1. A Noise and Vibration Impact Assessment will be required for proposals with the potential to cause disturbance to people or the natural environment due to noise and/or vibration and for proposals that are considered to be sensitive to noise and/or vibration. Proposals that would result in or be subject to noise pollution and/or vibration that is:

- a. Very disruptive and would have an unacceptable adverse effect on human health or the natural environment or the tranquillity and enjoyment of the countryside will not be permitted.*
 - b. Disruptive and would have a significant adverse effect on human health or the natural environment or the tranquillity and enjoyment of the countryside will be refused unless the need for, and benefits of, the development significantly outweigh the harm and all feasible solutions to avoid and mitigate that harm have been fully implemented.*
 - c. Intrusive and would have an adverse effect on human health or the natural environment or the tranquillity enjoyment of the countryside will be resisted unless the need for, and benefits of, the development outweigh the harm and all feasible solutions to avoid and mitigate that harm have been fully implemented.*
- 2. Proposals adjacent or within 100m of existing or proposed major roads, heavily trafficked roads, and railways will be required to adopt setbacks and landscaping measures to provide screening and acoustic buffers to protect the amenity of proposed buildings and areas of outdoor amenity space.”*

‘D5’

“1. All proposals will be required to create and protect a good standard of amenity for buildings and surrounding areas, and in particular should ensure:

b. Dwellings are dual aspect to enable passive ventilation, subject to any noise and air pollution mitigation measures that are required to make the proposal acceptable.”

Vale of Aylesbury Local Plan

12.8 Buckinghamshire Council (formerly Aylesbury Vale District Council, is currently in the final stages of preparing a new Local Plan. The Plan has been submitted for examination; the Inspector has issued interim findings and consultation took place on AVDC’s proposed Main Modifications in November and December 2019. The VALP is expected to be adopted in 2020. The draft plan, as proposed to be modified (Ref. 12.5) has the following policies relevant to noise:

12.9 VALP Policy 8 BE3 states:

“Planning permission will not be granted where the proposed development would unreasonably harm any aspect of the amenity of existing residents and achieve a satisfactory level of amenity for future residents. Where planning permission is granted, the Council will use conditions or planning obligations to ensure that any potential adverse impacts on neighbours are eliminated or appropriately controlled.”

12.10 VALP Policy 9 NE6 states:

“Significant noise-generating development will be required to minimise the impact of noise on the occupiers of proposed buildings, neighbouring properties and the surrounding environment. Applicants may be required to submit a noise impact study or to assess the effect of an existing noise source upon the proposed development, prior to the determination of a planning application.

Developments likely to generate more significant levels of noise will be permitted only where appropriate noise attenuation measures are incorporated which would reduce the impact on the surrounding land uses, existing or proposed, to acceptable levels in accordance with Government guidance.

Where necessary, planning conditions will be imposed and / or a planning obligation sought in order to specify and secure acceptable noise limits, hours of operation and attenuation measures. Planning permission for noise-sensitive development, such as housing, schools and hospitals, will not be granted if its users would be affected adversely by noise from existing uses (or programmed development) that generate significant levels of noise.”

12.11 As this new Local Plan has not yet been adopted, the saved policies of the Aylesbury Vale District Local Plan (Ref. 12.3) remain extant.

National Policy and Guidance

National Planning Policy Framework (NPPF), 2019 (Ref 12.6)

12.12 The NPPF was first introduced in March 2012 and last updated in February 2019.

12.13 Noise references within the NPPF as follows:

"170. Planning policies and decisions should contribute to and enhance the natural and local environments by:[a number of points including]...

preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;”
and

“180. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should:

- a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life⁶⁰;*
- 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;”*

- 12.14 Reference number 60 of the above quotation points to the Explanatory Note to the Noise Policy Statement for England (NPSE).

Noise Policy Statement for England, 2010 (Ref 12.7)

- 12.15 The NPSE was published in March 2010 by the Department for Environment Food and Rural Affairs (DEFRA) and is the overarching statement of noise policy for England. It applies to all forms of noise other than occupational noise, setting out the long-term vision of Government noise policy, which is 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.”

- 12.16 This long-term vision is supported by three aims:

- avoid significant adverse impacts on health and quality of life;
- mitigate and minimise adverse impacts on health and quality of life; and
- where possible, contribute to the improvement of health and quality of life.”

- 12.17 The Explanatory Note to the NPSE introduces three concepts to the assessment of noise in the UK:

- NOEL – No Observed Effect Level – This is the level below which no effect can be detected and below which there is no detectable effect on health and quality of life due to noise.
- LOAEL – Lowest Observed Adverse Effect Level – This is the level above which adverse effects on health and quality of life can be detected.
- SOAEL – Significant Observed Adverse Effect Level – This is the level above which significant adverse effects on health and quality of life occur.

- 12.18 None of these three levels are defined numerically in the NPSE and for the SOAEL the NPSE makes it clear that the noise level is likely to vary depending upon the noise source, the receptor and the time of day/day of the week, etc. The need for more research to investigate what may represent a SOAEL for noise is acknowledged and the NPSE asserts that not stating specific SOAEL levels provides policy flexibility in the period until there is further evidence and guidance.

Planning Practice Guidance (PPG), 2019 (Ref 12.8)

- 12.19 This web-based resource was issued for use by the Department for Communities and Local Government (DCLG). The purpose of the guidance is to complement the NPPF and provide advice on how to deliver its policies.

- 12.20 The section on noise was first published on 6 March 2014 and most recently updated in July 2019. It includes a table that summarises “the noise exposure hierarchy based on the likely average response of those affected” and offers “examples of outcomes” relevant to the NOEL, LOAEL and SOAEL effect levels described in the NPSE. The term Unacceptable Adverse Effect (UAE) is introduced which equates to noise perceived as “present and very disruptive”. It is stated that UAEs should be prevented.
- 12.21 These outcomes are in descriptive form and there is no numerical definition of the NOEL, LOAEL and SOAEL (or UAE) in the PPG or elsewhere. The noise exposure hierarchy table is reproduced as Table 12.1.

Table 12.1: Noise Exposure Hierarchy Based on the Likely Average Response

PERCEPTION	EXAMPLES OF OUTCOMES	INCREASING EFFECT LEVELS	ACTION
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level (NOAEL)			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level (LOAEL)			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; 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 small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level (SOAEL)			

Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Unacceptable Adverse Effect	Prevent

Professional Practice Guidance on Planning and Noise – New Residential Development, 2017 (Ref 12.9)

- 12.22 The Professional Practice Guidance on Planning and Noise (ProPG) was published in May 2017 and provides practitioners with guidance on a recommended approach to the management of noise within the planning system in England.
- 12.23 The scope of the ProPG is limited to the consideration of new residential development that will be exposed predominantly to airborne noise from transport sources (including road and aircraft, as is the case for the Site).
- 12.24 The ProPG aims to complement Government planning and noise policy and guidance, and in particular it strives to:
- *“advocate full consideration of the acoustic environment from the earliest possible stage of the development control process;*
 - *encourage the process of good acoustic design in and around new residential developments;*
 - *outline what should be taken into account in deciding planning applications for new noise-sensitive developments;*
 - *improve understanding of how to determine the extent of potential noise impact and effect; and*
 - *assist the delivery of sustainable development.”*
- 12.25 The ProPG also states that:
- “In most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45 dB LAmax,F more than 10 times a night.”*
- 12.26 The guidance discusses in detail how these numbers were derived and provides a rationale for adopting the 10th highest LAFmax level during the night-time period as ‘typical’.

Consultation

- 12.27 Consultation with Neil Green, the Environmental Health Officer (EHO) at Aylesbury Vale District Council, was undertaken in March 2020 to discuss and agree the methodology for the noise survey that has been employed within this assessment. It was agreed that due to the COVID-19 outbreak it will not be possible to carry out representative ambient survey measurements at the Application Site due to a reduction of traffic flows on all roads. For this reason, it was agreed to use the 2013 measurement data obtained for the previous application within our revised assessment and once the traffic levels return back to normal later in the year we will carry out an additional survey and provide a supplementary supporting note.
- 12.28 Consultation with Matthew Green, the EHO at MKC, was undertaken in March 2020. The EHO stated that:
- none of the monitoring locations fall within MKC's area and that they do not fall within their responsibility;
 - MKC would seek to protect the amenity of residents close to the eastern boundary of the Site; and
 - the East West Rail link that is likely to be operational by 2023/24 and this runs along the southern boundary of the site.

Guidance and Standards

- 12.29 For a development of this nature, there is no specific all-encompassing guidance relating to the standards associated with noise emission / noise effect. In lieu of any such national and local guidance, assessing the effect of such a development during the construction and operational phases must draw upon the following Standards and guidance documents, a full summary of which is presented within this Chapter.
- Guidance relating to the effects of construction noise on sensitive receptors in the vicinity of the site is taken from BS 5228-1:2009+A1:2014 Noise and Vibration Control on Construction and Open Sites. Part 1: Noise (BS 5228-1) (Ref. 12.10);
 - Guidance relating to the effects of construction vibration on sensitive receptors and buildings in the vicinity of the site is taken from BS 5228-2: 2009+A1:2014 Noise and Vibration Control on Construction and Open Sites. Part 2: Vibration (BS 5228-2) (Ref. 12.11);
 - Guidance relating to the effects of operational road traffic noise in accordance with the former Department of Transport/Welsh Office technical memorandum Calculation of Road Traffic Noise (CRTN) (Ref. 12.12), Design Manual for Roads and Bridges (DMRB) LA111 Noise and Vibration Revision 1 (2019) (Ref. 12.13) and Method for Converting the UK Road Traffic Noise Index LA10,18hr to the EU Noise Indices for Road Noise Mapping (2006). (Ref. 12.14).
 - Guidance relating to the operation of railway traffic is provided in the Department of the Environment, Transport and the Regions (DETR), Calculation of Railway Noise (CRN) (1995) (Ref. 12.15).
 - The suitability of the site for noise sensitive aspects of the development has been considered with regard to the guidance taken from BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (BS 8233) (Ref. 12.16), the World Health Organisation (WHO):1999 Guidelines for Community Noise (Ref. 12.17), Building Bulletin 93 (BB93) Acoustic design of schools: performance standards (February 2015) (Ref. 12.18), and Department of Health: Health Technical Memorandum 08-01: Acoustics (2013) (Ref. 12.19); and
 - Guidance relating to the effects of operational noise of fixed plant / goods delivery noise sources on sensitive receptors in the vicinity of the Site has been taken from BS 4142:2014+A1 2019 Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142) (Ref. 12.20).

Assessment Methodology

Scope of the assessment

- 12.30 This section presents the scope of the assessment and sets out the evidence base for the significant effects.

Insignificant Effects

- 12.31 The following effects have been considered insignificant and have therefore not been assessed further:
- Given the scale of the Proposed Development and anticipated phasing, the temporary changes in daily traffic flows as a result of construction traffic is unlikely to be greater than 25% compared with existing flows (i.e. will not cause more than a 1 decibel (dB) change). Buckingham Road and Whaddon Road are likely to provide the main site entrances i.e. most likely to be used by the construction traffic. Currently these roads have an annual average weekday traffic (AAWT 18hr) flow of around 8582 and 5629 vehicles respectively. To produce a 1 dB increase in noise level at least 2000 and 1400 vehicle movements daily would be required on each link respectively. It is anticipated that at peak construction a total of 433 AAWT construction vehicle movements are predicted. Therefore, changes in road traffic noise levels as a result of construction traffic are not considered to be significant and will not be considered further within the ES.
 - Given the nature of the Proposed Development, it is not expected that levels of vibration during the operational phase will be significant at the identified sensitive receptors. Therefore, effects from operational vibration are expected to be insignificant and will not be considered further within this ES.

Likely Significant Effects

- 12.32 The following are considered to have the potential to give rise to significant effects and have therefore been considered within the ES.

Construction Activities

- Disturbance to sensitive receptors from the generation of noise and vibration from on-site activities during the construction phase.

Operational Phase

- Disturbance to the future users of the Proposed Development from existing noise and vibration sources i.e. road, rail and any existing commercial/industrial uses.
- Increase in noise from development generated road traffic movements on the local road network immediately surrounding the Proposed Development attributable to the Proposed Development.
- Disturbance to sensitive receptors from noise generated by fixed plant and operational commercial / industrial activities associated with the Proposed Development.

Extent of the Study Area

- 12.33 The study area considered for the purpose of the noise and vibration assessment consists of the Application Site itself (within the red line boundary), noise and vibration sensitive receptors immediately surrounding the Site (i.e. existing residential dwellings), and sensitive receptors located adjacent to the local road traffic network immediately surrounding the Site (i.e. that applied within the Transport Assessment).

Significance Criteria

- 12.34 The assessment of potential impacts as a result of the Proposed Development has taken into account both the construction and operational phases. The construction phase includes earthworks and construction activities as detailed in Chapter 2: Application Site and Project Description. The assessment of impacts on sensitive aspects of the Proposed Development has taken into account both the existing sound sources in the vicinity of the site and any new sources or changes to sources proposed during the operational phase.
- 12.35 Separate to the requirement of EIA to determine significant effects as discussed above, noise related planning policy also references the need to consider significance in terms of Effect Levels (the NOEL, LOAEL and SOAEL descriptors as described within the NPSE). The impact magnitude scales presented in the following subsections therefore also show how the NOEL, LOAEL and SOAEL descriptors have been accounted for.

Construction Noise and Vibration Assessment Methodology

- 12.36 BS 5228-1 provides the latest recommendations for generic methods of noise control, where there is a need to protect people living and working in the vicinity of construction sites.
- 12.37 Given the outline nature of the Proposed Development, details of the construction methods including plant type and numbers to be employed are currently not fixed. Therefore, a quantitative assessment of construction activities has not been possible.
- 12.38 Qualitative reference has been made to the ABC Method for determining significance provided within BS 5228-1 (set out in Appendix 6.2 and Table A6.2-1). Given the prevailing ambient noise levels established at sensitive receptors as part of the baseline noise survey it is considered appropriate for the construction noise assessment to be undertaken with reference to the façade noise levels identified in Table 12.2.
- 12.39 BS 5228-1, Table E.1, Note 3 states that these limits apply to residential receptors only. Therefore, their application to non-residential receptors would be precautionary.

Table 12.2 Impact Magnitude Scale for Construction Site Noise at Residential Facades

IMPACT MAGNITUDE ¹	DAYTIME CONSTRUCTION NOISE LEVEL (FAÇADE) L _{Aeq,T} (dB)		
	Category A	Category B	Category C
None / Negligible	≤ 60	≤ 65	≤ 70
Minor	> 60 to 65	> 65 to 70	> 70 to 75
Moderate	> 65 to 70	> 70 to 75	> 75 to 80
Major	> 70	> 75	> 80

¹ A lower magnitude may apply where works are very short in duration.

(Source, BS 5228-1, Annex E, Table E.1, 2009+A1:2014)

- 12.40 Category A and B of the ABC Method in BS5228-1 has been adopted in determining significance for the receptors closest to construction activities based on the prevailing daytime noise levels established during the baseline noise survey.
- 12.41 BS 5228-1, Annex E, Table E.1, Note 1 states:
- “a potential significant effect is indicated if the L_{Aeq,T} noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level.”*
- 12.42 On this basis, and continuing the theme of 5 dB band widths, Table 12.3 has been created for the initial determination of the potential for significant effects in relation to construction noise. Only the daytime period has been considered, since it is assumed that the works would occur during typical construction site working hours (07:00-19:00 Monday to Friday and 08:00-13:00 Saturday), which will be controlled by the CEMP, secured by planning condition.

Table 12.3: Significance Scale for the Assessment of Noise during Construction

IMPACT MAGNITUDE ¹	DAYTIME CONSTRUCTION NOISE LEVEL (FAÇADE) L _{Aeq,T} (dB)			SIGNIFICANCE OF EFFECT
	Category A	Category B	Category C	
None / Negligible	≤ 60	≤ 65	≤ 70	Non-significant
Minor	> 60 to 65	> 65 to 70	> 70 to 75	
Moderate	> 65 to 70	> 70 to 75	> 75 to 80	Significant
Major	> 70	> 75	> 80	

¹ A lower magnitude may apply where works are very short in duration.

12.43 BS 5228-2 provides the latest recommendations for generic methods of vibration control, to protect people living and working in the vicinity of construction sites.

12.44 Table B1 of BS 5228-2 describes the effects of vibration on human beings and is reproduced in Table 12.4. The vibration level referred to in the table is the peak particle velocity (PPV) in mms⁻¹.

Table 12.4: BS 5228-2 Guidance on Effects of Vibration Levels

VIBRATION LEVEL	EFFECT
0.14 mm·s ⁻¹	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3 mm·s ⁻¹	Vibration might be just perceptible in residential environments.
1.0 mm·s ⁻¹	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10 mm·s ⁻¹	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

12.45 On this basis, Table 12.5 has been created for the initial determination of the potential for impact magnitude in relation to construction vibration. As for noise the magnitude relates to the daytime period.

Table 12.5: Significance Scale for the Assessment of Vibration during Construction

APPENDIX 26: BS-5228-2 THRESHOLD LEVEL (PPV/MM/S)	APPENDIX 27: IMPACT MAGNITUDE	APPENDIX 28: SIGNIFICANCE OF EFFECT
<0.3	Negligible	Significant
0.4 -1.0	Minor	
1.1-3.0	Moderate	Non-significant

≥ 3.1

Major

- 12.46 A PPV vibration level of 1 mms-1 has been identified as the threshold between moderate and major effect where BS5228-2 indicates that a PPV level of 1 mms-1 in a residential environment will cause complaint. This figure is considered more realistic than a value of 10 mms-1 for example, which could only realistically be tolerated for very brief exposure periods.
- 12.47 Guide values for cosmetic damage to buildings are given in BS 5228-2 (Table B.2 and associated Figure B.1, in Annex B). They are an order of magnitude higher than those for the protection of people.

Road Traffic Noise Assessment Methodology

- 12.48 Receptors potentially affected by noise from development generated road traffic would be those living close to roads within the local network. As these receptors are already exposed to a certain level of road traffic noise, it is the difference or change in level which will result from the Proposed Development that is important when quantifying impacts and assessing the significance of effects.
- 12.49 CRTN describes procedures for predicting and measuring noise from road traffic in terms of the LA10 – the level exceeded for 10% of the time – and is suitable for environmental assessments of schemes where road traffic noise may have an effect.
- 12.50 Design Manual for Roads and Bridges (DMRB) provides guidance on the environmental assessment of noise impacts from road schemes. DMRB contains advice and information on transport-related noise and vibration, which is relevant to both construction and operational phase traffic impacts at noise sensitive receptors. It also provides guideline criteria for assessing traffic related noise impacts.
- 12.51 DMRB suggests that a change in road traffic noise of 1 dB LA10,18h in the short-term (e.g. when a scheme opens) is the smallest that is perceptible. In the long-term (typically 15 years after a project opens) 3 dB LA10,18h is considered to be the smallest perceptible change. A different magnitude of effect is, therefore, applied for short-term and long-term changes in noise level.
- 12.52 The impact of the change in noise level from development related traffic will be determined with reference to the classification of magnitude of impact used in both the short and long-term traffic noise assessments presented in DMRB. The impact magnitudes ascribed to changes in noise level are shown in Table 12.6 for the short-term and 12.7 for the long-term.

Table 12.6 Impact Magnitude Scale for Assessment of Changes in Road Traffic Noise at Existing Receptors in the Short Term

NOISE IMPACT	LA10,18hr dB or Lnight NOISE CHANGE
Negligible	Less than 1.0
Minor	1.0 to 2.9
Moderate	3.0 – 4.9
Major	Greater than or equal to 5.0

(Source, DMRB, LA111. 2019)

Table 12.7 Impact Magnitude Scale for Assessment of Changes in Road Traffic Noise at Existing Receptors in the Long-Term

IMPACT MAGNITUDE	LA10,18hr dB or Lnight NOISE CHANGE
Negligible	Less than 3.0
Minor	3.0 to 4.9
Moderate	5.0 – 9.9
Major	Greater than or equal to 10.0

(Source: DMRB, LA111. 2019)

- 12.53 A summary of the assessment scale is provided in Table 12.8 along with the significance of effect for a receptor presumed to be sensitive to noise.

Table 12.8: Significance of Effect Scales for Development Generated Road Traffic

MAGNITUDE OF IMPACT	NOISE CHANGE, LA10,18H		SIGNIFICANCE OF EFFECT
	SHORT-TERM	LONG-TERM	
Negligible	Less than 1.0	Less than 3.0	Non-significant
Minor	1.0 to 2.9	3.0 to 4.9	
Moderate	3.0 – 4.9	5.0 to 9.9	Significant
Major	Greater than or equal to 5.0	Greater than or equal to 10.0	

- 12.54 CadnaA® uses the principal methodology set out in the CRTN, for determining the LA10,T noise level; the noise level that is exceeded for 10% of the time. To allow the BS8233 assessment to be undertaken, the LA10,18hr noise levels require conversion to a LAeq,T.
- 12.55 For assessment purposes, the modelled LA10,18hr road traffic noise levels will be converted to a LAeq,T, the equivalent continuous sound level using the formulae presented in Table 12.9, as recommended in the 'Method for Converting the UK Road Traffic Noise Index LA10,18hr to the EU Noise Indices for Road Noise Mapping' (2006).

Table 12.9 LA10, 18hr Conversion Calculations

TIME PERIOD	NON-MOTORWAY CONVERSION
2300-0700	$L_{night} = 0.90 \times LA_{10,18hr} - 3.77$
0700-2300	$L_{Aeq,16hr} = 10 \log_{10} ((12 \times (10^{L_{day}/10}) + 4 \times (10^{L_{evening}/10}) / 16)$

(Source, Transport Research Laboratory, Method for Converting the UK Road Traffic Noise Index LA10,18hr to the EU Noise Indices for Road Noise Mapping', 2006)

- 12.56 For this assessment, the non-motorway conversion calculations will be applied.

Railway Traffic Assessment Methodology

- 12.57 The disused railway line at the southern boundary of the development is proposed to be brought back into operation (East West Rail Project) and is expected to carry passenger and freight traffic from 2023 onwards.
- 12.58 Therefore, noise from rail traffic may impact upon proposed dwellings within the development at the southern boundary. Cumulative development effects of the scheme in conjunction with implementation of the East West Rail project have therefore been considered.
- 12.59 The exact numbers of rail movements proposed for the line are not currently known and therefore a reasonable worst case has been assumed with passenger movements of 281 trains in the daytime and 5 at night. Freight movements are assumed at 45 trains in the daytime and up to 40 during the night.
- 12.60 Calculations have been performed using CadnaA® noise modelling software which implements the CRN methodology.
- 12.61 Guidance provided in BS 8233 has been used in order to recommend levels of insulation required by the building façades of the proposed residential properties.

Site Suitability Methodology – Residential Development

- 12.62 Two documents are referenced with respect to appropriate noise levels and residential amenity – BS 8233:2014 and WHO 1999.
- 12.63 BS 8233:2014 provides recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings, or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.
- 12.64 The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings exposed to steady external noise sources. It is stated in the British Standard that it is desirable for internal ambient noise levels not to exceed the criteria set out in Table 12.10.

Table 12.10 Suitable Internal Noise Levels, dB

ACTIVITY	LOCATION	0700-2300 $L_{Aeq,16hr}$	2300-0700 $L_{Aeq,8hr}$
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

(Source, BS 8233:2014 Guidance on sound insulation and noise reduction for buildings)

- 12.65 BS8233 states that the recommended limits can be relaxed by up to 5dB “where development is considered necessary or desirable”.
- 12.66 Whilst it may be considered desirable to achieve the BS8233 recommended internal noise levels with windows open, it is stated that where the limit cannot be met with an open window “there needs to be appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.”

- 12.67 It is therefore not essential that the recommended internal noise levels are achievable with open windows if suitable alternative means of ventilation can be provided.
- 12.68 With regards to external noise, Section 7.7.3.2 of BS8233 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 LAeq,T, with an upper guideline value of 55 dB LAeq,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”*
- 12.69 The WHO guidelines are a wide-ranging document describing the effects of community noise. They provide information about the effects of noise that may occur at certain levels of exposure. For dwellings, the critical effects of noise are taken to be sleep disturbance, annoyance and speech interference.
- 12.70 Indoor guideline values are provided for bedrooms with the aim of protecting against sleep disturbance, a guideline value of 30 dB LAeq for continuous noise and 45 dB L_{Amax} for single sound events is recommended. To enable casual conversation during the daytime an internal guideline noise level of 35 dB LAeq is provided.
- 12.71 With respect to external noise levels it is stated that:
- “To protect the majority of people from being seriously annoyed during the daytime, it is recommended that the sound pressure level on balconies, terraces, and outdoor living areas should not exceed 55 dB LAeq for a steady continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor noise level should not exceed 50 dB LAeq.”*
- 12.72 In line with the WHO guidelines and the ProPG, a night-time LAF_{max} criterion of 45 dB has been used in this assessment.
- 12.73 For the residential aspects the absolute noise level will be assessed against the daytime and night-time noise limits detailed in BS8233 and with reference to the Site Risk Noise Assessment scale in PropPG: Planning and Noise, 2017.
- 12.74 The impact magnitude scale presented in Table 12.11 will be adopted for the residential aspects of the Proposed Development. The noise level ranges for both day and night-time periods are the external free field levels and the corresponding impact magnitude scale correlates with the degree of acoustic design input that is required to offset adverse impacts. The external free field noise level should include all relevant transportation noise sources and commercial / industrial sources where these are not dominant.
- 12.75 Typically, an open window will provide a sound reduction of 12 dB from a free field sound level, a non-acoustic trickle ventilator will afford 20 dB sound reduction and acoustic rated ventilator up to 30 dB reduction in sound level. Beyond this the requirement for mechanical ventilation systems and a detailed Acoustic Design Statement may be required detailing how adverse impacts will be offset.

Table 12.11 Impact Magnitude Scale – External Absolute Noise Levels and Effect Level (Residential Aspects), Free Field

IMPACT MAGNITUDE	INDICATIVE NOISE LEVEL CHANGE $L_{Aeq,T}$ dB		SIGNIFICANCE OF EFFECT
	DAYTIME (07:00 – 23:00 HOURS)	NIGHT-TIME (23:00 – 07:00 HOURS)	
None / Negligible	≤ 47 ¹	≤ 42 ²	Non-Significant
Minor	$>47 - \leq 55$	$>42 - \leq 50$	
Moderate	$>55 - \leq 65$ ³	$>50 - \leq 60$ ⁴	Significant
Major	>65	>60	

¹ Equivalent to 35 dB $L_{Aeq,T}$ inside assuming 12 dB reduction from a free field level across a partially open window (ref. WHO Guidelines for Community Noise).

² Equivalent to 30 dB $L_{Aeq,T}$ inside assuming 12 dB reduction from a free field level across a partially open window (ref. WHO Guidelines for Community Noise).

³ Based on the onset of serious community annoyance (ref. WHO Guidelines for Community Noise).

⁴ Equivalent to the levels above which hypertension health consequences are observed (ref. WHO Night Noise Guidelines for Europe).

(Source, ProPG: Planning and Noise, Association of Noise consultants, 2017)

12.76 A design target of 55 dB L_{Aeq} , 16hr applicable within principal outdoor amenity areas during the day has also been considered.

12.77 Where it is identified that the Proposed Development can be designed such that the adopted assessment criteria are not exceeded, the magnitude of impact is categorised as being negligible.

Site Suitability Methodology – Education Uses

12.78 The proposed development includes a primary and secondary school. The assessment is based on noise levels within the centre of the proposed school sites, for the operational year 2026. An estimate of the free-field daytime $L_{Aeq,16h}$ at this location has been made using the noise model developed for the assessment of road traffic noise impacts.

12.79 BB 93 provides acoustic guidance on the design of schools that seeks to facilitate clear communication of speech between teacher and student (and between students) and that seeks to ensure noise environments that do not interfere with study activities.

12.80 This document presents a series of upper limits for both internal and external teaching and learning spaces. These design criteria are specified in terms of the $L_{Aeq,30min}$. The stipulated noise criteria are applicable within the teaching / learning spaces without contribution from pupils, teachers, equipment and playgrounds.

12.81 BB93 states that where external free-field noise levels at the location of proposed school buildings are 70 dB $L_{Aeq,30mins}$ or more it may be possible to meet the specified internal levels, but this will require considerable sound insulation, screening or barriers. Whilst BB93 was updated in 2014, the noise limits for external areas to define suitability were not included within the update and therefore remain valid.

12.82 60 dB $L_{Aeq,30mins}$ free-field is recommended as an upper limit for the boundary of external areas used for formal and informal outdoor teaching and recreational areas. Though for playgrounds and playing fields a limit of 55 dB $L_{Aeq,30mins}$ is recommended, and for at least one outdoor teaching area a limit of 50 dB $L_{Aeq,30mins}$.

12.83 The predicted daytime LAeq,16h road noise level is not directly comparable with the BB93 recommendations specified as LAeq,30mins. However, the results will provide a good indication of whether the recommendations are likely to be met at the proposed school site.

12.84 Compliance with the criteria in BB93 would ensure the magnitude of the impact and significance of the effect of ambient noise on the proposed new school is negligible.

Site Suitability Methodology – Extra Care Uses

12.85 The proposed development includes 60 extra care units.

12.86 Health Technical Memorandum 08-01 provides advice and guidance on the design, installation and operation of healthcare facilities. This document provides guidance drawing upon healthcare specific elements of standards, policies and up-to-date established best practice.

12.87 The guidance covers acoustic design criteria that are important for healthcare premises, and addresses issues such as the provision of temporary healthcare facilities, refurbishments and the control of noise and vibration during construction.

12.88 Specifically relevant to this project, the document recommends acoustic criteria for:

- Noise levels in rooms – both from medical services within the building and from noise coming from outside; and
- External noise levels – noise created by the healthcare building and operation should not unduly affect those that live and work around it.

12.89 With respect to noise from health care facilities having the potential to affect properties outside the site it is recommended that the following provisions should apply, with the most stringent taking precedence:

- Noise levels at the site boundary should meet reasonable standards required by the local authority or other relevant body.
- Noise outside the buildings should be controlled to allow the internal noise criteria to be achieved (with windows or trickle vents open for ventilation if the space is naturally ventilated).
- Open external areas should be protected. Noise from services should not exceed the existing daytime background noise level or 50 dB LA90, whichever is the higher. This limit should be achieved in any areas normally occupied by staff or the public. Meaning noisy plant rooms should not typically face occupied external areas unless adequate acoustic control is provided.

12.90 The document suggests that a relaxation of acoustic criteria for emergency situations and sporadic events can be considered. However, this is subject to agreement by the Local Authority or other relevant body.

Operational Noise – Building Services and Commercial Activities, Local Centre

12.91 The potential exists for noise from the development to result in impacts on nearby sensitive receptors. The likely sources of noise within the development are fixed plant associated with the employment uses, neighbourhood centre and school – such as heating, ventilation, air conditioning or refrigeration plant (HVAC).

12.92 Details of the likely occupants of the employment areas of the development are currently unknown and so no details of the type, number and location of any plant or operations are available. Under these circumstances it is appropriate to specify suitable design criteria based on appropriate guidance.

12.93 For these reasons a qualitative rather than a quantitative, assessment of the potential impacts of operational noise has been undertaken.

- 12.94 It is anticipated that there will not be any significant sources of vibration within the development and therefore operational vibration has not been considered further within this report.
- 12.95 BS 4142 describes methods for rating and assessing sound of an industrial and/or commercial nature. Such sound sources include industrial/manufacturing processes, sound from fixed installations comprising mechanical and electrical plant and equipment, sound from the loading and unloading of goods and materials, and sound from mobile plant and vehicles which are intrinsic to the overall sound emanating from premises or processes.
- 12.96 The Standard describes methods using outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling upon which sound is incident.
- 12.97 The basic premise of the BS 4142 approach is to compare the derived or predicted sound rating level from the source(s) in question (the sound rating level) with the background sound level at the assessment location. The sound rating level(s) may include character corrections (penalties) to account for distinguishing acoustic features (tonality, impulsivity, intermittency etc.). Corrections for acoustic features can be determined subjectively or objectively, with a range of correction factors applied depending on the assessed character of the specific sound.
- 12.98 The sound rating level is to be evaluated over a 1-hour period during the daytime, and over a 15-minute period at night. Day and night are defined in the Standard as 07:00 to 23:00 hours and 23:00 to 07:00 hours respectively.
- 12.99 BS 4142 advises that the measurement time interval should be 'sufficient to obtain a representative value of the background sound level for the period of interest. This should comprise continuous measurements of normally not less than 15-minute intervals, which can be contiguous or disaggregated.'
- 12.100 The BS 4142 assessment requires that an initial estimate of the impact of the noise source(s) is undertaken by subtracting the measured background sound level from the rating level. The Standard states that the calculated difference is to be considered against the following:
- a) *Typically, the greater this difference, the greater the magnitude of the impact.*
 - b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
 - c) *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
 - d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*
- 12.101 The Standard goes on to state:
- "Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.*
- 1) *The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low.*
- Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse*

impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

2) The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.

3) The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:

- i) facade insulation treatment;
- ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
- iii) acoustic screening.”

12.102 It is appropriate to recommend design noise criteria based on the guidance contained within BS4142. In this regard, a Rating Level no greater than 0dB above the existing background sound level LA90,T (determined outside noise sensitive receptors) would be considered to be appropriate for new noise sources, during both the day (07:00 – 23:00) and night (23:00 – 07:00).

12.103 A level 0 dB above background would correspond to the situation described as being ‘an indication of the specific sound source having a low impact’, in BS 4142. Accordingly, the impact magnitude scale presented in Table 12.12 has been adopted in the assessment of noise from such commercial sources and activities.

Table 12.12 Impact Magnitude Scale Applicable to Noise from Fixed Plant Items and Industrial / Commercial Operations - Dwellings

IMPACT MAGNITUDE	DIFFERENCE BETWEEN THE RATING LEVEL AND THE BACKGROUND SOUND LEVEL
None	< -10.0
Negligible	-9.9 to 0.0
Minor	0.0 to +4.9
Moderate	+5.0 to +9.9
Major	> +10.0

Assessing the magnitude of impact

12.104 The criteria for assessing the magnitude of the predicted impacts from the various assessed sources are summarised in Table 12.13.

Table 12.13 Criteria for Assessing Magnitude of Impact on Environment Receptors During Operation

MAGNITUDE	CONSTRUCTION NOISE LEVEL (2)	CONSTRUCTION VIBRATION LEVEL	CHANGE IN ROAD TRAFFIC NOISE LEVEL (3)	BUILDING SERVICES AND COMMERCIAL ACTIVITIES
Negligible	≤ 60 dB L _{Aeq,T}	≤ 0.3 mm/s PPV	Less than 1.0	-9.9 to 0.0
Minor	> 60 to 65 dB L _{Aeq,T}	0.4 - 1.0 mm/s PPV	1.0 to 2.9	0.0 to +4.9
Moderate	> 65 to 70 dB L _{Aeq,T}	1.1 - 3.0 mm/s PPV	3.0 – 4.9	+5.0 to +9.9
Major	70 dB L _{Aeq,T}	> 3.1 mm/s PPV	Greater than or equal to 5.0	> +10.0

Notes:

(1) The significance of effect is based on a receptor being sensitive to noise and/or vibration.

(2) This free-field level relates to a point one metre externally from the façade of a Category A building during a weekday daytime. For Category B buildings see Table 12.2.

(3) This scale applies to short-term changes in road traffic noise; for long term changes see Table 12.7.

Assessing the sensitivity of receptors

12.105 In accordance with the principles of environmental impact assessment, the sensitivity of receptors (existing and proposed) to noise or vibration impacts during either construction or operation have been defined in Table 12.14.

Table 12.14 Criteria for Assessing Sensitivity of Receptors

SENSITIVITY	RECEPTORS
Very High	Concert halls/theatres, specialist vibration sensitive equipment
High	Residential properties, educational buildings, medical facilities, care homes
Medium	Places of worship, community facilities
Low	Commercial and industrial premises

Determining the significance of effect

12.106 The following terms have been used to define the significance of the effects identified:

- Major effect: where the Proposed Development could be expected to have a considerable effect (either positive or adverse) on existing and proposed noise sensitive receptors both within and surrounding the Site.
- Moderate effect: where the Proposed Development could be expected to have a noticeable effect (either positive or adverse) on existing and proposed noise sensitive receptors both within and surrounding the Site;

- Minor effect: where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or adverse) on existing and proposed noise sensitive receptors both within and surrounding the Site; and
- Negligible: where no discernible effect is expected as a result of the Proposed Development on existing and proposed noise sensitive receptors both within and surrounding the Site (i.e. the effect is insignificant).

12.107 For the purpose of the noise and vibration assessments, effects of moderate and major are considered to be significant, effects of negligible and minor are considered not significant.

12.108 Drawing upon the defined impact magnitude and receptor sensitivity, the significance criteria have been determined with reference to the significance matrix presented in Table 12.15.

Table 12.15 Matrix for Determining the Significance of Effect

SENSITIVITY	Very High	Major	Major	Moderate	Minor
	High	Major	Moderate	Minor	Negligible
	Medium	Moderate	Minor	Negligible	Negligible
	Low	Minor	Negligible	Negligible	Negligible
		Major	Moderate	Minor	Negligible
MAGNITUDE OF IMPACT					

Baseline Conditions

Sensitive Receptors

12.109 For the purposes of this assessment, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship that might be impacted in terms of noise or vibration by the proposed development can be said to be a sensitive receptor.

12.110 Locations were chosen to represent the receptors most likely to be impacted by the development.

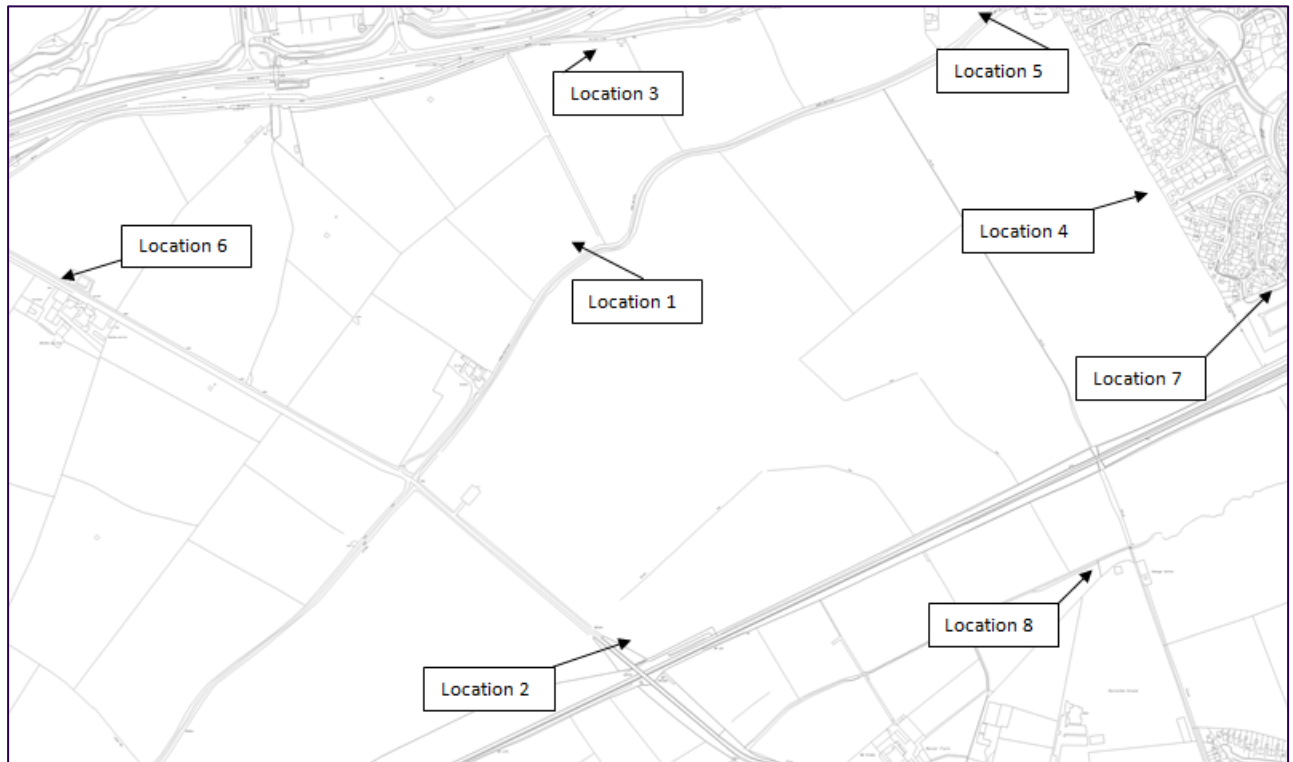
Importance and Sensitivity of Affected Receptors

12.111 Taking into account the scale of the development and its situation, an edge of urban area greenfield site adjoining the strategic road network in which noise levels are already at a high level, all receptors potentially affected by the development can be considered to be of local importance.

Measurement Locations

12.112 As outlined previously, due to the current COVID-19 pandemic an update to the noise measurements carried out in 2013 could not be undertaken and the previous baseline measurements have been used within the assessment and details of this are provided below. Based upon a desktop study of the potentially most affected properties eight No. noise measurement locations within the site and close to the site, were selected to monitor existing noise levels. The monitoring locations are shown in Figure 12.1.

Figure 12.1 Monitoring Locations



Measurement Equipment and Conditions

12.113 On the monitoring dates (13th and 14th of March 2013) weather conditions were dry and calm with wind speeds below 5ms-1.

12.114 Measurements were obtained using the following equipment:

- Norsonic Nor140 Type 1 sound level meter, Serial Number 1403010.
- Norsonic Type 1251 acoustic calibrator, Serial Number 1872.
- Norsonic Nor140 Type 1 sound level meter, Serial Number 1403009.
- Norsonic Type 1251 acoustic calibrator, Serial Number 31821.
- Cirrus CR 831B Serial Number, C17175FF.
- Cirrus CR 511E Serial Number, 036342.
- Cirrus CR171B Serial Number, G061698.
- Cirrus CR515, Serial Number 60608.

12.115 The sound level meters were appropriately calibrated before and after the measurements. At all locations the microphone was mounted on a tripod of height 1.2m and the ground condition at all locations could be classified as “soft ground”. The instruments were configured with the time response set to fast. Measurements were obtained with ‘A’ weighting for LAeq,T LAmix, LA90,T, and LA10,T at five minute intervals.

Existing Noise Sources and Sensitive Receptors

12.116 Ambient noise in the area is generally dominated by traffic on the surrounding roads (Standing Way, Buckingham Road and Whaddon Road).

- 12.117 Existing noise-sensitive receptors are predominantly the residential properties to the east of the Application Site off Wincanton Hill and Chepstow Drive, a property on Weasel Lane to the west and properties on Whaddon Road to the north-west.
- 12.118 These receptors will experience both operational and construction phase noise impacts from the proposed development.
- 12.119 Details of the proposed nature of the development were reviewed to determine the appropriate timing and duration of noise surveys to assess existing ambient conditions. The following locations were chosen to undertake monitoring:
- Location 1 off Weasel Lane.
 - Location 2 SW corner of site approximately 35m from Whaddon Road.
 - Location 3 northern boundary with Standing Way.
 - Location 4 near to residential properties on Hamilton Lane.
 - Location 5 Weasel Lane near the junction with Buckingham Road.
 - Location 6 at Leys Ground Farm off Whaddon Road.
 - Location 7 at Blaydon Close.
 - Location 8 at Hammond Park, Newton Longville.
- 12.120 Day and night-time noise measurements were undertaken at locations 1 – 4 and daytime only measurements were undertaken at locations 5 – 8.
- 12.121 The noise climate at each receptor is detailed below:
- Location 1 – Distant road traffic from Standing Way, occasional vehicles on Weasel Lane.
 - Location 2 – Road traffic on Whaddon Road.
 - Location 3 – Road traffic on Standing Way.
 - Location 4 – Distant road traffic from Standing Way, occasional vehicles on Hamilton Lane.
 - Location 5 – Road traffic on Buckingham Road, occasional vehicles on Weasel Lane, distant road traffic on Standing Way.
 - Location 6 – Road traffic on Whaddon Road, distant road traffic on Standing Way.
 - Location 7 – Occasional vehicle movements, dog walkers.
 - Location 8 – Occasional dog walkers, vehicle movements, distant road traffic from Whaddon Road.

Existing Noise Levels

- 12.122 The results of the baseline noise surveys are summarised in Table 12.16:

Table 12.16 Results of Noise Monitoring, dB

Location	Period	L _{Aeq,T}	L _{A90}	L _{A10}	L _{AFmax}
Location 1	Daytime	54	51	55	81
	Night-time	50	43	50	64
Location 2	Daytime	61	45	53	74
	Night-time	46	38	46	68

Location	Period	L _{Aeq,T}	L _{A90}	L _{A10}	L _{AFmax}
Location 3	Daytime	59	54	60	77
	Night-time	54	45	55	69
Location 4	Daytime	49	45	50	66
	Night-time	45	39	46	61
Location 5	Daytime	64	57	67	75
Location 6	Daytime	68	59	72	81
Location 7	Daytime	48	40	49	61
Location 8	Daytime	48	40	47	66

Likely Significant Effects

Construction Phase

Constructions- Noise

- 12.123 The main construction activities likely to generate noise are likely to comprise ground preparation, excavations for foundations, construction of new roads and buildings and the offloading of materials. The use of piling is not anticipated.
- 12.124 Considering the worst-case assessment location at Weasel Lane, the Application Site surrounds the property at this location and the noise impacts during construction have the potential to be of major magnitude (an increase above the respective façade Threshold Category noise level in Table 12.3) during certain stages of construction. Impacts at the noise sensitive receptors located to the east of the Application Site are likely to be of lesser magnitude during construction than those at Weasel Lane.
- 12.125 Based on the above indicative assessment it is recognised that impacts of major magnitude may occur when construction activities are undertaken close to noise sensitive receptors. The sensitivity of the closest receptors is considered to be high and the impact of some activities prior to mitigation could be of a major magnitude. Therefore, there is potential for a direct, temporary, short to medium term effect of major adverse significance to arise prior to the implementation of mitigation measures.

Construction - Vibration

- 12.126 No vibration impacts are anticipated at the nearest existing vibration sensitive receptors since piling is not required as part of the building foundation design. Localised ground improvement may be undertaken e.g. for road construction, but these are considered unlikely to constitute a significant vibration source due to the distances between potential working areas and existing vibration sensitive receptors. Therefore, the impact of construction vibration from the development is considered to be negligible.

Operational Phase

Noise Effects upon the Development

Absolute Noise Levels

12.127 The external daytime noise levels at each ground floor façade is shown in Figure 12.2. The modelled predictions for both daytime and night-time include future railway traffic and road traffic flows for the assessment year 2026 with Cumulative Scheme.

Figure 12.2 Daytime Noise Level, dB LAeq (Free Field)



12.128 Figure 12.2 shows that:

- For aspects of the site (residential and extra care) removed from the local road network and rail line, and where the development buildings themselves afford screening from these sources, the external daytime noise level is predicted to be 47 dB LAeq,T or less. In these areas (shown in dark green) allowing a 12 dB reduction for an open window, the BS8233 internal limit for daytime resting will be met.
- At aspects (residential and extra care) setback and facing the road network and rail line, and where there is an increased angle of view to these sources (shown in light green), the daytime external noise level is predicted to be in the range 47 to 55 dB LAeq,T.
- From a review of the noise map at the closest proposed aspects (residential only) fronting Standing Way, Whaddon Road and the rail line (shown in yellow), the daytime external noise level is predicted to be in the range 55 to 65 dB LAeq,T.
- No areas of the site are expected to exceed the 65 dB LAeq,T external day-time threshold and therefore impacts no greater than moderate magnitude are likely at the Proposed Development.

12.129 The sensitivity of the receptor (residential and extra care) is considered to be high and drawing upon the predicted impact magnitude presented in Table 12.11, the impact prior to mitigation is considered to be moderate at worst. Therefore, there is potential for a direct, permanent, long-term effect on proposed noise sensitive receptors of moderate adverse significance to arise prior to the implementation of mitigation measures.

12.130 The external night-time noise level at proposed residential and extra care aspects (at first floor) is shown in Figure 12.3.

Figure 12.3 Night-time Noise Level, dB LAeq (Free Field)



12.131 Figure 12.3 shows that:

- For aspects of the site (residential and extra care) removed from the local road network and rail line and where the development buildings themselves afford screening from these sources, the external night-time noise level is predicted to be 42 dB LAeq,T or less. In these areas (shown in dark green) allowing a 12 dB reduction for an open window, the BS8233 internal limit for night-time will be met.
- At aspects (residential and extra care) setback and facing the road network and rail line, and where there is an increased angle of view to these sources (shown light green), the external night-time noise level is predicted to be in the range 42 to 50 dB LAeq,T .
- At aspects (residential only) fronting the road network (shown in yellow), the night-time external noise level is predicted to be in the range 50 to 60 dB LAeq,T.
- No areas of the site are expected to exceed the 60 dB LAeq,T external night-time threshold and therefore impacts no greater than moderate magnitude are likely at the Proposed Development.

12.132 The sensitivity of the receptor (residential and extra care) is considered to be high and drawing upon the predicted impact magnitude presented in Table 12.11, the impact prior to mitigation is considered to be moderate at worst. Therefore, there is potential for a direct, permanent, long-term effect on proposed noise sensitive receptors of moderate adverse significance to arise prior to the implementation of mitigation measures.

12.133 Given the predicted noise levels, it is necessary that consideration be given to the noise attenuation that will be required to ensure a commensurate level of protection against noise for future occupants within the proposed noise sensitive aspects.

External Noise Levels

12.134 With the development masterplan for the site included within the noise model, the daytime external LAeq,T noise environment at a height of 1.5m can be seen in Figure 12.4. The model includes both railway and road traffic noise sources.

Figure 12.4 External Daytime Noise Level, dB LAeq



12.135 Figure 12.4 shows that:

- The external ambient daytime noise level across the central areas of the site meets the lower guideline value of 50 dB LAeq,T.
- The external ambient daytime noise level at amenity areas fronting Whaddon Road, Buckingham Road and the rail line will meet the upper guideline value of 55dB LAeq,T.
- External amenity areas of the closest proposed aspects fronting Standing Way are predicted to exceed the upper guideline value of 55 dB LAeq,T during the daytime.
- Areas allocated for education use (Primary and Secondary) are not predicted to exceed an external ambient daytime noise level of 50 dB LAeq,T.
-

12.136 The sensitivity of the receptor (residential) in external amenity areas is considered to be high and drawing upon the predicted impact magnitude presented in Table 12.10, the impact prior to mitigation is considered to be moderate at the closest proposed residential receptors to Standing Way. Therefore, there is potential for a direct, permanent, long-term effect on proposed noise sensitive receptors of moderate adverse significance to arise prior to the implementation of mitigation measures.

12.137 For proposed amenity areas fronting Whaddon Road, Buckingham Road and the rail line, the sensitivity of the receptor (residential and extra care) is considered to be high and drawing upon the predicted impact magnitude presented in Table 12.10, the impact prior to mitigation is considered to be minor. Therefore, there is potential for a direct, permanent, long-term effect on proposed noise sensitive receptors of minor adverse significance to arise prior to the implementation of mitigation measures.

12.138 For the closest proposed educational aspects to the road network and rail line it is evident that worst case free-field noise levels during the daytime are not expected to exceed 50 dB LAeq,T. The sensitivity of the receptor (educational) is considered to be high and drawing upon the predicted impact magnitude for education uses, the impact prior to mitigation is considered to be negligible. Therefore, there is potential for a direct, permanent, long-term effect on proposed noise sensitive receptors of negligible significance to arise prior to the implementation of mitigation measures.

Development Related Traffic Noise

12.139 This assessment focuses on potential development generated road traffic noise levels on the existing road traffic network.

12.140 Road traffic noise predictions have been carried out in accordance with the CRTN for a notional receptor location 10m from the edge of the carriageway of each road considered. A notional receptor has been used because the change in traffic noise level adjacent to any given road will be the same at all distances where noise from that route is dominant. Traffic noise calculations have been undertaken to establish the change in the daytime LA10,18hr noise level.

12.141 Based on the methodology outlined above the LA10,18hr noise level has been determined for the following scenarios:

- 2026 year of completion without Proposed Development and with committed development flows.
- 2026 year of completion with Proposed Development and with committed development flows.
- 2033 (year of completion +7 years) without Proposed Development and with committed development flows.
- 2033 (year of completion +7 years) with Proposed Development and with committed development flows.

12.142 The predicted changes in road traffic noise for existing roads are shown in Table 12.17. This table shows the following comparisons / assessments and includes for committed developments.

- A - year of completion (2026) with Proposed Development (with committed development) v year of completion (2026) without the Proposed Development (with committed development);
- B – year of completion +7 years (2033) without Proposed Development (with committed development) v completion year (2026) without the Proposed Development (with committed development).
- C – year of completion +7 years (2033) with Proposed Development (with committed development) v completion year (2026) without the Proposed Development (with committed development).

12.143 The LA10,18hr façade noise level changes are compared in Table 12.17.

Table 12.17 Predicted Changes in Road Traffic Noise Levels Resulting from the Proposed Development, dB

RECEPTOR	LINK ID	[A] 2026 with development – 2026 without development	[B] 2033 without development – 2026 without development	[C] 2033 with development – 2026 without development
Buckingham Road	001 Buckingham Road, west of Weasel Lane	1.6	0.3	1.8
Bletchley Road	003 Bletchley Road	0.0	0.3	0.3
Whaddon Road	006 Whaddon Road (south of Weasel Lane)	0.4	0.3	0.6
Whaddon Road	007 Whaddon Road (north of Weasel Lane)	0.9	0.4	1.2
A421	008 A421 adjacent to Buckingham Road	0.1	0.3	0.4
Whaddon Road	023 Whaddon Road	0.4	0.3	0.6
Snelshall Street	029 Snelshall Street, SE of Anderson Gate	0.5	0.3	0.8
Standing Way	051 A421 Standing Way	0.5	0.3	0.7
Standing Way	053 A421 Standing Way near Rhoscolin Drive	0.9	0.3	1.1

12.144 Table 12.17 Column A, for all routes with the exception of Buckingham Road (west of Weasel Lane) noise level changes of less than +1dB in the short term are predicted to arise as a result of the Proposed Development in the year of completion.

12.145 It can be seen from Column C, that for all routes noise level changes of less than +3dB in the long term are predicted to arise as a result of the Proposed Development in the future assessment year.

12.146 Drawing upon the criteria presented in Table 12.8 for the year of completion, for links other than Buckingham Road (west of Weasel Lane) the impact magnitude is predicted to be negligible and the sensitivity of dwellings fronting these local road traffic routes is considered to be high. Therefore, there is likely to be a direct, permanent, short-term effect on dwellings of Negligible significance prior to the implementation of mitigation measures. For dwellings immediately adjacent to Buckingham Road (west of Weasel Lane) the sensitivity of dwellings is high and the impact prior to mitigation is predicted to be minor. Therefore, there is likely to be a direct, permanent, short-term effect on existing dwellings immediately adjacent to these links of minor adverse significance prior to the implementation of mitigation measures.

12.147 Drawing upon the criteria presented in Table 12.8 for the year of completion + 7 years (2033), for all dwellings fronting local road traffic routes, the impact magnitude is predicted to be negligible and the sensitivity of dwellings fronting these local road traffic routes is considered to be high. Therefore, there is likely to be a direct, permanent, long-term effect on dwellings of negligible significance prior to the implementation of mitigation measures.

12.148 The assessment has accounted for the road links in the immediate vicinity of the Proposed Development including links through the village of Newton Longville. Road traffic noise level changes in both the short and the long term are predicted to be of negligible impact magnitude at receptors in the vicinity of road link ID's 023 Whaddon Road and 003 Bletchley Road. By extension road links at a greater distance from the Proposed Development are expected to experience road traffic noise level changes no greater than those predicted for Newton Longville as development generated road traffic is spread across the local network.

Commercial/Industrial Sources

12.149 The introduction of the any fixed plant, general service yard activities, mobile plant and HGV movements associated with the employment uses, neighbourhood centre and school has the potential to result in adverse noise effects at existing and proposed noise sensitive receptors surrounding these uses. It is therefore necessary that the layout of these uses be carefully designed with the aim of minimising potential adverse noise effects.

12.150 Based on the illustrative Masterplan it is evident that the closest noise sensitive receptors to the employment uses, neighbourhood centre and school include the following:

- Assessment Location A – Dwellings off Wincanton Hill and Chepstow Drive; and
- Assessment Location B - Existing (i.e. Weasel Lane) and proposed residential properties within the development close to the employment areas.

12.151 Given the outline nature of the application and that the occupants of the employment areas of the development are currently unknown it is not possible to consider the potential noise effects associated with service areas and access roads in detail. Best practice mitigation design options which will be considered during formulation of the site layout and design are presented within the mitigation section.

12.152 Criteria have been determined in accordance with the methodology contained within BS4142. The criteria include corrections for acoustic characteristics in accordance with the guidance set out in BS4142.

12.153 Design criteria have been derived based on measurements undertaken at the following measurement locations as is applicable to the presented corresponding Assessment Location:

- Assessment Location A- Design criteria derived based on Measurement Location 4
- Assessment Location B- Design criteria derived based on Measurement Location 1

12.154 Based on the above, the combined noise level from all plant and equipment associated with the Proposed Development should be designed to meet the rating level design criteria in line with those presented in Table 12.18.

Table 12.18 Proposed Plant Rating Level Design Criteria, Free Field, dB

ASSESSMENT LOCATION	PERIOD	TYPICAL $L_{A90,T}$	RATING LEVEL DESIGN CRITERIA
Assessment Location A	Day (07:00 – 23:00)	45	45
	Night (23:00 – 07:00)	39	39
Assessment Location B	Day (07:00 – 23:00)	51	51
	Night (23:00 – 07:00)	43	45

- 12.155 The above rating level design criteria apply at 3.5m from the façade of any noise sensitive receptor (Free-Field).
- 12.156 In accordance with BS 4142, assessments of noise emissions plant and activities should include corrections for acoustic features (i.e. tonality, impulsivity, intermittency and other sound characteristics), before comparison with the above criteria.
- 12.157 The suggested noise design criteria presented within Table 12.18 have been provided with the aim of minimising potential noise effects associated with proposed equipment and fixed plant items. As the development proposals progress, and detail is available with respect to proposed plant, equipment and activities further detailed assessments will need to be undertaken in order to determine any mitigation required to comply with the limits presented above.
- 12.158 A condition will be imposed on the planning permission to ensure that all noise generating equipment and activities are designed to meet the criteria presented above. As such the magnitude of impact would be no worse than minor (Table 12.12).

Mitigation Measures

Construction Phase Mitigation

Construction - Noise

- 12.159 Safeguards exist to minimise the effects of construction noise, these include:
- The various EC Directives and UK Statutory Instruments that limit noise emissions of a variety of construction plant; and
 - The powers that exist for local authorities under Parts III of the EPA, and Sections 60 and 61 of the CoPA to control noise from construction sites.
- 12.160 Notwithstanding the absence of detailed construction phase information, the Best Practicable Means (BPM) will be employed to minimise construction impacts and the following specific measures will be employed in the Construction Environment Management Plan (CEMP).
- Limiting the use of particularly noisy plant, i.e. do not use particularly noisy plant early in the morning where avoidable.
 - Avoidance of the use of percussive plant where alternative non-percussive plant is available for a given task.
 - Limiting the number of plant items in use at any one time.
 - Completion of any earth bunding, site hoardings and any permanent noise barriers as early as practical in the construction programme.
 - Erection of local hoarding, screens or barriers as necessary to shield particularly noisy activities.
 - Phasing the works to maximise the benefit from perimeter structures.
 - Silencing any compressors, generators etc. brought on to site or use of sound reduced models fitted with acoustic enclosures.
 - Reducing the speed of vehicle movements when on-site.
 - Fitting all pneumatic tools with silencers or mufflers.
 - Ensuring that operations are designed to be undertaken with any directional noise emissions pointing away from noise-sensitive receptors where practicable.
 - Minimising drop heights when loading vehicles with rubble.

- Taking care when loading vehicles to minimise disturbance to local residents. Vehicles should be prohibited from waiting within the site with their engines running.
- Maintaining and operating all plant items in accordance with the manufacturers' recommendations in such a manner as to avoid causing excessive noise. All plant should be sited so that the noise impact at nearby noise-sensitive properties is minimised.
- Plant maintenance operations should be undertaken as far away from noise-sensitive receptors as possible.
- When replacing older plant, ensuring that the quietest plant available is considered wherever possible; any deliveries/waste removal vehicles should be programmed to arrive and depart during daytime hours only.
- Switching all audible warning systems to the minimum setting required by the Health and Safety requirements.
- Restricting the use of radios, other sound systems or loudspeakers when on-site.
- Taking a considerate and neighbourly approach to relations with local residents and ensuring that an on-site contact number for noise complaints is made available.

12.161 By implementing these measures, typical noise levels from construction works can be reduced by 5dB (A) or more.

12.162 With regards to training; the contractor's site induction programme and site rules will include good working practice instructions for site staff/managers and contractors to help minimise noise and vibration whilst working on the site. This will be secured through the CEMP.

12.163 Good working practice guidance/instructions will include, but not be limited to, the following points:

- Avoid un-necessary revving of engines;
- Plant used intermittently should be shut-down between operational periods;
- Avoid reversing wherever possible;
- Drive carefully and within the site speed limit at all times; and
- Report any defective equipment/plant as soon as possible so that corrective maintenance can be taken.

12.164 With regards to maintenance weekly inspection of all plant will be made to ensure that:

- Any plant found to be requiring interim maintenance should be identified by the operator and repairs undertaken by a qualified engineer as soon as possible.
- Doors fitted to acoustic enclosures around fixed plant remain closed; the fitting of self-closing mechanisms is advisable.

12.165 Consultation and communication with the local community throughout the construction period also serves to publicise the works schedule, giving warning to residents regarding periods when higher levels of noise may occur during specific operations, and providing them with lines of communication where complaints can be addressed. Dissemination of such information is likely to encourage the community to be tolerant of short-term disturbance with potential long-term benefits of the proposals.

12.166 A complaints response system shall be maintained by the construction contractor for the site enabling any complaints regarding noise to be reported and appropriate action taken.

12.167 An investigation shall be instigated as soon as possible following receipt of the complaint to identify the cause of the complaint and may involve the identification and cessation of the activity or activities considered to be the cause of the complaint and/or the investigation of mitigation measures to reduce the noise emission levels from the activity or activities, for example the replacement of noisy plant with quieter alternatives and/or the use of temporary screening mounds.

12.168 Any deviation from agreed working practices shall be identified immediately and conformance to the working practice reinstated.

12.169 Through implementation of mitigation measures and industry best practice it is considered that construction noise effects can be controlled. After mitigation, the effect is likely to be temporary, minor adverse at existing receptors. Careful management of noise through the CEMP will need to be implemented.

Construction - Vibration

12.170 Notwithstanding that construction vibration from the development are considered to be negligible, BPM will be adopted with respect of construction generated vibration and associated activities when operating near to existing receptors. Many of the generic measures listed for noise will also help to minimise vibration. All plant items will be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive vibration, whilst careful consideration should be given to the methods of work.

12.171 Mitigation measures and appropriate operational considerations will be incorporated within the CEMP in order that the effects of groundborne construction vibration can be kept to a minimum wherever practically possible.

Operational Phase Mitigation

Absolute Noise Levels

12.172 Given the measured night-time LAFmax noise levels and the distances between the closest possible proposed noise sensitive aspects and the existing road traffic links, it is expected that mitigation will be dictated by LAeq,T levels and not LAFmax levels.

12.173 Figures 12.2 and 12.3 illustrate that at those sensitive receptors towards the fringe of the proposed development, the daytime and night-time internal noise environment exceeds the guideline values recommended in BS8233 with an allowance for open windows.

12.174 In these areas shown yellow (daytime and night-time) there will be effects of Moderate significance and mitigation to reduce noise levels internally would be required. PropPG: Planning and Noise Supplementary Document 2, Good Acoustic Design, provides advice and guidance on 'Good Acoustic Design process' that incorporates design amendments to avoid 'unreasonable' acoustic conditions and prevent 'unacceptable' acoustic conditions.

12.175 Examples of these are listed below in order of preference for a site of this nature and size:

- Maximising the spatial separation of noise source and receptor;
- Boundary Screening – this could be in the form of a wall, fence or earth bund, or a combination thereof;
- Using the layout of the scheme to reduce noise propagation across the site;
- Internal layouts - whereby rooms for resting and sleeping are located on the side of the building furthest away from the noise source(s). Rooms of lower noise sensitivity such as kitchens, bathrooms and circulation spaces should be placed on the noisy side of the dwelling. The number of windows and doors on the noisy façade could also be limited (not just in number, but also in size) where possible so as to provide sufficient noise insulation without having to resort to expensive glazing and ventilation methods; and
- Sound insulation/mechanical ventilation - typically a last resort (where the above options have been exhausted), significant attenuation can be provided by closed windows, with numerous glazing (and background ventilation unit) configurations available to maximise the sound insulation performance of the building envelope.

- 12.176 Notwithstanding the above recommendations, a worst-case mitigation assessment has been undertaken at the worst affected receptors closest to, and facing towards, the local road network in order to determine the acoustic properties of façade components that are expected to be required in order to achieve the adopted internal noise criteria..
- 12.177 It is assumed that the non-glazed elements of the building envelope will provide sufficient sound insulation against external noise sources. Therefore, as the glazing elements are likely to be the acoustic ‘weak link’ of the building façade, it is appropriate to explore the level of protection afforded by the glazing.
- 12.178 The glazing assessment has been based on the external daytime and night-time noise levels as presented in Figure 12.2 and 12.3. The ‘simple calculation’ methodology within BS 8233 describes a procedure for determining the sound insulation performance of the glazing based on the external noise levels and the internal noise criteria.
- 12.179 This methodology does, however, potentially underestimate the sound insulation performance requirement by up to 5 dB. Therefore, the sound insulation performance figures cautiously include an allowance of 5 dB.
- 12.180 A summary of the internal noise criteria, the predicted free-field noise levels, and the required sound insulation values (with an allowance of 5 dB) is set out in Table 12.19.

Table 12.19 Required Sound Insulation Performance for Residential Dwellings at Worst Case Development Locations, dB(A)

LOCATION	PERIOD	NOISE LEVEL (dBA)	INTERNAL TARGET NOISE LEVEL	REQUIRED SOUND REDUCTION
Closest possible proposed residential and educational uses ¹	Day (L _{Aeq,16hr})	66	35	36
	Night (L _{Aeq,8hr})	57	30	32
Closest possible proposed extra care uses	Day (L _{Aeq,16hr})	65	40	30
	Night (L _{Aeq,8hr})	56	35	26

¹ Only daytime noise levels applicable to educational aspects.

- 12.181 Where trickle ventilators are to be installed in the building façade to provide background ventilation (assumed to be the case), it can be assumed windows are used only for purge or discretionary ventilation, the assessment of noise break-in assumes that the windows are closed (and the ventilation units open).
- 12.182 British Standard 12354-3:2000 Building Acoustics – Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound (BS12354-3) (Ref. 12.21) sets out data relating to the typical noise reduction performance of different glazing systems. A selection of these performances is set out in Table 12.20.

Table 12.20 Typical Sound Reduction Properties of Insulating Glass Units

GLASS / CAVITY WIDTH / GLASS (mm)	SOUND REDUCTION ($R_w - C$ dB)
4 / 12 / 4	28
6 / 12 / 6	30
10 / 12 / 6	36

12.183 Comparing the sound insulation performance requirements in Table 12.19 with the typical sound insulation performance values of those different glazing systems presented in Table 12.20, standard double-glazing systems, such as 6/12/6 (glazing (mm) / air gap (mm) / glazing (mm)), would be sufficient in order to achieve the internal noise criteria within habitable rooms of the worst affected buildings with windows closed.

12.184 The above calculations do not make any allowance for the incorporation of permanent ventilation to the dwellings. On ventilation, BS 8233 advises that:

"The Building Regulations on ventilation recommend that habitable rooms in dwellings have background ventilation. Trickle ventilators can provide this, and sound attenuating types are available. Where sound insulation requirements preclude opening windows for rapid ventilation and cooling, acoustic ventilation units incorporating fans are available for insertion in external walls; these can provide sound reduction comparable with domestic secondary glazing."

12.185 Where appropriate, the preferred choice of ventilation is through the use of natural ventilation openings such as trickle vents, air-bricks and passive ventilation devices. Such ventilators can be used to meet the requirements of the Building Regulations Approved Document F for background ventilation. The future occupants would then have the option of keeping windows closed for most of the time and opening windows for rapid ventilation and summer cooling.

12.186 The Building Research Establishment (BRE) has published an Information Paper on the acoustic performance of such passive ventilation systems. IP4/99: 1999: Ventilators: Ventilation and Acoustic Effectiveness (Ref. 12.22) details a study into the sound reduction performance of fourteen different window mounted trickle ventilators and seven different through-wall passive ventilators. The measured sound reduction performance, after taking into account flanking sound paths (i.e. sound paths that do not travel directly through the vent) and the effective area of the ventilator are provided in Table 12.21.

Table 12.21 Range of Measured Sound Reduction Performance Values for Passive Ventilators, with Vents Open

WINDOW MOUNTED TRICKLED VENTS (OPEN) dB(A)	PASSIVE THROUGH-WALL VENTILATORS (OPEN) dB(A)
From 14 to 40 (depending on model)	From 30 to 46 (depending on model)
Note: The figures have been corrected for the effective area of the ventilator	

12.187 The above figures show that passive through wall ventilators are available that meet the requirements of the Building Regulations Approved Document F for background ventilation and also provide a sound insulation performance that meets or exceeds that required from the glazing elements.

12.188 The above mitigation assessment has been provided as a means of demonstrating how acceptable internal noise levels can be achieved at the design stage within the proposed noise sensitive buildings (residential accommodation, extra care and educational aspects).

External Noise

12.189 Figure 12.4 demonstrates that at those aspects fronting Standing Way the daytime external noise environment is predicted to exceed 55 dB LAeq,T. In these areas shown yellow there will be a Moderate significant effect and mitigation to reduce noise levels in external areas would be required. In order to mitigate the effect, the layout of the development should be designed such that the dwellings provide screening to their gardens and outdoor amenity areas.

Development Related Traffic

12.190 The predicted significance of effects is minor at worst in the short-term; no further mitigation is required.

Commercial/Industrial

12.191 It is assumed that the specification and location of any plant and equipment is sufficiently flexible to ensure suitably quiet plant can be procured, and/or mitigation options can be investigated, to ensure compliance with the recommended design criteria. Similarly, it is expected that the specification of buildings and / or enclosures and compounds housing plant and equipment is sufficiently flexible to enable acoustic mitigation to be built into the design of the proposed noise generative uses.

12.192 A summary of the mitigation measures which will be adopted during the detailed design of the South West Milton Keynes development is detailed below:

- Careful siting of noise sources.
- Choice of HVAC and refrigeration plant.
- The provision of screening to delivery areas and HVAC plant.
- Choice of construction materials and sound insulation for the commercial buildings to reduce noise break out.
- Agreement of delivery hours with the local authority.
- Agreement with the local authority on opening hours of premises within the development.

Residual Effects

Construction Phase Residual Effects

Construction Noise

12.193 Mitigation and enhancement measures are proposed for the construction phase of the development. There is likely to be a direct, temporary, short to medium term residual effect on existing receptors of negligible to moderate adverse significance.

Construction Vibration

12.194 Specific mitigation measures for construction vibration are not considered necessary. The effect of the proposed development is likely to be a direct, temporary, short to medium term residual effect on existing receptors of negligible significance.

Operational Phase Residual Effects

Internal Noise

- 12.195 Accounting for future railway traffic and road traffic flows in the assessment year 2026 with cumulative development, at the closest location to the local road and rail network once account is taken of the appropriate sound insulation (building fabric specification), a commensurate level of protection can be afforded to future occupants of proposed noise sensitive uses.
- 12.196 With those mitigation measures in place, the impact magnitude will be negligible. The sensitivity of proposed residential and extra care uses is high, and the impact magnitude, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term residual effect on such receptors of negligible significance following the implementation of mitigation measures.

External Noise

- 12.197 For external noise levels accounting for a worst-case scenario it has been identified that with due consideration to development layout and boundary acoustic treatment the impact following the recommended mitigation, is negligible at worst. The sensitivity of proposed users of the external amenity areas is high, and the impact magnitude, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, long-term residual effect on such receptors of negligible significance following the implementation of mitigation measures.

Development Related Traffic

- 12.198 The sensitivity of existing noise sensitive receptors is high, and the predicted impact magnitude, remains minor at worst in the short term for dwellings immediately adjacent to Buckingham Road (west of Weasel Lane). Therefore, there is likely to be a direct, temporary, short-term residual effect on existing sensitive receptors of minor adverse significance.

Commercial/Industrial Noise

- 12.199 The proposed acoustic design criteria have been derived with the aim of appropriately minimising the likelihood of adverse effects. Provided that these criteria are complied with, and that appropriate scheme design is progressed, the magnitude of impact, following mitigation, will be minor. Given that the sensitivity of proposed and existing noise sensitive receptors will be high, and the magnitude of impact, following mitigation, is minor, there is likely to be a direct, temporary, long-term effect on existing and proposed noise sensitive receptors of minor significance following the implementation of mitigation measures.

Cumulative Effects

Cumulative Impacts of the Proposed Scheme with other Schemes

- 12.200 The only possible cumulative effect of this scheme could result from the generation of additional traffic on local roads. It is understood that all currently known committed schemes are included within the traffic model and have therefore already been included within the traffic noise assessment.
- 12.201 Cumulative effects associated with the baseline conditions across the Site have been considered through the assessment of all the existing dominant noise sources within the vicinity of the Proposed Development and any noise sources likely to be proposed in the future. This has included a consideration of the future use of the East West Rail Project.
- 12.202 Therefore, in relation to noise and vibration, there are not considered to be any cumulative impacts of the proposed development.

Summary

12.203 This assessment has included:

- Qualitative assessment of construction noise and vibration impacts at sensitive receptors.
- Assessment of noise levels at the Application Site.
- Assessment of noise levels at receptors, which have the potential to be affected by an increase in road traffic noise level in future years as a result of the development.
- Qualitative assessment of commercial/industrial noise impacts at sensitive receptors.

12.204 The assessment has concluded:

- The significance of construction noise effects has the potential to be major adverse at worst. With mitigation in place the impact magnitude would reduce to negligible to moderate. Residual effects are predicted to be of negligible to moderate adverse significance.
- The significance of construction vibration effects is negligible. As such, no further mitigation is required and the residual effects will remain of negligible significance.
- The significance of future ambient noise levels upon the noise sensitive aspects of the Proposed Development have been assessed to be of moderate adverse significance at a small number of aspects facing and closest to Standing Way, Whaddon Road and the rail line during the daytime and night-time. With mitigation in place in the form of appropriate façade insulation and appropriate layout, design and boundary treatment the impact would reduce to negligible. Residual effects are predicted to be of negligible significance for internal habitable rooms and external amenity areas.
- The significance of potential road traffic noise level changes from development generated road traffic at existing dwellings immediately adjacent to Buckingham Road (west of Weasel Lane) have been assessed to be of minor adverse significance. As such, no further mitigation is considered necessary and the residual effects are of minor adverse significance.
- Rating level noise limits for proposed commercial/industrial noise sources have been recommended to ensure that any residual effects would be no greater than of minor significance.

12.205 Table 12.22 summarises the environmental noise and vibration impacts of the South West Milton Keynes development, both for the construction and the operational phases.

Table 12.22 Significant Environmental Effects

CHARACTERISATION OF THE IMPACT	PERIOD	SENSITIVITY OF RECEPTORS	POTENTIAL SIGNIFICANCE	ADDITIONAL MITIGATION	RESIDUAL EFFECTS
Construction Noise	Daytime	High	Major	CEMP Industry best practice	Negligible to Moderate
Construction Vibration	Daytime	High	Negligible	N/A	Negligible
Noise Effect upon the Development – Internal	Daytime/Night-Time	High	Minor to Moderate	See chapter	Negligible

CHARACTERISATION OF THE IMPACT	PERIOD	SENSITIVITY OF RECEPTORS	POTENTIAL SIGNIFICANCE	ADDITIONAL MITIGATION	RESIDUAL EFFECTS
Noise Effect upon the Development – External	Daytime	High	Minor to Moderate	See chapter	Negligible
Development Related Traffic	Daytime/Night-Time	High	Negligible to Minor	N/A	Negligible to Minor
Commercial/Industrial Noise	Daytime/Night-Time	High	Minor	See chapter	Minor

References

Ref 12.1 UK Government, 1974, *Control of Pollution Act (CoPA)*.

Ref 12.2 UK Government, 1990, *Environmental Protection Act (EPA)*.

Ref 12.3: *Aylesbury Vale District Local Plan. January 2004*

Ref 12.4: *Milton Keynes Council, 2019. Plan: MK 2016-2031.*

Ref 12.5: *Vale of Aylesbury Local Plan 2013 – 2033. Proposed Submission.*

Ref 12.6: Department for Communities and Local Government, 2019. *National Planning Policy Framework*.

Ref 12.7: Department for Environment, Food and Rural Affairs, 2010. *Noise Policy Statement for England (NPSE)*.

Ref 12.8: Department for Communities and Local Government, 2019. *Planning Practice Guidance (PPG)*.

Ref 12.9: Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH), 2017, *ProPG: Planning & Noise Supplementary Document 2 Good Acoustic Design*.

Ref 12.10: British Standard BS5228:2009+A1:2014 *Noise and vibration control on construction and open sites – Part 1 Noise*.

Ref 12.11: British Standard BS5228:2009+A1:2014 *Noise and vibration control on construction and open sites – Part 2 Vibration*.

Ref 12.12: Department of Transport, 1988. *Calculation of Road Traffic Noise (CRTN)*.

Ref 12.13: Highways England/Transport for Scotland. 2019. Design Manual for Roads and Bridges, Sustainability & Environment Appraisal LA111 Noise and Vibration, Revision 1.

- Ref 12.14: *Method for Converting the UK Road Traffic Noise Index $L_{A10,18hr}$ to the EU Noise Indices for Road Noise Mapping*, 2006.
- Ref 12.15: Department of the Environment, Transport and the Regions (DETR), 1995. *Calculation of Railway Noise*.
- Ref 12.16: BS8233:2014 *Guidance on sound insulation and noise reduction for buildings*.
- Ref 12.17: World Health Organisation (WHO), 1999. *Guidelines for Community Noise*.
- Ref 12.18: Building Bulletin 93 (BB93), 2014. *Acoustic Design of Schools: Performance Standards*.
- Ref 12.19: Department of Health, 2013. *Health Technical Memorandum 08-01: Acoustics*.
- Ref 12.20: BS 4142:2014+A1:2019. *Methods for Rating and Assessing Industrial and Commercial Sound*.
- Ref 12.21: BS 12354-3:2000 Building Acoustics – *Estimation of acoustic performance of buildings from the performance of elements – Part 3: Airborne sound insulation against outdoor sound*.
- Ref 12.22: Building Research Establishment (BRE) IP4/99: 1999: *Ventilators: Ventilation and Acoustic Effectiveness*

13. SOCIO-ECONOMIC ISSUES

Introduction

- 13.1 This Chapter assesses the potential socio-economic impacts of the Proposed Development, to evaluate the significance of any effects on socio-economic matters, and to identify the mitigation measures required to prevent, reduce or offset any significant adverse socio-economic effects.

Planning Policy Context

Local Policy

- 13.2 The development plan for the Planning Application comprises the following:

- Aylesbury Vale District Local Plan adopted January 2004 (AVDLP2004) – saved policies.
- Plan:MK adopted March 2019 (Plan:MK)

- 13.3 In addition, the Application Site is allocated in the Submission Vale of Aylesbury Local Plan (SVALP2017) for a mixed use sustainable urban extension – Site Ref. NVL001: Land at South West Milton Keynes. Policy NLV001 provides for residential development, community facilities and green infrastructure, education, a neighbourhood centre, and employment all of which are relevant to socio-economic matters. These matters have not been identified as a concern in the Inspector's interim findings and are not included as main modifications proposed by the Council.

Aylesbury Vale District Local Plan (2004)

- 13.4 There are no saved policies within AVDLP2004 that are relevant to socio-economic issues.

Plan:MK (2019)

- 13.5 Plan:MK sets out the vision and framework for the development of the Borough of Milton Keynes to 2031, addressing issues such as housing, the economy, infrastructure, the environment, adapting to climate change and securing good design. The spatial vision for Plan:MK expects Milton Keynes to grow during the plan period.

- 13.6 Plan:MK sets out a number of strategic objectives, including:

“Strategic Objective 2: To deliver land for a minimum of 26,500 net new homes within the Borough between 2016 and 2031, principally within and adjacent to the city.”

“Strategic Objective 3: To work jointly with neighbouring authorities and other key organisations on the planning of any development located on the edge of Milton Keynes (but outside the Borough boundary) so that these areas are integrated with the city and contribute to its role and character.”

- 13.7 Plan:MK sets out the housing strategy for the plan period, stating that the provision of new homes and jobs from 2016 to 2031 will be focused on, and adjacent to, the existing urban area of Milton Keynes and the three key settlements of Newport Pagnell, Olney and Woburn Sands.
- 13.8 Policy SD15 is considered particularly relevant as it sets out the place-making principles for development for sustainable urban extensions in adjacent local authorities. It states that:

- A. *"It is expected that development proposals on the edge of Milton Keynes are likely to have significant impacts upon the infrastructure and services of Milton Keynes, particularly given the significant attractor Milton Keynes will be for any future residents.*
- B. *When and if development comes forward for an area on the edge of Milton Keynes which is wholly or partly within the administrative boundary of a neighbouring authority, this Council will put forward the following principles of development during the joint working on planning, design and implementation:*
 1. *The local authorities will work jointly, and with infrastructure and services providers, to achieve a coordinated and well designed development.*
 2. *A sustainable, safe and high quality urban extension should be created which is well integrated with, and accessible from, the existing city. Its structure and layout should be based on the principles that have shaped the existing city, especially the grid road system, redways and the linear parks and strategic, integrated flood management.*
 3. *A strategic, integrated and sustainable approach to water resource management (including SUDS and flood risk mitigation) should be taken.*
 4. *The design of development should respect its context as well as the character of the adjoining areas of the city.*
 5. *Linear parks should be extended into the development where possible to provide recreational, walking and cycling links within the development area and to continue the city's extensive green infrastructure and redway network.*
 6. *Technical work should be undertaken to fully assess the traffic impacts of the development on the road network within the city and nearby town and district centres and adjoining rural areas, and to identify necessary improvements to public transport and to the road network, including parking.*
 7. *A route for the future construction of a strategic link road(s) and/or rail link should be protected where necessary.*
 8. *New social and commercial facilities and services should be provided, and existing facilities improved where possible, to meet the day to day needs of new and existing residents.*
 9. *The opportunity for new 'Park and Ride' sites for the city should be fully explored and where possible provided, and efficiently and effectively linked to the city road system.*
 10. *The local authorities and their partner organisations should produce an agreement on appropriate mechanisms to secure developer contributions towards improvement and provision of infrastructure to support the development, including facilities in the city that will be used by residents of the development area."*

Submission Vale of Aylesbury Local Plan 2013 - 2033 (2017) including Proposed Modifications

- 13.9 The SVALP2017 sets out the strategic vision for the District to 2033. Policy S2 states that the Local Plan will make provision for the delivery of 27,400 new homes (increased to 28,600 as part of the Proposed Modifications), at least 27 hectares of employment land, at least 7,337 sq. m of retail convenience and at least 29,289 sq. m of comparison floorspace. The SVALP2017 stipulates that the primary focus of strategic growth and investment will be at Aylesbury, Buckingham, Winslow, Wendover and Haddenham, as well as adjacent to Milton Keynes. In terms of the latter, it states that *"land within Aylesbury Vale adjacent to Milton Keynes will make provision for 2,212 homes on a number of sites"*; however, the Proposed Modifications updates this to *"land in the north east of Aylesbury Vale will make provision for 3,362 [homes] on a number of sites"* (Policy S2f).
- 13.10 Section 4 of the SVALP2017, entitled Strategic Delivery, examines strategic locations for growth in the District. This includes land adjacent to Milton Keynes, Policy D-NLV001, which allocates the Application Site and a parcel of land to the east for a residential-led mixed use scheme to include:
 - **Residential** - 1,855 dwellings

- **Community facilities and green infrastructure** - 55.35ha of green open space; 1.22ha of allotment land; eight locally equipped areas of play (LEAPs); two neighbourhood equipped areas of play (NEAPs); a youth shelter; a multi-use games area (MUGA); sports hall; changing pavilion; skateboard park; sports pitches; cricket wicket; tennis courts; and a community centre.
- **Education** - a three-form entry primary school, early years pre-school facilities, and a secondary school
- **Neighbourhood centre** - a neighbourhood centre covering 0.67ha to include retail (A1/A2/A3/A5 and A5) and community facilities (D1 and D2).
- **Employment** - an employment area (B1) on 2.07ha of land.

13.11 The Proposed Modifications include an additional draft allocation in the north east of Aylesbury Vale, adjacent to Milton Keynes. The new draft allocation at Shenley Park, Policy D-WHA001, would increase the housing provision in this part of the District from 2,212 homes to 3,362 homes. The allocation includes:

- **Residential** - 1,150 homes and a 110 bed care home/extra care facility
- **Community facilities and green infrastructure** - multi-functional green infrastructure
- **Education** - a two-form entry primary school, pre-school facilities and a new secondary school (subject to need)
- **Local centre** - a local centre to include a community hall and the option of a healthcare facility

13.12 Section 6 of the SVALP2017, entitled 'Economy', sets out the employment vision of the plan to *"ensure the availability of a diverse and flexible range of employment opportunities for new and existing businesses, which match the expectations for employment growth in the district"*.

13.13 Section 11 of the SVALP2017 covers green infrastructure, sport and recreation, and community facilities. It stipulates the need for green infrastructure to meet the environmental, social and economic needs of communities and wildlife; for sports and recreation facilities to help improve the health of the community and promote social cohesion; and community facilities to help promote healthy inclusive community where residents have opportunities to meet through safe and accessible environments.

National Policy and Guidance

13.14 The NPPF covers a wide range of socio-economic issues including, but not limited to, housing, the economy, the vitality of town centres, the health and safety of communities, sustainable transport, and the design of spaces. Paragraph 20 advises that, at a strategic level, policies should set out an overall strategy for the pattern, scale and quality of development and make such provision for housing, affordable housing, employment, retail, leisure and other commercial development.

13.15 Paragraph 72 advises that *"the supply of large numbers of new homes can often be best achieved through planning for larger scale development, such as new settlements or significant extensions to existing villages and towns, provided they are well located and designed, and supported by the necessary infrastructure and facilities"*.

13.16 Paragraph 104 stipulates that planning policies should support an appropriate mix of uses across an area, and within larger scale sites, to minimise the number and length of journeys needed for employment, shopping, leisure, education and other activities.

Assessment Methodology

- 13.17 The need for an assessment on socio-economic issues was identified within the Scoping Report submitted to AVDC in January 2013 in respect of the previous scheme. AVDC subsequently adopted a scoping opinion which confirmed that the matters identified in the Scoping Report were those that needed to be addressed within the ES.

Scope of the Assessment

- 13.18 The issues, which are addressed as part of this socio-economic chapter, comprise:
- any impacts on the characteristics of the local population as a result of the Proposed Development;
 - any impacts arising from the employment provision within the Application Sites and the number of jobs likely to be created as a result of the Proposed Development;
 - any impacts arising from the proposed use of the Site on the existing centres in the surrounding area;
 - any impacts on the education provision as a result of the Proposed Development;
 - any impacts on the provision of open space for play, sport and recreation as a result of the Proposed Development; and
 - how facilities and services will be phased as part of the delivery of the Proposed Development.
- 13.19 The above criteria were considered through undertaking an initial desktop analysis of local information, including the 2011 Census results, to examine initial baseline conditions. A separate Health Impact Assessment containing additional information on employment, education and health matters is provided in **Appendix 13.2**.
- 13.20 There are inherent difficulties associated with determining the significance of socio-economic impacts. Therefore, it is inevitable that there will be a degree of subjectivity in assessing the nature of the impacts described. However, the assessment describes the principal effects in terms of whether the impact and any residual effects are beneficial or adverse; permanent or temporary; and major, moderate, minor or negligible.

Reference Material and Assessment Method

- 13.21 The baseline information provided in this chapter has been sourced from the Office of National Statistics, Department for Work and Pensions, Department for Health, Census data, and relevant studies undertaken on behalf of Buckinghamshire County Council, AVDC and MKC.

Assumptions and Limitations

- 13.22 In the context of the analysis below, it is important to note that the Application is for outline planning permission with all matters reserved except for access for a mixed-use sustainable urban extension on 144.48 hectares of land to the south west of Milton Keynes. A full description of the Proposed Development is provided in Chapter 2.
- 13.23 The empirical data used in the assessment is limited by the quality of the data that has been published or is available from independent and reliable sources.
- 13.24 HS2 is currently planned to go through the District and it is uncertain how this will influence the medium and long-term patterns of growth in the District.
- 13.25 The Site abuts land reserved for the opening of the East / West railway line. This part of the East / West railway line falls within the Western Section: Phase 2 between Bicester Village and Bedford. The East West Railway Company Ltd advises that the Western Section: Phase 2 involves creating a new station at Winslow,

building two new platforms at Bletchley, installing 8 new over-bridges, 22 new footbridges or subways, and making changes to 97 railway crossings. It advises that some enabling work has already been completed, and that major work will begin in late 2019 with the first of these services to be introduced from the end of 2023. While it was previously intended for the East / West railway line to be electrified, this has since been deferred indefinitely.

Baseline Conditions

Demographics

- 13.26 The total population of the Aylesbury Vale District was estimated at 199,448 in 2018 (ONS 2018 Mid Year Estimates), compared to a total population of 9,133,625 in the South East region. Table 13.1 below illustrates the population changes between the last two Census datasets.
- 13.27 The Aylesbury Vale District's population grew by some 5.1% between 2001 and 2018, which represents a comparatively low growth rate compared to that of Milton Keynes (20.2%), Buckinghamshire (5.5%) and the South East 7.9%) - see Table 13.1 below.

Table 13.1 Population Changes between 2001 and 2018

Area	Population		Population Increase (%)	Latest Estimates	Overall Change (%)
	2001 Census	2011 Census	2001 - 2011	Mid 2018	
Aylesbury Vale District	165,748	174,137	5.1	199,448	20.33
Milton Keynes District	207,057	248,821	20.2	268,607	29.73
Buckinghamshire	479,026	505,283	5.5	540,059	12.74
South East Region	8,000,645	8,634,750	7.9	9,133,625	14.16

(Census Data 2001 and 2011, and ONS)

- 13.28 The demographic characteristics of the population have also changed, as is shown in Table 13.2. For example, the number of residents aged 60 - 64 registered a proportionally higher increase of 48% between 2001 and 2011. In contrast, Buckinghamshire's comparative increase was 32% and the South East of England was 38%. Aylesbury Vale also saw a 29% increase in those aged 80 - 84 between 2001 and 2011, compared to an increase of only 1.5% in Milton Keynes over the same time period and an increase of 14% in the South England region.
- 13.29 In contrast to this, the 30 - 34 years age group experienced a relatively large decrease in population of 18% between 2001 and 2011. This decrease was greater than those for Buckinghamshire and the South East region which experienced decreases of 14% and 10% respectively, but can perhaps be partially explained by the close proximity of London and to a lesser extent Milton Keynes, the latter of which experienced an 8.4% increase over the same period.
- 13.30 This largely indicates that the Aylesbury Vale District has become increasingly attractive to those people over 65 years of age, while residents in younger age groups seem to look for opportunities elsewhere, such as in

neighbouring Milton Keynes. The working age group that saw the biggest rise in Aylesbury Vale were those aged 45 to 49, which saw a 27% increase between 2001 and 2011.

- 13.31 It is also pertinent to note that around 40% of the population live in the main town of Aylesbury which is the focus for employment and social services in the District.

Table 13.2 Demographic Changes Between the 2001 and 2011 Census'

AGE BANDS	AYLESBURY	MILTON KEYNES	BUCKS	SOUTH ENGLAND	ENGLAND
0-19 year olds	1%	26.9%	3%	35%	33%
20 - 24 year olds	4%	5.6%	4%	15%	20%
25 - 29 year olds	-6%	7.9%	-5%	5%	10%
30 - 34 year olds	-18%	8.4%	-14%	-10%	-8%
35 - 39 year olds	-17%	7.8%	-13%	-10%	-10%
40 - 44 year olds	6%	7.7%	6%	11%	11%
45 - 49 year olds	27%	7.2%	23%	26%	24%
50 - 54 year olds	5%	6.4%	1%	1%	2%
55 - 59 year olds	8%	5.7%	2%	4%	6%
60 - 64 year olds	48%	5.3%	32%	38%	32%
65 - 69 year olds	25%	3.6%	21%	73%	18%
70 - 74 year olds	22%	2.7%	16%	6%	4%
75 - 79 year olds	14%	2.0%	20%	4%	2%
80 - 84 year olds	29%	1.5%	29%	14%	13%
85 and above	31%	1.5%	30%	25%	24%

(Census Data, 2001 and 2011)

Housing

- 13.32 With regard to Aylesbury Vale's housing market, the analysis shows that there is a comparatively high proportion of detached and semi-detached housing and a low proportion of flats, maisonettes or apartments. The breakdown of occupied households by tenure, as measured in the 2011 Census, indicates that most dwellings are owner occupied (72%), while a relatively low proportion of the population live in private rented accommodation (13%), social rented accommodation (13%), shared ownership accommodation (1%) and rent free accommodation (1%).
- 13.33 With regard to housing need and affordability, analysis shows that Aylesbury Vale continues to face major challenges. The issue of affordability was highlighted in the Housing Monitoring Factsheet 2016 which advises that there remains a severe problem with a lack of affordability of housing in the District. This is supported by

recent ONS statistics which reveal that the median house price in 2019 was 10.05 times the median gross annual income for residence-based earnings, up from 8.12 in 2014 (ONS, 2020).

- 13.34 With regard to housing need, the Council published documents setting out the market and affordable housing need for the District to support the emerging SVALP2017. SVALP2017 as modified identifies an overall need for an additional 6,850 affordable dwellings homes between 2013 and 2033, which equates to an average of 343 affordable dwellings per annum.
- 13.35 The need to address affordable housing early on in the plan period was also recognised within the Buckinghamshire Housing and Economic Development Needs Assessment Update 2016. It states that, given the unmet need for almost 1,800 affordable homes in the Buckinghamshire Housing Market Area at the start of the Plan periods, it would be appropriate to maximise affordable housing delivery in the early years of the Plans, provided this does not unduly compromise overall levels of housing delivery in the area.
- 13.36 Therefore, in order for Aylesbury Vale to keep its generally low level of deprivation, issues with housing affordability will need to be addressed by bringing forward new housing development quickly.

Employment

- 13.37 Labour supply data suggests that the number of people in Aylesbury Vale who are economically active (either in employment or unemployed) is similar to that of the South East region. For the year to June 2018, Aylesbury Vale had an economic activity rate of 84.9%, compared to 81.1% for the South East (ONS, 2018a). Table 8 and 9 in the Health Impact Assessment (see **Appendix 13.2**) provides additional information on economic activity and qualifications.
- 13.38 With regard to employment rates⁸, Aylesbury Vale has seen a year on year improvement in employment rates since the year to June 2012, starting at 72.5% and raising steadily to 83.4% in the year to June 2018. In contrast, employment rates have been lower and more erratic in Milton Keynes and Buckinghamshire, the former of which experienced only three years of continuous improvements from 73.9% in the year to June 2016, raising to 76.9% in the year to June 2018. Buckinghamshire experienced a decline from 82.8% in the year to June 2017 to 81% in the year to 2017/2018.
- 13.39 The unemployment rate⁹ for 16-64 year olds in Aylesbury Vale for the period to June 2018 was down from the previous year at 1.9%. While similar to Buckinghamshire (1.8%), it was lower than Milton Keynes (5.3%) and the South East region (3.6%) for the same period (ONS, 2018a). While the claimant counts as a proportion of residents aged 16-64 rose slightly from 0.7% in June 2016 to 0.8% in June 2017 and 2018, they remained lower than those for Milton Keynes, Buckinghamshire and the South East for the same period.
- 13.40 In terms of job density, ONS data replicated in Table 13.3 suggests that Aylesbury Vale has a comparatively low job density rate compared to Milton Keynes, Buckinghamshire, the South East and England. This is further supported by the decrease in residents aged between 25 and 34 shown in Table 13.2 above, suggesting that the population is increasingly tending to look for work elsewhere: notably London, Oxford, Hertfordshire and Milton Keynes. This suggests that any employment-creating initiatives in Aylesbury Vale are likely to reduce this adverse trend.

Table 13.3 Job Density Ratios*

⁸ Employment rate as the number of people in employment expressed as a percentage of all people aged 16-64.

⁹ Unemployment rate as those unemployed as a percentage of the economically active population.

AREA	JOB DENSITY
Aylesbury Vale	0.76
Milton Keynes	1.18
Buckinghamshire	0.86
South East of England	0.88
England	0.85

(ONS, 2016)

*ratio of total jobs to population aged 16-64

- 13.41 Within the employment sector in Aylesbury Vale, the following sectors dominate when measured by employment: health (13.8%), business administration and support services (11.2%) and education (10%). This is similar to Milton Keynes, although with a greater focus on health.

Assessment of Existing Social Infrastructure

- 13.42 As part of the establishment of the baseline provision of social infrastructure, a review of the current health and educational facilities was undertaken, along with an assessment of what open space facilities and local facilities are available for the proposed community at South West Milton Keynes. In addition to existing facilities, committed developments were also investigated to determine their location in relation to the proposal and evaluate their proposals and status.

Education Facilities

- 13.43 Buckinghamshire County Council is the Local Education Authority for Aylesbury Vale and as such the Application Site. Milton Keynes Council is a unitary authority and as such is responsible for the education of all children to the immediate north and east of the Application Site.
- 13.44 Primary schools in Buckinghamshire cater for children aged 4 to 11 and include infant schools (ages 4 to 7), junior schools (ages 7 to 11), combined schools (aged 4 to 11) and special schools, although in Aylesbury Vale District the majority of primary schools now fall within the combined category. Secondary schools in Buckinghamshire cater for children aged 11 to 18 and comprise upper/all-ability schools, grammar schools and special schools. In Milton Keynes, the majority of schools now either cater for the under 11s or the 11 to 18 year old age range.
- 13.45 Paragraphs 5.15 to 5.25 of the Health Impact Assessment (see **Appendix 13.2**) provides additional data and information on education facilities.

Primary and Early Years Education

- 13.46 There is one primary school in Aylesbury Vale District that is within 2km of the site, as shown on the Facilities Plan (see **Appendix 13.1**). This is Newton Longville Church of England School, a combined primary school providing infant and junior education with an attached pre-school.

- 13.47 In addition to this, there are six primary schools in Milton Keynes Borough that are within 2km of the Application Site. These are all combined primary schools and include Chestnuts Primary School and St. Thomas Aquinas Catholic Primary School in Bletchley, Giles Brook Primary School in Tattenhoe, Howe Park School in Emerson Valley, Priory Rise Primary School in Tattenhoe Park, and the independent Milton Keynes Preparatory School adjacent to Windmill Golf Club. While most of these cater for children from 4 to 11 years, Giles Brook Primary School and Priory Rise Priory School also cater for children from 3 years, and Milton Keynes Preparatory School from 0 years. In addition, Little Chestnuts Day Nursery and Pre-School caters for children aged 6 weeks to 5 years.

Secondary Education

- 13.48 Pupils can apply for admission to any of Buckinghamshire's schools which are in the catchment area of the Application Site, subject to the individual school's entrance requirements. The four closest schools to the Application Site, that are within Aylesbury Vale District, are the Sir Thomas Fremantle Comprehensive School in Winslow, the Cottesloe Upper School in Wing, the Royal Latin Grammar School in Buckingham, and the Buckingham Upper School in Buckingham.
- 13.49 Alternatively, slightly further away from the Application Site are the four secondary schools in Aylesbury comprising the Sir Harry Floyd Grammar School, Aylesbury Grammar School, Aylesbury High School and the Aylesbury Vale Academy.
- 13.50 There is further secondary provision in Milton Keynes, including Lord Grey Secondary School in Bletchley, Shenley Brook End Secondary School in Shenley Brook End, and The Hazeley Academy in Hazeley.

Post 18 Education

- 13.51 In Aylesbury Vale, post 18 educational provision is provided for in the privately funded University Campus Aylesbury Vale, a partnership between Aylesbury College and Buckinghamshire New University.
- 13.52 In contrast, Milton Keynes offers educational opportunities at the University of Bedfordshire Milton Keynes campus, and at the Open University Milton Keynes campus. In addition, some five miles to the north west of Milton Keynes is Cranfield University, which specialises in post degree education. Cranfield University have also launched plans for a new university in Milton Keynes, the University of Milton Keynes (MK:U), designed to meet urgent technological and skills gaps. MK:U is currently expected to open to students in 2021.

Special Educational Needs Schools

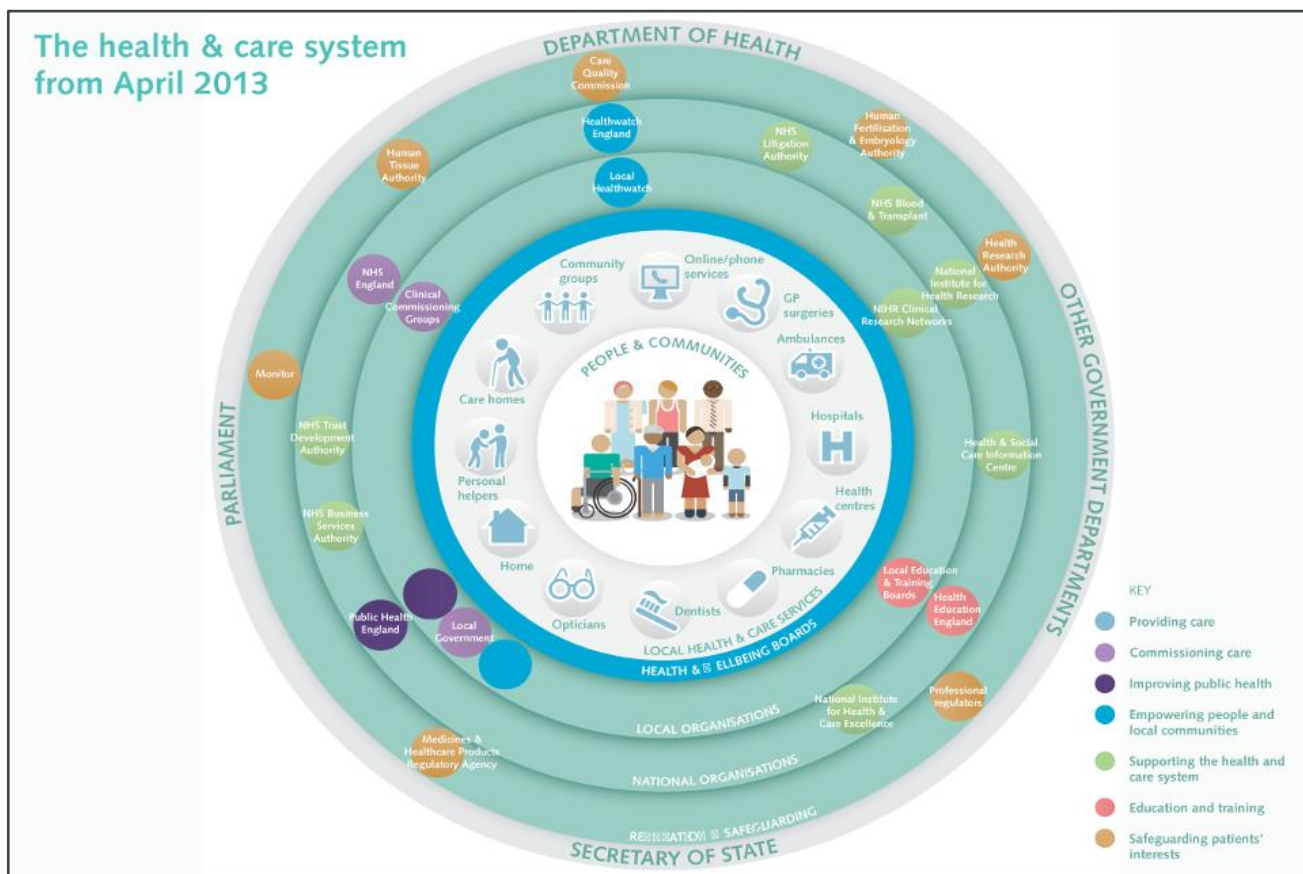
- 13.53 Within Aylesbury Vale there are seven dedicated schools for the provision of special educational needs. Those located closest to the Application Site include Furze Down School in Winslow which caters for children aged 2 to 19, and Pebble Brook School and Stocklake Park Community School in Aylesbury which cater for children aged 11 to 19. In addition, many local schools also have special educational needs units, and there is The Puzzle Centre specialist pre-school in Middle Clayton which is run by a charitable trust, and the Pace School in Aylesbury which is also run by a charity and caters for children aged 4 to 14.
- 13.54 Within Milton Keynes, special educational needs facilities close to the site are provided by The Walnuts School, which has a lower school in Bletchley and a middle and upper school in Hazeley, and White Spire and Romans Field Schools in Bletchley. In addition, many local schools have a special needs unit within them.

Health Facilities

- 13.55 In April 2013 radical changes were introduced by the Coalition Government that saw the abolition of Primary Care Trusts and Strategic Health Authorities. The structure of the new system is shown in the NHS organisational diagram in Figure 13.1.

- 13.56 These changes have had an effect on who makes decisions about NHS services, how these services are commissioned, the way money is spent, and how decisions about future provision are undertaken. Part of this change in the delivery of services has been the introduction of the private sector.

Figure 13.1 The Healthcare System in England from April 2013



(Department for Health, 2013)

- 13.57 Clinical Commissioning Groups (CCGs) have replaced Primary Care Trusts and are responsible for the planning and commissioning of healthcare services for their local areas. CCG members include GPs, as well as other clinicians such as nurses and consultants. CCGs are responsible for about 60% of the NHS budget, commission most secondary services and play a part in the commissioning of GP services. The CCGs in and close to Aylesbury Vale are:
- NHS Buckinghamshire CCG
 - NHS Milton Keynes CCG
 - NHS Oxfordshire CCG
 - NHS Luton CCG
- 13.58 The NHS Buckinghamshire CCG replaced the NHS Aylesbury Vale CCG and NHS Chiltern CCG in April 2018
- 13.59 Local authorities have also been given a bigger role, assuming responsibility and funding for many public health services including sexual health services and services for drug or alcohol treatment. Health and wellbeing boards now have duties to encourage integrated working between commissioners of services across

health, social care, public health and children's services, involving democratically elected representatives of local people. Local authorities are expected to work more closely with other health and care providers, community groups and agencies, using their knowledge of local communities to tackle challenges such as smoking, alcohol and drug misuse and obesity.

- 13.60 Most hospital services are now provided by NHS foundation trusts and NHS trusts providing ambulance services, emergency care services, or mental health services. NHS foundation trusts are independent legal entities that are accountable to local people, who can become governors and members. However, some hospitals in England are managed by acute trusts, some of which have also gained foundation status. Acute trusts ensure that hospitals provide high-quality healthcare and check they spend their money efficiently. They can also provide services in the community. The NHS foundation and acute trusts in and close to Aylesbury Vale are:
- Buckinghamshire Healthcare NHS Trust
 - Milton Keynes University Hospital NHS Foundation Trust
 - Oxford Health NHS Foundation Trust
 - Oxford University Hospitals NHS Foundation Trust
 - Luton and Dunstable University Hospitals NHS Foundation Trust
- 13.61 Buckinghamshire has been selected as one of the first eight wave 1 Integrated Care Systems in the country aimed at integrating services to improve the health and wellbeing of the population, while Milton Keynes University Hospital NHS Foundation Trust has entered into a partnership with the University of Buckingham to establish the first independent Medical School in the country.
- 13.62 The Oxford Health NHS Foundation Trust provides mental health services to people of all ages in Oxfordshire and Buckinghamshire, which includes the Aylesbury Vale area. Mental illness affects one in four people in their lifetime, and the shared vision is to support people's recovery from mental illness and to promote wellbeing whilst allowing them to stay in the community. Buckingham Healthcare NHS Trust also provides a renowned National Spinal Injuries Centre for patients across England and internationally.
- 13.63 There is one hospital located in Aylesbury Vale, the Stoke Mandeville Hospital, and one hospital in central Milton Keynes, the Milton Keynes University Hospital, as well as other community healthcare services. Stoke Mandeville Hospital is currently redeveloping its A&E department to ensure it continues to meet the needs of the population, while Milton Keynes University Hospital has a number of developments planned to improve services and capacity including developing the northern part of the hospital site in 2018/19, and plans for a new Cancer Centre. In the latest rankings by the Care Quality Commission, Stoke Mandeville Hospital has been assessed as 'requires improvement' overall, and Milton Keynes University Hospital as 'good'.
- 13.64 Paragraphs 5.8 to 5.14 of the Health Impact Assessment (see **Appendix 13.2**) provides additional information and data on health services and facilities.
- 13.65 Private dental surgeries and pharmacies are delivered under open market conditions and are based on the strength of local demand. Therefore, it is concluded that where demand exceeds supply, the gap will be met by an individual pharmacist or dentist opening a shop/surgery in the area.

Community Facilities

- 13.66 An audit has been carried out of the facilities and services within a 2.5km radius (approx.) of the Application Site. This includes the village of Newton Longville within Aylesbury Vale District to the south of the site, and the areas of Westcroft, Tattenhoe, Tattenhoe Park, Emerson Valley and parts of Bletchley (including Far

Bletchley) to the north and east of the Application Site which are within the jurisdiction of Milton Keynes Unitary Authority.

- 13.67 The audit demonstrates there are four local retail centres/provision and one district centre within 2.5km of the Application Site which provide a range of facilities and services, see Table 13.4. The primary location for community facilities is Westcroft District Centre in Milton Keynes where there is a pre-school, day nursery, health care centre, library, dental practice, pharmacy and an optician.
- 13.68 A wide range of community facilities are also available in Bletchley / Far Bletchley to the east and north-east of the site which includes (inter alia) a medical centre, residential and nursing home, community centres, veterinary practice, pharmacy, youth centre, places of worship and a public house.

Table 13.4 Existing Facilities within Approximately 2.5km of the Application Site

LOCATION	FACILITY
Bletchley / Far Bletchley	
Shenley Road/ Buckingham Road	The Three Trees Public House
Shenley Road (south)	Barbers Post Box Hair and Beauty Salon Old Swann Public House
Chepstow Park, Blaydon Close	Allotments Informal Open Space Playing Fields 2no. Areas of Play
Whiteley Crescent / Newton Road	Recreation Ground and Play Area
Newton Road Local Centre	Tesco Express Shop Co-op Shop
St Mary's Avenue Local Centre	Off-Licence Newsagents Fish and Chip shop Chemist Bridal Wear Chinese Takeaway Dog Grooming Hair and Beauty Salon Tattoo Studio Floral Art and Design Payphone
Wincanton Hill	Post Box
St Catherine's Avenue	Post Box Payphone
Whiteley Crescent	Post Box
St Clement's Drive	Play Area
Epsom Grove	Residential and Nursing Home
Chepstow Community Centre	Premier Shop Community Centre

LOCATION	FACILITY
Chepstow Drive	Informal Open Space
St George's Road	Chestnuts Primary School Little Chestnuts Day Nursery and Pre-School
St Mary's Avenue	St Thomas Aquinas Catholic Primary School
St Andrew's Road	Place of Worship Post Box
Conway Crescent	Place of Worship
Windmill Hill Golf Course	Golf Course Associated facilities
Warwick Road	Post Box
Porchester Close Local Centre	Fish and Chip Shop Petrol Station M ^c Coll's West Bletchley Council Offices Royal Oak Club Post Office Tattoo Studio Barbers Shop Betting Shop Veterinary Clinic Pharmacy Chicken Takeaway Car Wash Premier shop Phone booth Post box West Bletchley Community Centre Warwick Road Activity Centre
Windmill Hill Golf Course	Golf Course Associated facilities
Mersey Way	Post Box
Severn Way	Premier Shop Bletchley Youth Centre Playing Fields Post Box
Knaresborough Court	Play Area
Tattenhoe Lane	Post Box Tattenhoe Lane Playing Fields Milton Keynes Preparatory School MidCounties Co-op Cash Machine
The Don	Open Space
Sunningdale Way / Hunstanton Way	Play Area
Kenilworth Drive	Post Box Open Space
Whaddon Way	Place of Worship

LOCATION	FACILITY
Avon Grove	Play Area Post Box Payphone
Tweed Drive	Whaddon Medical Centre Pharmacy Open Space Place of Worship
Trent Road	River Community Learning Centre
Tattenhoe Lane	Tattenhoe Lane Playing Fields Post Box Milton Keynes Preparatory School Royal Air Force Association Skate Park
Shenley Road (north)	Roman Fields School – Special School Bletchley St Martins Bowls Club Rickley Park
Muirfield Drive	Post Box
Windmill Hill Drive	Post Box Mobile Library
Otter Close	Play Area
Emerson Valley / Tattenhoe	
River Valley Centre, White Horse Drive	Hair and Beauty Salon Kebab and Pizza Takeaway River Valley Community Centre Indian Restaurant Pharmacy One Stop Shop Cast Point Post Office The Clocktower Public House (Hungry Horse Restaurant) Post Box
Emerson Valley Local Centre, Bowland Drive	Co-op Emerson Valley Community Centre Chinese Takeaway Post Box
Bowland Drive	Emerson Valley Sports Pavilion, Milton Keynes RUFC and Sports Pitches Howe Park Nursery and Infant School Emerson Valley District Park Play Area
Rusland Circus	Emerson Valley Junior School
Hareden Croft	Play Area
Standing Way H8	BP Petrol Station and M&S Store
Quantock Crescent	Play Area

LOCATION	FACILITY
Leigh Crescent	Play Area
Belvoir Avenue	Play Area
Sykes Croft	Play Area
Chipping Vale	Post Box
Chaffron Way H7/ Tattenhoe Street V2	Howe Park Wood
Rosemullion Avenue	Allotments 2no. Areas of Play
Holbourn Crescent	Giles Brook Combined School Post Box Open Space
Off Holbourn Crescent	Tattenhoe Sports Pavilion and Sports Pitches District Park Playing Fields Play Area
Portishead Drive	Place of Worship Prince George Public House Open Space Area of Play
Great Ormes	Area of Play
Langerstone Lane	Play Area
Rhoscolyn Drive	Post Box
Various	Tattenhoe Valley Park including open space and play facilities
Westcroft / Tattenhoe Park	
Westcroft District Centre	Morrisons Supermarket Morrisons Petrol Station Boots Pharmacy Pet Food Superstore Hair Studios Fish and Chip Shops Charity Shop Opticians Dentist Card Factory Timpson Thomas Cook Costa Coffee Indigo Tanning Salon Ladbrokes Betting Shop Pep&Co Clothing B&M Bargains Aldi Poundstretcher Poundland KFC Ducklings Pre-School

LOCATION	FACILITY
	Acord Nursery Car Sales Units McDonalds Pizza Hut Westcroft Library Healthcare Centre
Savill Lane	Westcroft Health Centre
Cranbourne Avenue	Cricket Pitch Area of Play Allotments
Stoneleigh Court	Allotments
Miserden Crescent	Area of Play
Babylon Grove	Area of Play
Frampton Grove	Open Space
Various	National Cycle Route 51
Barnsdale Drive	Nut and Squirrel Public House / Restaurant
Tattenhoe Park	Priory Rise Combined Primary School
Newton Longville	
Newton Longville Village Centre. Berry Road/Greenway	Berry Road Shops: Village Shop Chinese Takeaway Hair Salon Post Box
Westbrook End	Crooked Billet Public House and Country Restaurant Post Box Yew Tree Farm Bed and Breakfast
Church End	Village Hall PJ Pollard and Sons Butchers
Whaddon Road	Place of Worship Post Box
Bletchley Road	Place of Worship
School Drive	Newton Longville Church of England Primary School incorporating Newton Longville Pre-School & Extended Services
Other	
Buckingham Road	Thrift Farm / Adult Learning Centre

By author

Cultural and Leisure Facilities

- 13.69 AVDC carried out a full audit of leisure and cultural facilities in 2012, which was subsequently updated in 2017 to support SVALP2017. The audit covered a wide range of built and green leisure provision, including indoor and outdoor sports, arts and entertainment centres, community buildings and green spaces.

- 13.70 The updated Assessment of Open Space, Sports and Recreation Needs for Aylesbury Vale (March 2017) examines the likely impact of Aylesbury Vale's population growth on the need for open space, sport and recreation facilities. As well as district wide provision, such as for a swimming pool, artificial grass pitches and indoor bowls, the assessment identifies the following requirement for land adjacent to Milton Keynes, based on housing growth of 4,274 new dwellings in this location:
- Sports Halls – the need equivalent to an additional three badminton court hall or 0.74 four court sports halls
 - Community Centre and Village Halls - the need equivalent to two community centres
 - Grass Playing Pitches – the need for eight grass pitches and three cricket wickets
 - Outdoor Tennis – the need for seven tennis courts
 - Green Infrastructure – the need for 21.2ha of accessible natural green space, 14.8ha of incidental open space, and 12.7ha of major open space
- 13.71 With regard to Milton Keynes, the Open Space and the Natural Environment Plan:MK Topic Paper (2014) advises that open space in Milton Keynes Borough covers approximately 3,200 hectares, over 129 hectares per 1,000 population, placing it among the highest local authorities in terms of open space per resident. This majority of this is managed by Milton Keynes Parks Trust, although Milton Keynes Council and Town and Parish Councils are also Partners.
- 13.72 With regard to culture and recreation, Milton Keynes has adopted two strategies setting out their vision to be world class; the Milton Keynes Creative and Cultural Strategy 2018 – 2027 and the Milton Keynes Sport & Active Communities Strategy 2014-2023. Milton Keynes is also working towards the aspiration to bid for the European Capital of Culture.

Likely Significant Effects

- 13.73 The Proposed Development will affect the existing local socio-economic environment both during construction and once the site is occupied and the planned facilities are in full operation. This section provides an evaluation of the impacts and focuses on the following key aspects:
- construction stage employment impacts – an assessment of temporary construction jobs created as a result of the expenditure incurred on the Proposed Development;
 - construction stage on existing economic activity on the site – an assessment of the impacts on the existing businesses and employment uses currently based on the Site or immediately adjacent to the Site as a result of the construction of the Proposed Development;
 - operational stage employment impacts – an assessment of the employment impacts of the development once the employment and other commercial floorspace is delivered as part of the Proposed Development;
 - operational stage demographic impacts – an assessment of the likely scale and age structure of the population who are likely to live in the Proposed Development once it is completed;
 - operational stage appropriateness of social infrastructure – an assessment of current (or increased) pre-defined elements of social infrastructure in light of the projected increase in demand as a result of the population generated from the Proposed Development; and

- operational stage of wider regeneration impacts – an assessment of the impacts of the Proposed Development on the identified socio-economic priorities for the local area and contribution towards socio-economic policies and strategies reviewed as part of this assessment.

Construction Stage Employment Impacts

13.74 One of the key economic impacts is evaluated in terms of the additional employment directly generated by the construction activity. Given the scale of the proposals, the Proposed Development of the Site would lead to the creation of both full and part time construction jobs on site over a significant timeframe. The precise period of time it takes to complete the Proposed Development, which is estimated at ten years from 2021 – 2031, will depend on a number of interrelated factors, these include:

- the rate at which infrastructure upgrades are provided by statutory providers;
- the number of phases and developers which ultimately build-out the site;
- the availability of finance to fund the delivery of on and off site infrastructure;
- the rate at which homes are built by the house builders;
- the rate at which on site educational, cultural and leisure facilities are provided;
- the rate at which other homes are constructed in the area's housing market;
- the buoyancy of the regional economy;
- the fluidity of the regional housing market; and
- the availability of mortgages to house buyers.

13.75 As set out in Chapter 1, it is anticipated that development will be phased, starting with infrastructure delivery in 2021/22, followed by housing delivery from 2021/22 to 2030/31. It is estimated that the peak annual housing delivery rate would be 250 dwellings per annum.

13.76 Assuming that this pattern of delivery is adopted on this site, then it is likely that both infrastructure and housing contractors will provide in excess of 150 construction jobs at any one point in time, for the majority of the duration of the delivery of the project. The construction stage impact on employment can be classified as moderate beneficial.

Construction Stage on Existing Economic Activity on the Site

13.77 The Application Site includes land currently used by two separate farming businesses. These businesses take the form of:

- a small part of the Cook family farmland holding; and
- part of Hurdlesgrove Farm.

13.78 As advised in the Agricultural Land chapter of this ES, the land owned by Messer's Cook is currently occupied by a small part-time business on an Agricultural Holdings Act Tenancy. The total business extends 19.6 hectares in total, of which 16 hectares are at SWMK. While approximately 82% of the land occupied by the business would be lost when the Proposed Development is delivered, due to the part-time nature of the business the magnitude of impact is only deemed to be minor adverse.

13.79 As advised in the Agricultural Land chapter of this ES, Hurdlesgrove Farm extends some 607 hectares in total, of which 485 hectares is arable land and the remainder is used to support a herd of 50 Suckler Cows and off-spring. Of this, the business farms approximately 105 hectares of land at SWMK, of which 60 hectares are owned, 38 hectares are farmed on a Farm Business Tenancy, and 7 hectares are farmed on a contract

farming arrangement with the other farming occupier. Therefore, approximately 17% of the total area farmed and approximately 22% of the total arable enterprise will be lost when this proposal is delivered. However, the land at SWMK represents some of the least profitable arable land farmed by the business due to its higher input costs (labour and machinery) resulting from its distance from the main holding. Also, the continued operation of the Suckler Cow Herd will not be prejudiced by the loss of this land. Accordingly, as stated within the Agricultural Land chapter, the magnitude of impact of the proposal on Hurdlesgrove Farm would be minor adverse.

- 13.80 Furthermore, the Proposed Development will not be built as a single phase. Consequently, land will only be removed from economic agricultural production as the site progresses over time. This is likely to lessen the impact of the loss of land, as the available area to farm is likely to decrease slowly over time rather than all of it being lost at one specific point in time. The construction stage impact on existing economic activity can be classified as minor adverse.

Operational Stage Employment Impacts

- 13.81 An Employment Assessment has been carried out to assess the employment likely to be generated by the Proposed Development. This includes 2.07 hectares of employment land, a neighbourhood centre, a primary school and a secondary school. The Employment Assessment highlights the key employment impacts, and should be referred to for detailed information on this aspect of the proposal.
- 13.82 The Employment Assessment concludes that, based on the quantum of employment land and other uses proposed, it is envisaged that the Proposed Development has the potential to generate the following:
- Employment land (assuming office (B1) use) – circa 690 jobs
 - Indirect jobs from retailing, health etc. – circa 594 jobs
 - Indirect jobs from education, real estate etc. – circa 709 jobs
 - Local centre – circa 87 jobs
 - Primary school – circa 30 full time teaching staff jobs
 - Secondary school – circa 37 teaching staff jobs
- 13.83 Therefore, it is estimated that up to 2,147 total jobs could be created by the Proposed Development, with a job ratio of 1.14 jobs per dwelling.
- 13.84 A summary of the policy and evidence based documents relating to employment are set out within the Employment Assessment. From this, the Employment Assessment concludes that both Aylesbury Vale and Milton Keynes LPAs seek to deliver jobs growth. In terms of the spatial distribution it is recognised that the main centres of Aylesbury, and Milton Keynes in particular, possess a critical mass given existing agglomerations of commercial provision as well as their accessibility. The Proposed Development would not be in competition with these locations, but rather represents a location that would provide complementary commercial uses as part of a sustainable development. Therefore, the operational stage employment impact has been assessed as minor beneficial.

Operational Stage Demographic Impacts

- 13.85 The Proposed Development seeks to deliver up to 1,855 new mixed tenure homes. Data from the Department for Work and Pensions (DWP) publication on Households Below Average Income advises that the median household disposable income¹⁰ for the South East region in the three years 2014/15 to 2016/17 was £544 per

¹⁰ Disposable income = income after direct taxes such as Income Tax, National Insurance and Council Tax etc.

week, equating to a household income of £28,288 per annum (DWP, 2018). As statistics on household disposable income are not available below the regional level, the figure of £28,288 has been used as a multiplier to calculate the potential economic impact of the new homes that would be delivered. This equates to the households within the Proposed Development injecting some £52,474,240 into the economy per annum, much of which would be directed locally.

- 13.86 According to the 2011 Census the average household in England contained 2.4 people in 2011; this figure for the South East region was 2.4 and for Milton Keynes and for Aylesbury Vale it was 2.5. The more recent ONS data, the 2016-Based household projections, reflects the 2011 Census; however, the projections show a steady fall in household sizes across all three areas to 2041, by which time they are predicted to contain an average of 2.26 in England and 2.35 people in Milton Keynes and Aylesbury Vale (ONS, 2018b).
- 13.87 With these published figures in mind, it is evident that the initial phases of the Proposed Development are likely to deliver higher household sizes than the latter phases.
- 13.88 In order for adequate facilities to be provided, AVDC has previously requested that 2.56 people is assumed to be the average household size for the master planning of the entire development. Whilst this figure is precautionary and is clearly far higher than that published in national, regional or local figures, it has been adopted by the Applicant in order to provide a robust proposal. Consequently, using the figures suggested by AVDC, 1,855 dwellings at the Proposed Development would accommodate approximately 4,749 residents.
- 13.89 The predicted 4,749 new residents will inevitably affect the demand for key community services (e.g. education and health) within the immediate vicinity of the site. As the new residents are likely to use facilities in both Aylesbury Vale and Milton Keynes, the subsequent section of this assessment considers both administrative areas.

Operational Stage Appropriateness of Social Infrastructure

- 13.90 This section of the chapter investigates what impact the new residents are likely to have on the existing provision of health facilities, education facilities and other community infrastructure. The assessment adopts a three-tier approach, the three elements examined are:
- baseline conditions;
 - new social infrastructure planned or under construction; and
 - the Proposed Development
- 13.91 To assist previous discussions with the local authorities, an initial audit of the facilities that were available within five kilometres of the centre of the Application Site was undertaken in March 2013. This audit was subsequently updated in March 2014 and January 2019. The facilities illustrated in **Appendix 13.1** include:
- district and local centres;
 - places of education (university, colleges, schools and libraries);
 - village halls / meeting places;
 - places of worship;
 - medical facilities (General Hospitals, General Practitioners, dentists, pharmacies and vets);
 - leisure facilities (National Bowl, leisure centres, public golf courses, district and linear parks and woodland);
 - major transport nodes and routes (trunk roads, railways stations and canals); and

- the administrative boundary between Aylesbury Vale District Council/Buckinghamshire County Council and the Unitary Authority of Milton Keynes.

13.92 The facilities survey demonstrates that this part of Aylesbury Vale is a rural area, with villages containing a limited range of community facilities. In contrast, Milton Keynes is an urban area with a wide range of community facilities to serve its residents and those that wish to travel from the rural hinterland to use them.

Education Provision

Baseline conditions

- 13.93 The Health Impact Assessment in **Appendix 13.2** includes an assessment of education facilities. Responsibility for provision of education facilities rests with Buckinghamshire County Council, as the Local Education Authority. However, as the site directly abuts Milton Keynes and new residents are likely to look towards Milton Keynes instead of Aylesbury or its rural villages for services, the impact on its level of educational provision has also been considered as part of the master planning of the proposal.
- 13.94 Outside mainstream education, people with special needs are frequently assessed by the relevant Local Education Authority, so the best possible support can be provided for them initially in the local community and, as a last resort, in a specialised school. Consequently, a tiered approach is frequently provided in both Buckinghamshire and Milton Keynes. This is likely to take the following form:
- allocation of a teaching assistant to an individual who is taught in a mainstream school;
 - creation of a specialised unit with teacher and support staff at a mainstream school;
 - educating the person in a specialised school which caters for the individual's needs; and
 - bursaries to private educational facilities with particularly specialised teachers.
- 13.95 There is already a wide range of special needs provision. However, if this is suitable for a person with special needs who lives at the Proposed Development or not, will largely depend on the nature of their personal circumstances.

Assessment of the proposals

- 13.96 The Illustrative Masterplan (Drawing No.CSA/4857/100 RevC) makes provision for 3.0 hectares of land for a three-form primary school with early year's provision. This level of provision is in line with the requirements of the local education authority and would meet the majority of the mainstream primary educational needs that are likely to be generated by the new residents of the Proposed Development.
- 13.97 The Proposed Development also includes 8.90 Ha of land for a secondary school. This would meet the mainstream secondary educational needs that are likely to be generated by the new residents of the Proposed Development.
- 13.98 It is relevant to note here that a draft S106 Agreement has been prepared and is close to agreement, with the likely contributions and trigger points for the contributions. This includes:
- **Primary Education:**
 - Primary School Contribution - £10,918,103 (Index Linked) - 50 per cent to be paid within 20 working days of the County Council providing written notice of the contract for the construction of the Primary School, and 50 per cent to be paid to County Council on the date 12 months from the date the contribution above became due
 - Primary School Loose Furniture and Equipment Contribution - [£1,064,714] (Index Linked) - to be paid prior to the occupation of the 1,600th dwelling

- Primary Education Contribution - £491,039 (Index Linked) – to be paid in accordance with the triggers set out in the approved Primary School Scheme
- **Secondary Education:**
 - Secondary School Contribution - £11,096,764 (Index Linked) - 25 per cent to be paid to the County Council prior to the occupation of the 750th dwelling, 25 per cent prior to the occupation of the 1,050th dwelling, 25 per cent prior to the occupation of the 1,350th dwelling, and 25 per cent prior to the occupation of the 1,600th dwelling
 - Secondary School Alternative Site Contribution - up to £5,070,000 (amount to be identified in the Secondary School Land Notice) - to be paid to the County Council towards the cost of acquiring a site for additional Secondary School places
- **Special Education Needs (SEN):**
 - SEN Contribution - £1,308,441 (Index Linked) - one third to be paid prior to the occupation of >85% of the Phase 1 dwellings, one third prior to the occupation of >85% of the Phase 2 dwellings, and one third prior to the occupation of >85% of the Phase 3 dwellings.

13.99 As with the provision of local retail facilities, provision for local education facilities is a key element for the encouragement of sustainable patterns of activity for developments of this scale and nature.

13.100 Whilst educational self-containment in order to minimise travelling to and from nursery / school is the Applicant's intention, a number of other factors will influence this movement pattern. These factors, which are largely outside the control of the developer and which cannot be defined at this stage in the development include:

- The birth rate of new children from the residents who live in the development;
- Parental choice, particularly when different forms of education are available in the form of comprehensive, grammar school and private school provision locally;
- The availability of places; it is therefore important that the timing of the school provision is carefully considered to encourage and facilitate as many local children to attend on site facilities as possible;
- The size of schools as some parents will be attracted to a new modern school whilst others will seek to support the smaller-scale rural schools in the outlying villages. This may go some way to reverse the generally declining number of children going to rural schools thereby strengthening those local, sometimes rather isolated and under resourced communities;
- As Milton Keynes continues to grow some of its existing population will undoubtedly move into the development. For these families, who already have links with their existing communities and schools, they may retain their existing school places in preference for taking the planned educational places in the new development; and
- The changing demographics of the UK indicate that with more partnerships / marriages ending in separation / divorce this can result in children having a bedroom with each parent and as such this can skew the factors previously identified; and
- Frequently, if Local Authority transport is not available to collect children from home and take them to and from school, then children are taken to school as part of the daily commute to work. In these circumstances ease of movement and the direction of both part time and full time employment can influence educational choices.

Summary

13.101 The analysis shows that the Proposed Development will inevitably have an impact on existing and planned educational facilities. Some of these impacts may be positive (for example the support of local village schools and the provision of new schools). Others may be negative in that established local schools may be oversubscribed with new children, or schools further afield, where residents currently live, may lose children and thereby the viability of the existing schools may suffer.

13.102 However, with the provision of a suitable level of educational provision onsite and the provision of financial contributions in the form of planning obligations, it is considered that overall educational choice will be improved and, as such, the impact of the development is likely to be relatively minor but positive.

Healthcare Provision

Baseline conditions

13.103 The Health Impact Assessment in **Appendix 13.2** includes an assessment of health facilities. Modern day health provision is provided by an evolving blend of public and private facilities. This situation is complicated further by the on-going changes to the National Health Service (NHS) at both a local and national level (see Paragraphs 13.56 – 13.68). In addition, private facilities are established, expanded or closed at an unpredictable rate.

13.104 Buckinghamshire Healthcare NHS Trust is a major healthcare provider. Since April 2010 it has been responsible for integrated hospital and community services for people living in Buckinghamshire and the surrounding counties, providing care to over half a million patients every year. Prior to April 2010, the community health services were provided by Buckinghamshire Primary Care Trust.

13.105 Buckinghamshire Healthcare NHS Trust runs seven hospitals across the County offering different services. This includes:

- Amersham Hospital
- Buckingham Community Hospital
- Chalfont and Gerrards Cross Community Hospital
- Marlow Community Hospital
- Stoke Mandeville Hospital
- Thame Community Hospital
- Wycombe Hospital

13.106 Stoke Mandeville Hospital is also home to the internationally recognised National Spinal Injuries Centre which provides specialist care for patients across England and internationally. In addition, Buckinghamshire Healthcare NHS Trust provides a regional centre for burn care, plastic surgery and dermatology, and are recognised nationally for their urology, stroke expertise and skin cancer services.

13.107 Buckinghamshire Healthcare NHS Trust also provide community care. They seek to support Buckinghamshire families, children, people with special needs and older people in their homes or from local health centres, GP surgeries, the Florence Nightingale Hospice, Rayners Hedge Rehabilitation Unit and the community hospitals including Buckingham, Marlow, Thame, Waterside and the Chalfont and Gerrards Cross Community Hospital. These community healthcare services include:

- Adult community healthcare teams
- Community hospital inpatient services
- Continence
- Diabetic specialist nursing, education and dietetics
- Falls service
- Integrated home care services
- Musculoskeletal assessment and treatment
- Musculoskeletal physiotherapy and women's health

- Pain management
- Palliative and end of life care services
- Podiatry
- Primary care mental health
- Public health nursing
- Smoking cessation
- Specialist nursing
- Wheelchair service

- 13.108 While the Application Site is in Buckinghamshire, it directly abuts Milton Keynes and as such, for any baseline assessment to be robust, the services offered by this closer, more centralised provider should also be taken into account.
- 13.109 Milton Keynes University Hospital NHS Foundation Trust is a medium sized district hospital that provides a full range of acute hospital services and an increasing number of specialist services to Milton Keynes and the surrounding areas.
- 13.110 In addition, Milton Keynes is served by the Central and North West London NHS Foundation Trust which provides integrated healthcare to part of London, Milton Keynes and beyond including addictions and substance misuse, community health, eating disorders, learning disabilities, mental health, offender care, and sexual health.
- 13.111 A baseline assessment using NHS data and desk-top mapping research has established the following existing level of provision, set out in Table 13.5.

Table 13.5 Proximity to Existing Healthcare Facilities

	HEALTHCARE FACILITIES WITHIN 5KM OF THE SITE
Hospital	0
General Practitioners	10
Dentists	13
Pharmacy	14

- 13.112 Milton Keynes University Hospital is located approximately 6km from the site, to the north of Standing Way. Residents living on the Application Site may also access four other hospitals with accident and emergency facilities, including Stoke Mandeville Hospital (21km), Luton and Dunstable University Hospital (24km), Bedford Hospital (27km) and Northampton General Hospital (29km). However, for emergency treatment patients are likely to be taken to Milton Keynes University Hospital with its walk in centre and accident and emergency facilities.
- 13.113 Whilst health self-containment in order to minimise the carbon footprint of each resident travelling to and from facilities is the Applicant's intention, a number of other factors will influence this movement pattern. These factors, which are largely outside the control of the developer and are indefinable at this stage in the development include:

- Patient choice, as in non-urgent cases residents will often prefer to stay with their existing service provider so there is continuity in care;
- Some facilities need a critical mass of people in order to be financially and operationally viable. Levels of viability change over time; and
- The availability of specialist care as, with centres of excellence continually changing to meet the evolving needs of the wider population, patients may wish to access services more widely e.g. to Oxford or London.

13.114 The disposition of services within 5km of the Application Site are shown in the Facilities Plan provided in **Appendix 13.1**.

Assessment of the Proposed Development

13.115 For adequate services to be provided for the new residents, and those in the area who wish to use them, the Development Framework Parameters Plan (Drawing No.CSA/4857/100 RevC) identifies a parcel of land for a potential 6no. GP Practice within an Employment Area (up to 0.2 hectares) to provide accessible (D1) health facilities. At this point in time, the precise capacity, design, function and timing of this facility is unknown. Consequently, during the determination of the application and subsequent phases of infrastructure, further discussions will take place with service providers so the new facility meets the projected requirements for the area.

13.116 It is relevant to note here that a draft S106 Agreement has been prepared for the Proposed Development, which indicates the likely healthcare contributions and trigger points for the contributions. This includes:

- £125,000 to be paid to the District Council towards the cost of additional land and buildings in the provision of necessary public healthcare and medical facilities to serve the development.
- Up to £1,990,057 to be paid to the District Council as a Hospital Contribution pursuant to an acceptable Hospital Notice.

Summary

13.117 There is limited information on current or future capacity of health infrastructure of the various service providers and the degree to which, in the future, services may be shared. Health care constantly evolves. However, as space is being provided for a potential healthcare centre to address identifiable requirements, and reasonable financial contributions by way of a Planning Obligation will be provided, it is likely that the health demands from the new residents will be satisfied.

Community and Leisure Provision

Baseline conditions

13.118 Community and formal leisure facilities are provided in the area by a combination of providers. These include local Councils, Town and Parish Councils, Trusts, amenity groups and commercial operators.

13.119 Aylesbury Vale District Council published a full audit of leisure and cultural facilities in 2012. This audit was subsequently updated in 2016, with the updated Assessment of Open Space, Sports and Recreation Needs for Aylesbury Vale published 2017 to support the emerging Vale of Aylesbury Local Plan. The audit did not assume the development site would be brought forward.

13.120 The latest audit confirmed that there are nine sites with one or more swimming pools of a length of 20m or above and a minimum width of 8m within Aylesbury Vale. The closest facilities are in Aylesbury and Buckingham. The Sport England FPM states that for facilities to be appropriately accessible they should be within a 20-minute travel time. On this basis, the facilities at Buckingham satisfy this level of accessibility. Reinforcing this level of provision is the Bletchley Leisure Centre that is some 4km east of the site, in Milton

Keynes administrative area, and less than 10 minutes away from the site. Further provision is found within the 20-minute drive time at the Wolverton Leisure Centre, or the private facilities provided by David Lloyd, Living Well and DW Fitness in Central Milton Keynes.

- 13.121 Community centres and village halls are an important element in the creation of vibrant and cohesive communities in rural areas. They can frequently provide a focus for a wide spectrum of events such as social events, local hobby groups, indoor sports, amateur dramatics, pre-school groups, bridge clubs, local discos and Parish Council meetings. Consequently, within the majority of villages near the site, community or village halls exist. In relation to Milton Keynes over the last 40 years, the master planning of each residential area has ensured that a community hall is provided.
- 13.122 There is no nationally recognised facility model for entertainment or arts facilities. Consequently, a comparison of 'best practice' in local areas is the only guide as to the suitability of the level of provision. While entertainment and arts facilities are not covered within the latest audit, within the 2012 audit Aylesbury Vale District Council judged St Albans, Watford and High Wycombe to be acceptable comparators to Aylesbury. This highlighted that a settlement the size of Aylesbury should have a performance space and an arts facility. The opening of the Waterside Theatre in 2010, in addition to subsidiary facilities at the Queens Park Arts Centre and the Limelight Theatre, provides an acceptable level of provision.
- 13.123 In relation to Milton Keynes, it has a substantial purpose built theatre and a wide selection of nationally important but smaller performance spaces such as The Stables and the MK Gallery. Consequently, provision is made for the region's leading live entertainment venues, showcasing West End and touring productions from across the UK.
- 13.124 The presence of these facilities within a reasonable travelling distance of the site broadly suggests that the existing local/community facilities would not be adversely affected as a direct result of the Proposed Development. Indeed, the additional patronage may assist with their long-term viability and the range of events they could offer. Equally and importantly, higher order leisure and community facilities can be sourced via a 35-minute train ride to Euston, London.
- 13.125 Aylesbury Vale's latest audit of leisure facilities, published in 2017, addresses the provision of synthetic turf pitches. This noted that, according to Sport England's 'Synthetic Turf Pitch Study' (2006), 70% of the facilities' users travel for up to five miles, while the average travel distance is six miles and the average travel time 22 minutes to reach a facility. The audit found that all of Aylesbury Vale met this accessibility standard, and that the current need in the District is met, and more than met in other areas of the district. The audit also recommends that 0.03 synthetic turf pitches are provided for every 1,000 new residents.
- 13.126 The Aylesbury Vale Playing Pitch Strategy (2010) established a detailed summary of the supply and demand evaluation for grass pitches within the District. To the north of Aylesbury, the study noted that there were two foci for pitches: Buckingham and Newton Longville. At the time the Playing Pitch Strategy was published in 2010, the pitches at Buckingham were considered to be satisfactory in number, but would benefit from a better maintenance regime. Further pitches have since been delivered as part of a new development south of the A421 in Buckingham.
- 13.127 The other focus for playing pitches in the district of Aylesbury Vale is in Newton Longville, one kilometre to the south of the Application Site. At the time the Playing Pitch Strategy was published in 2010, it was showing a deficit of one mini pitch, although there was adequate surplus of adult pitches to cover this shortfall.
- 13.128 More recently, the Assessment of Open Space, Sports and Recreation Needs for Aylesbury Vale (2017) set the following standards for playing pitch provision:

- Aylesbury Strategic Settlement – 0.49 adult size grass pitch per 1,000 population, 0.03 cricket wickets per 1,000 population;
- Aylesbury (all other areas) - 0.73 adult size grass pitch equivalent per 1,000 population, 0.28 cricket wickets per 1,000 population.

13.129 At a higher qualitative level, the Playing Pitch Strategy (2010) established there was no large-scale playing pitch facility, or a need for such a facility, in the Aylesbury district. The later Assessment of Open Space, Sports and Recreation Needs for Aylesbury Vale (2017) re-evaluates the need for such provision in Aylesbury Vale, advising that, on a comparative perspective, the future size of the Aylesbury Strategic Settlement area will be the same as, or greater than, many locations where reasonable sized stadia exist. However, the assessment does not conclude whether such a facility should be pursued at this time. In contrast, 1km to the north of the Application Site at Denbigh North is the MK Dons stadium which was completed in 2013 and has been built to standards that can accommodate European standard football and rugby matches.

New social infrastructure planned or under construction

13.130 The Proposed Development includes the provision of a local centre with community uses. The Development Framework Parameters Plan (Drawing No.CSA/4857/100 RevC) provides for 0.67 hectares of land for the local centre, which includes up to 575 sq. m. for community uses (D1 and D2). There is little detail on what these community uses will be at present. However, a reasonable assumption can be made that the inclusion of space for community facilities – along similar lines to those already provided in Milton Keynes, one community centre per grid square of 1,200 to 2,000 new homes - and the surrounding villages - will increase the new local population's accessibility and availability to local community facilities.

Assessment of the Proposed Development

13.131 The Proposed Development, as shown on the Illustrative Masterplan (Drawing No.CSA/4857/100 RevC) and the Development Framework Parameters Plan (Drawing No.CSA/4857/112), includes the provision of a neighbourhood centre with community uses, sports pitches and a sports pavilion with changing facilities. Setting aside land for such community and leisure provision will make a significant positive contribution towards ensuring development of a sustainable new community, which is specifically designed to meet the need of the new residents and new businesses. Further, the proposed high quality design of these facilities will assist in creating vibrancy and a sense of community pride for the new development.

13.132 The draft S106 Agreement prepared in respect of the previous application on the site (LPA Ref. 15/00314/AOP) indicates that a contribution of approximately £1,500 may be sought towards the costs of inspecting/re-inspecting any Community Building until it has been formally certified as being acceptable.

Summary

13.133 There are sufficient existing local facilities to cater for future population demand. However, to widen the choice of community and leisure facilities available, the scheme proposes additional provision which will contribute positively to the overall accessibility and availability of community and leisure facilities in the local area.

Open Space Provision

Baseline conditions

13.134 Green infrastructure (GI) is a strategically planned network of high quality multi-functional green spaces and interconnecting links to other environmental features that have been designed to meet the environmental, social and economic needs of communities. For the purpose of the Assessment of Open Space, Sports and Recreation Needs for Aylesbury Vale (2017), and for this Environmental Impact Assessment, urban parkland,

green public open space used for recreational purposes, commons, woodland, village greens, historic parks, watercourses, lakes, ponds, footpaths, cycleways and allotments are included as GI.

13.135 The principles for the creation and management of such spaces within the district are defined in the Aylesbury Vale Green Infrastructure Strategy 2011-2026, which in turn references Accessible Greenspace Standard as prepared by Natural England (2003) as its benchmark, and are replicated in the Assessment of Open Space, Sports and Recreation Needs for Aylesbury Vale (2017). Whilst accepting that various uses can be overlain, the standards include:

- at least 2ha of open space should be within 300m of each property and that there should be at least 2ha of such space per 1,000 population;
- at least one accessible 20ha area within 2km of peoples' homes;
- one accessible 100ha area within 5km of peoples' homes;
- one accessible 500ha area within 10km of peoples' homes;
- 1.4ha per 1,000 population as incidental open space (incorporating amenity, landscaped and planted areas and green corridors); and
- 2.4ha per 1,000 population as major open space (incorporating parks, formal gardens and public open space which in turn is broken down to 1.6ha of outdoor sports space (1.2 pitch sport) and 0.8ha for children and young people playing space).

13.136 The Strategy identifies three Priority Action Areas one of which, despite its rural and largely open character, is the North Aylesbury Vale, in which the Application Site is situated. Identified as Priority Action Area 1, the North of Aylesbury Vale was assessed as being deficient in green infrastructure including a lack of larger areas of accessible greenspace in the arc around the south and west of Milton Keynes.

13.137 MKC has long established open space standards, which have been carried forward from the New Town's inception by the Milton Keynes Development Corporation. As prescribed by Policy L3 and Appendix L3 of the adopted Local Plan (2005), and more recently the Planning and Obligations for Leisure, Recreation and Sports Facilities Supplementary Planning Guidance (2005), the standards promoted include:

- at least 1.5ha (gross) or 1ha (net) of playing fields per 1,000 new residents;
- at least 0.35ha of local play areas within 300m of each property per 1,000 new residents;
- at least 0.6ha of neighbourhood play area within 600m of each property per 1,000 new residents;
- at least 0.4ha of local parks area within 600m of each property per 1,000 new residents;
- at least 0.8ha of district park area within 1.2km of each property per 1,000 new residents; and
- at least 0.25ha of allotments within 600m of each property per 1,000 new residents.

13.138 In addition to these standards, in Milton Keynes informal provision is based on the need to retain and enhance site-specific features. Grid roads are also identified, as a significant part of these constitute green reserve areas on either side of the carriageway. Over the last 40 years of delivery, this has resulted in a town where 20% of its land use budget is either formal or informal public open space and as such, this has become a critical component defining the character of the area.

New green infrastructure planned or under construction

13.139 The Buckinghamshire Green Infrastructure Delivery Plan (2013) shortlists six locations for area specific green infrastructure proposals. This includes one area within Priority Action Area 1 at Whaddon Chase, which comprises a historic hunting chase and woodland pasture. The area at Whaddon Chase is also identified as one of ten flagship green infrastructure projects in the Aylesbury Vale Green Infrastructure Strategy Update

(2014) intended to help address the current shortfall. However, while Whaddon Chase has been identified as an opportunity area, as neither the Council nor the Parishes control this land, its future is unknown.

Assessment of the Proposed Development

- 13.140 The Proposed Development includes over 56.57 hectares of open space and green infrastructure comprising 55.35Ha of green infrastructure and 1.22Ha of allotments. This represents approximately 39% of the Application Site all of which is for use by both the existing and future residents of the area, thereby significantly contributing to the environmental and landscape value of the wider locality. This level of provision includes multi-functional green infrastructure including amenity greenspace; a central area of public open space, sports and recreational facilities; play areas including 8no. Local Areas of Play (LEAPs) and 2no. Neighbourhood Areas of Play (NEAPs); retained woodland and hedgerows and allotments. Hence, the Proposed Development will provide an open space provision of 11.91Ha per 1,000 new residents (using AVDC's multiplier of 2.56 people per dwelling unit and there being 1,855 new mixed tenure homes equating to 4,749 new residents), which is significantly in excess of the District's target and the requirements of Milton Keynes Council.
- 13.141 Within the Illustrative Masterplan (Drawing No.CSA/4857/112), as is the case in both Milton Keynes and the Vale of Aylesbury, green infrastructure is used to define character areas, create areas where communities can interact, delineate and define spaces and which provide a matrix of habitat and usage corridors. This is detailed further on the Landscape Character Areas Plan (Drawing No.CSA/4857/121).

Summary

- 13.142 According to the Council's own 2012 audit of leisure and cultural provision, Aylesbury Vale District currently has 710ha of green infrastructure (if only sites of more than 0.1ha in size on some 620 individual sites are included). Using the 2011 Census population of 174,100 this equates to a green infrastructure density of 4.08ha for every 1,000 people.
- 13.143 In simple mathematical terms, based on the 2011 Census population data, the Proposed Development (excluding all other developments in the District) will increase the total population within the District by some 2.73% to 178,849 people. However, the Proposed Development will deliver an additional 55.35 Ha of green infrastructure, equating to an increase in green infrastructure of 7.8%.
- 13.144 With the green infrastructure of the Proposed Development, the green infrastructure in the District will increase to 765 Ha. With regard to the Proposed Development alone, this will lead to a green infrastructure density of 4.27Ha per 1000 people for the District, taking into account the increase in population generated by the Proposed Development of 4749 residents.

Operational Stage of Wider Regeneration Impacts

- 13.145 The development of the Application Site will allow public sector partners to address the issues affecting the communities' socio economic welfare in the surrounding areas. More particularly, the provision of additional employment floorspace, residential units and community infrastructure has the potential to bring benefits to this rural part of Aylesbury Vale and Bletchley.
- 13.146 The Proposed Development will provide up to 1,855 new mixed tenure dwellings on the Site. By applying the Council's preferred household size of 2.56, this equates to the proposal supporting a population of approximately 4,749 on the Application Site. With the population in Aylesbury Vale expected to increase to around 214,000 by 2033, as set out within the emerging Local Plan, it is clear there is a need for additional housing in the District and the Proposed Development will go some way to meeting this need.

- 13.147 Furthermore, the provision of on-site community facilities including new schools, a neighbourhood centre, and a significant quantum of open space, together with excellent links to leisure activities in Central Milton Keynes, this will result in the development being a highly attractive location.
- 13.148 The proposals will result in an increase in the District's economic activity level by providing operational employment opportunities and increasing the job density. The Proposed Development will also benefit residents in the more deprived areas in both the northern rural area of Aylesbury Vale and Bletchley.
- 13.149 The Proposed Development has been designed to accommodate employment for the local market encouraging the growth of small to medium sized occupiers in modern buildings – it being assumed that the long-term market trend will continue for head quarter buildings to gravitate to Aylesbury and Central Milton Keynes. On this basis and by looking at published employment indicators, it is assumed that a wide range of jobs may be created, including research, finance, administration, consultancy, management, sales, fitters, drivers, technicians, and production engineers.
- 13.150 In the most recent Centre for Cities publication 'Cities Outlook 2019', Milton Keynes was highlighted as being the fifth highest place in the UK for start-up businesses. As the proposed site directly abuts Milton Keynes, it is therefore likely that the proposals also have the potential to provide a dynamic entrepreneurial base, by providing start-up facilities for a wide range of sectors including rural businesses and service oriented sectors. This will not only support the regional and local aspirations of wealth creation but also support the local priority of supporting the rural economy.
- 13.151 Further economic benefits also likely to accrue from the Proposed Development include:
- planning obligations – in the form of both land, buildings, subsidised services such as public transport, and financial contributions to support other off site facilities and services;
 - new homes bonus – to be paid to the relevant local authority for the 1,855 new dwellings;
 - business rates – to be paid to Aylesbury Vale District Council in perpetuity for the new employment buildings; and,
 - additional income from new residents - using average household incomes the Proposed Development could inject as much as £52,474,240 into the economy each year, much of which is likely to be directed locally. This is likely to have a further multiplier effect, as the funds invested in local services are then used to pay local people working in those services, who in turn spend the money in the locality on other services.
- 13.152 The Proposed Development would also provide a significant contribution towards the District's affordable housing target.
- 13.153 In terms of transport infrastructure, the draft S106 Agreement gives an indication of the likely contributions and trigger points for highway works in respect of the Proposed Development. This includes:
- Cycle Parking Contribution - £25,000 - to be paid prior to the occupation of the 649th dwelling (unless otherwise agreed in writing)
 - Travel Plan Monitoring Fee - £5,000 (Index Linked) - to be paid in respect of both the Residential Travel Plan and Commercial Travel Plan prior to the occupation of any dwellings
 - A421 Corridor Improvements Contribution - up to £1,300,896 (Index Linked) - to be paid within 2 months of receipt of A421 Corridor Improvements Notice (if such notice is issued)
 - A421 Corridor Improvements Design Contribution - up to £144,544 (Index Linked) - to be paid prior to the occupation of the 300th dwelling

- Weasel Lane Contribution - £40,000 (Index Linked) - to be paid prior to the occupation of more than 599 dwellings
- Footpath 19 Off-site Improvements Contribution - £41,800 (Index Linked) - to be paid prior to the occupation of more than 599 dwellings
- Newton Longville Traffic Calming Contribution - £280,000 (Index Linked) - 20 per cent to be paid on the commencement of development and the residue prior to the first anniversary of the first payment
- Whaddon Highway Safety Improvement Scheme Contribution - £22,000 (Index Linked) - to be paid prior to the occupation of more than 100 dwellings
- Milton Keynes Highway Works Contribution - £209,517 (Index Linked) - to be paid to the District Council prior to the occupation of the 749th dwelling

Contributions to the Policy Frameworks

- 13.154 The Proposed Development would contribute positively to various social and economic policy frameworks. In the national context, the development will provide partners with the opportunity to address deprivation on multiple levels, as promoted by Government advice, and would also constitute sustainable development, as defined within the NPPF, by providing construction and infrastructure jobs, housing, employment space, community facilities and green infrastructure.
- 13.155 As defined by the SWOT analysis in the Aylesbury Vale Economic Development Strategy 2016-2033, the provision of employment space is important for the District which is located in an excellent strategic location on the Oxford to Cambridge Arc, and with good links to London and Birmingham. In these circumstances, the master planning of the site has been undertaken in order to strike the right balance between economic and housing growth. Market analysis provided within the Employment Assessment indicates that the Application Site is unlikely to be appropriate for large-scale office or warehousing. Instead, it is more likely to take the form of a smaller scale business park, and it envisaged that it would meet local needs for offices, including some serviced office accommodation.
- 13.156 The Employment Assessment estimates that some 690 jobs would be generated from the employment land, assuming that this land is used for office (B1) use, see Table 13.6. In order to consider the full impact of employment generated on this site, consideration must also be given to the creation of jobs for those that work in the neighbourhood centre (87 jobs), the primary school (30 jobs) and the secondary school (37 jobs). In addition, based on the quantum of development proposed, it is estimated that an additional 1,261 indirect jobs will be created by the Proposed Development - see Table 13.6. Overall, it is anticipated that the Proposed Development is likely to deliver a job ratio of 1.14 jobs per dwelling.

Table 13.6 Estimated Employment Impact

	Proposed Development
Employment land (assuming B1 use)	690
Indirect jobs in retailing, health etc.	575
Indirect jobs in education, real estate etc.	686
Local centre	87
Primary School	30

Secondary School	37
Total	2105
Ratio of jobs to homes	1.14

13.157 On a local level, the development will contribute towards the jobs target in PSVALP2017. As a result, with regard to the impact of the contributions to local and national policies, local economic regeneration will be of high magnitude. The impact on these receptors therefore is of major positive and long- term significance.

Mitigation Measures

13.158 Taking into account the long-term positive and neutral nature of impacts on the local economy, it is considered that there is no requirement for mitigation measures in socio economic terms for these receptors.

Residual Impacts

13.159 The Proposed Development will bring forward a range of benefits in terms of diversifying the local economy and providing the communities with an increased housing supply as well as improved access to new employment and community facilities. This will be facilitated by providing the capacity for additional employment on a local level and the increased housing offer, including affordable housing. Consequently, provided that the new community is positively embraced by both Aylesbury Vale District Council and Milton Keynes Council and their representative Town and Parish Councils, there should be no significant unmet social or economic needs.

Cumulative Effects

13.160 The Proposed Development has been designed as a standalone community, providing a neighbourhood centre, community facilities and open space to meet the needs of future residents, and planning obligations are identified in the draft S106 Agreement to address impacts on facilities. The developments at Tattenhoe Park and Newton Leys are also providing local facilities to meet their residents' needs, and are required to make planning contributions towards community facilities. Therefore, it is not necessary to consider cumulative impacts within this socio-economic assessment.

Summary

13.161 The Proposed Development would have long-term significant beneficial impacts on the local economy. The Proposed Development will primarily have the capacity to provide 1,855 new mixed tenure dwellings. This will help meet the identified housing need in Aylesbury Vale. The development would also ensure significant provision of affordable housing units, which will contribute significantly towards one of the most important local priorities.

13.162 Furthermore, this growth in the number of residents will be supported by creating (and safeguarding) a significant number of full time and part time employment opportunities during the construction and operational phase for the local economy. In a wider socio-economic context, the development clearly has the potential to raise the local area's economic profile with regards to economic activity, employment and income, as well as access to social infrastructure. The latter will particularly be supported through the provision of 55.35 Ha of multi-functional green infrastructure.

References

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14. SERVICES AND UTILITIES

Introduction

- 14.1 This Chapter of the ES assesses the likely significant effects of the Proposed Development in terms of services and utilities.
- 14.2 This Chapter outlines the strategy for providing; gas, electricity and water supplies to the development, while also confirming the associated confirmed and potential costs.
- 14.3 Furthermore, this Chapter also addresses the following issues:
- Existing network apparatus,
 - Supply requirements for the new development; and,
 - Consultations with the incumbent supply network operators.

Legislative and Planning Policy Context

Legislation and Regulation

Water

- 14.4 Until relatively recently, water companies had near monopolies in the supply and transmission of water, as well as providing the infrastructure that is required. The introduction of the Water Act 2003 has formalised the procedures for developers wishing to complete self-lay schemes through multi-utility businesses.
- 14.5 Under the Water Act, the new off-site and on-site infrastructure can be implemented by multi-utility contractors, with the exception of a small element of non-contestable works where the new supply is connected to the existing network. Alternative asset owning businesses are able to implement and supply a strategic area through an Inset Appointment. Alternative asset owners normally procure the water supply through a bulk supply contract with the incumbent business or by an alternative means of supply such as a borehole.

Electricity

- 14.6 Competition in the electrical market is now reasonably mature and a developer is able to procure third party Distribution Network Operators (DNO's) to provide an embedded network, or indeed multi-utility/third party installations. DNO's are required by law to offer a network to anyone who requires a network. The creation, maintenance and operation of electricity networks is a matter for network companies and overseen by the independent regulator, the Office of the Gas and Electricity Markets (Ofgem).

Gas

- 14.7 Since its introduction in 2000 of competition for connections, Utility Infrastructure Suppliers (UIPs) can compete with Gas Distribution Networks (GDNs) to complete some connection activities, with over half of new and modified gas connections now being undertaken by non-GDNs.

Telecommunications

- 14.8 The incumbent national communication business, British Telecommunications was a state-owned business prior to privatisation in 1984. With BT controlling the existing cables feeding residential development, and the exchange (what is known as the 'local loop' or 'last mile'), BT have maintained a dominant position in controlling the communications sector.

- 14.9 The industry regulator, Ofcom has completed much work in “unbundling” the local loop and bringing competition into the residential market. Following this deregulation, Virgin and TalkTalk are undertaking major investment to place switch equipment into BT’s existing exchanges and hence allow direct access to their network. This system, known as Carrier Pre-Selection, is becoming increasingly popular. Accordingly, BT or local cable franchise operators are the prime source of network connections on residential sites.

Planning Policy

Adopted Aylesbury Vale District Local Plan (AVDLP) 2004

- 14.10 Policy GP.18 which related to the utilities has not been saved in the Local Plan. As such, there is no saved policy regarding utilities within the Aylesbury Vale District Adopted Local Plan

Plan MK: 2016-2031

- 14.11 Policy D6 (Mains and Telecommunications Services) of Plan:MK states that all new electric and telecommunications services within the boundary of Milton Keynes City should be provided underground. The Proposed Development is outside the boundary of Milton Keynes City.

Draft - Vale of Aylesbury Local Plan (VALP) 2013-2033

- 14.12 The Draft Vale of Aylesbury Local Plan (2013-2033) was subject to examination during 2019. The Inspector issued interim findings, and AVDC carried out consultation on its proposed main modifications to the VALP in November and December 2019. The responses are being collated for submission to the Local Plan Inspector. The plan is anticipated to be adopted in 2020.
- 14.13 The third strategic objective of the Vale of Aylesbury Draft Local Plan is that the Council, along with its partners will secure the timely and well-located provision of infrastructure, services and facilities needed to sustain and enhance existing and new communities which includes utilities.
- 14.14 The site has been allocated within this draft Local Plan for a mixed-use sustainable urban extension (allocation ref. NLV001 Salden Chase). There is no mention of utility requirements or constraints associated with the allocation.

National Planning Policy Framework (NPPF) February 2019

- 14.15 The NPPF sets out the Government’s national planning policy and is a material consideration in the determination of all planning applications. Paragraph 81 provides that planning policy should seek to address potential barriers to investment such as inadequate infrastructure or services.
- 14.16 Paragraph 112 explains that advanced, high quality and reliable communications in infrastructure is essential for economic growth and social well-being. Policies should set out how high-quality digital infrastructure, with services from a range of providers, can be delivered with full fibre connections to both existing and new developments.

Assessment Methodology

- 14.17 The format of this Chapter follows a standard process, by setting out an appraisal of the baseline conditions at the Proposed Development and surroundings; the nature of the environmental impacts of the Proposed

Development; and the mitigation measures required to prevent, reduce or offset any significant adverse impacts.

14.18 The following incumbent suppliers have been consulted while completing this study:

- Anglian Water Water Supply and Foul Water
- UK Power Networks Electricity
- Cadent Gas (formerly known as National Grid) Gas
- BT Telecommunications

14.19 At the time of writing, positive responses from Anglian Water and UK Power Networks Western Power Distribution has been received, which has been taken into account, but no further comments have been provided from other incumbent suppliers.

Assessing the Magnitude of Impact

14.20 The criteria for assessing the magnitude of the predicted impact is given in table 14.1 below.

Table 14.1 Criteria for Assessing Magnitude of Impact on Environment Receptors

MAGNITUDE	IMPACT
Major	Loss of Asset
Moderate	Loss of Integrity or Partial Loss of an Asset
Minor	Loss of a Minor Asset or Minor Integral Loss
Negligible	Loss of Asset which does not Affect Use or Integrity

14.21 The magnitude of impact depends on end users effective and period of time they are affected for.

Table 14.2 Criteria for assessing sensitivity of receptors

SENSITIVITY	RECEPTORS
High	Utility New Supplies: development located in an area with a general lack of local utility capacity (electricity, gas, potable water, foul sewerage and telecoms), therefore requiring significant offsite network reinforcements to deliver a complete, coordinated and integrated infrastructure arrangement for the site.
	Utility Diversions: development located in an area that requires significant utility diversions to strategic infrastructure (e.g. strategic water mains, high pressure gas mains, or oil pipelines) to facilitate its construction.
Medium	Utility New Supplies: development located in an area where currently there are capacity issues on the existing utility networks to supply at least one of the utility services (electricity, gas, potable water, foul sewerage and telecoms), therefore considerable offsite network reinforcement works would be required to deliver one of the utility services.
	Utility Diversions: development located in an area requiring major utility diversions to local utility providers' infrastructure to facilitate the development.
Low	Utility New Supplies: development located in an area where currently there are minor capacity issues on the existing utility networks to supply the utility services, therefore minor reinforcement works would be required to deliver the utility services.
	Utility Diversions: development located in an area requiring small scale utility diversions to local utility providers' infrastructure to facilitate the development.

- 14.22 The matrix for assessing the significance of an effect is given in Table 14.3 below. Those considered as significant are Moderate or above as noted within Chapter 4 of this ES.

Determining the Significance of Effect

Table 14.3 Matrix for Determining the Significance of Effect

Sensitivity	High	Major	Major	Moderate	Minor	No Impact
	Medium	Major	Moderate	Minor	Negligible	
	Low	Moderate	Minor	Negligible	Negligible	
		Major	Moderate	Minor	Negligible	No Impact
		MAGNITUDE OF IMPACT				

Baseline Conditions

- 14.23 The Proposed Development site is generally in agricultural use and has no utility supply provision. There are a number of services that traverse the site, as follows:
- Water: an 18 inch potable water supply pipe that follows the route of Weasel Lane;

- Water: a 450mm potable water supply pipe that runs roughly north to south, adjacent to a hedge line between Buckingham Road and Weasel Lane;
- Foul water drainage: a foul water rising main, believed to be 225mm diameter, used to run roughly south west to north east from the southern boundary to Hamilton Lane to the east of the site, latest Anglian Water sewer mapping identifies that this has been abandoned;
- Electricity: 132kV overhead power lines running north east to south west, transferring to underground cables that run along the northern boundary of the site adjacent to the old Buckingham Road carriageway;
- Electricity: 11kV high voltage and low voltage cables bisecting the north-western corner of the site, running north east to south west, supplying Bletchley Leys Farm and Lower Salden Farm;
- Gas: a 600mm Intermediate Pressure gas main running roughly north to south from Buckingham Road to the southern site boundary, and then east within the site along the toe of the embankment of the disused railway line;
- BT: cables running along the alignment of the old Buckingham Road carriageway and adjacent to Whaddon Road; and
- Oil: 10 inch and 12 inch high pressure fuel pipelines bisecting the site running north to south.

14.24 There are also a number of existing utility supplies present that serve the existing residential development adjacent to the site (supplying water, electricity gas and telecommunications). A composite utilities plan is available within Appendix 14.

Proposed Development

Water Supply

14.25 The Proposed Development site benefits from a strategic water main and a connection for the Proposed Development could be made at Weasel Lane to the northeast of 'The Leys.'

Foul Water

14.26 Anglian Water have calculated that based on the size and scale of the development a 450mm internal drain diameter would be required to drain the Proposed Development with the nearest practicable connection point at Manhole 5601 (adjacent to Hartland Avenue) at National Grid Reference NGR SP 83529 33644.

14.27 Anglian Water have also assessed the need for pumped foul flows from the Proposed Development and would consider a 250mm nominal bore rising main to be sufficient. Discharge rates for pumped connection should be confirmed at detailed design.

14.28 There is sufficient capacity for foul flows into the Anglian Water network at present. Further liaison will be required through the phasing and detailed design of the development to ensure adequate upgrades to the system are made as necessary.

Electricity

14.29 There are currently 11kV high voltage and low voltage cables bisecting the north-western corner of the Proposed Development site, running north east to south west, supplying Bletchley Leys Farm and Lower Salden Farm. Western Power have been contacted and they have estimated an increase in loading of 11MVA from the Proposed Development.

14.30 A connection at Tattenhoe Primary Substation has been identified approximately 1.5km north of the Proposed Development site at Chaffron Way, given suitable reinforcements and on-site works are undertaken. These will be further developed once detailed design and phasing for the Proposed Development comes forward.

Gas

- 14.31 Cadent Gas SGN has been contacted for upgrade requirements for the development. At the time of writing, no response has been received relating to these. Within the previous ES Chapter dated January 2015 the following information was provided:

“SGN has advised that the proposed development may be supplied from the existing Intermediate Pressure (IP) gas main within the site. The pressure will be reduced with a governor for on-site medium and low-pressure distribution.

SGN has advised that minor reinforcement works will be required to facilitate the development. Further detailed modelling will be required to fully inform the scheme as the design of each phase progresses.

Localised lowering / protection or diversion works will be required to the IP gas main where it is affected by road crossings or other development features”.

- 14.32 Further liaison with SGN will take place throughout the detailed design and phasing of the Proposed Development.

Oil

- 14.33 There is a high-pressure BPA Fuel Line bisecting the Proposed Development site. The following has been confirmed as a requirement of works on site by BPA:
- A BPA Technician is to mark and locate the pipeline through the site before any works commence including hand trial holes with 7 days’ notice to arrange supervision provided to BPA.
 - All works within 6m of the pipeline require prior approval by BPA and a BPA Technician must supervise all works within 6m of the pipeline. The technician will determine whether a written method statement is necessary before any works proceed.
 - Heavy vehicle crossing points to be approved before use across the easement.
 - Any works involving the exposure of the pipeline/s requires a continuous site presence until backfilled (this may mean a security arrangement out of hours).
 - Utility crossings may require a formal crossing consent.
- 14.34 No development is proposed over the pipeline or within the 3m easement of the pipeline in the current Proposed Development masterplan. Further liaison will be undertaken with BPA, particularly with regards to the construction phase of the development.

Telecommunications

- 14.35 Existing BT cables running along the alignment of the old Buckingham Road carriageway and adjacent to Whaddon Road.
- 14.36 Should the developer be minded registering their scheme with Openreach, given this is a development of over 30 homes, free fibre to the home could be provided. No further information could be provided until such time as planning permission is granted and further detailed design is developed.

Likely Significant Effects

- 14.37 The potential service supply environmental effects relate to both the operation and construction phases of the development.

Construction Effects

- 14.38 Potential effects of in the Construction of the Proposed Development include direct short-term loss of supply due to works connection to the supply network. Reinforcement works to existing local and strategic utility networks and the construction of new utility infrastructure (e.g. pipelines, underground or overhead powerlines) which are required to serve the development during the Operational phase.
- 14.39 Asset mapping has been obtained from the relevant statutory undertakers (as identified on the composite plan, available within Appendix 14) and noted in the 'Baseline Conditions' section above and identifies potential utilities which may require diversion or could be damaged if they are to remain in position.
- 14.40 New utilities connections, reinforcement and supply works will be further considered as the detailed design for the proposed development site comes forward and further discussions with the relevant incumbent suppliers continues. As the locations of utilities is known based on existing utility mapping and the heavily regulated nature of utilities and infrastructure provisions, the likely significant effects are Negligible and as such are not significant.

Operational Effects

- 14.41 Potential effects of the operational Proposed Development relate to the capacity of the relevant infrastructure both locally and within the wider network area.
- 14.42 Each of the incumbent suppliers were contacted through the writing of this Chapter for information relating to the proposed potential loading of the system, potential utility diversions or easements and infrastructure upgrade requirements.
- 14.43 Whilst most incumbent suppliers require further detailed design information at later stages of the proposed development, some locations have been identified at which potential connections into the existing networks can be made.
- 14.44 As a result, provided that the reinforcements and connection works are completed for the development, effects on capacity are mitigated by design measures as required by statutory undertakers, likely significant effects are Minor and as such are not significant.

Mitigation Measures

Construction Effects

- 14.45 Network outage may occur whilst new connections are made to the supply network or through accidental damage to existing infrastructure.
- 14.46 In mitigation of the need to shut down supplies whilst making new connections, network operators have developed methodologies to permit live jointing whereby the existing network remains fully operational during connection works. During certain very occasional operations it remains necessary to temporarily shut down the local network. In such circumstances the area to be shut down is localised and planned for periods that

cause the least disruption. The supplying company is obliged to give adequate notice to the affected users and ensure that appropriate provision is made for essential supplies.

- 14.47 Potential loss of supply through network damage is mitigated through careful planning of the construction phases of the development and good construction practice. The existing and planned networks will be located on construction drawings and manually traced on the ground for all contractors to use during construction. Control measures will be put in place at a site-level, such as the 'License to Dig' process, to substantially reduce the risk of damage to the supplying networks.
- 14.48 Accordingly, this potential effect is considered to be Negligible as whilst there is the potential for loss of integrity or part of an asset and whilst there are minimal supplies present within the Proposed Development boundary, where there are major supplies, their locations are known and a 'License to Dig' is required prior to works. The Sensitivity of the receptor is considered Low as there are no notable supply issues which have been identified through the writing of this ES Chapter. As such, the likely significant effects are considered to be Minor and as such are not significant.

Operational Effects

- 14.49 Inadequate provision of service supplies to a development can result in local and, potentially, more widespread reductions in network robustness and supply continuity. Therefore, when assessing the supply requirements for a development it is essential that the appropriate supply operators are involved in assessing their own existing network and given the opportunity to form strategies for dealing with demand and supply growth.
- 14.50 The relevant incumbent suppliers have been contacted through the writing of each ES Chapter, further liaison with incumbent suppliers will be required as the detailed design of the development to ensure that the development can be brought forwards with adequate supply.
- 14.51 The regulatory regimes applicable to public service supply companies dictate that any network expansion should result in no loss or reduction of service. The proposals developed by the supply companies, which are outlined in the above paragraphs, will ensure that the minimum regulatory standards are maintained and that no environmental effect will result from supplying the Proposed Development.
- 14.52 Furthermore, easements from existing utilities within the development, most notably the oil pipeline through the site are to be maintained where services are not proposed to be diverted.
- 14.53 Given the regulatory regimes in place which dictate that there should be no loss in service supply as a result of network expansion means that the magnitude of the impact is considered Minor. The Sensitivity of the receptor is considered Low as there are no notable supply issues which have been identified through the writing of this ES Chapter. As such, the likely significant effects are considered to be Negligible and as such not significant.

Cumulative Impacts

- 14.54 The development has been assessed for cumulative impacts against committed schemes at Tattenhoe Park, Kingsmead South and Shenley Park, all north of the Proposed Development.
- 14.55 The heavily regulated nature of utilities supply and infrastructure requires that no loss of supply or detrimental impacts should arise from new developments.

- 14.56 The provision of utilities generally cannot be reserved. Continued liaison with the relevant incumbent suppliers with the phasing and delivery of the Proposed Development will help to ensure demand can be met as multiple developments in the area are bought forwards which will be required at detailed design stage, once planning approval has been granted.

Summary

- 14.57 Relative incumbent suppliers have been contacted as part of this report. It is recommended that all operators are contacted for relevant and updated information surrounding diversions, network upgrades and connection locations once the scheme has gained planning permission and through the detailed design works to ensure the scheme is based on the most relevant and up-to-date information.
- 14.58 The Operation and Construction of the Proposed Development are likely to have Negligible/Minor effects in comparison to the baseline conditions with regards to Utilities and Services and are therefore not significant.

15. WASTE

Introduction

15.01 This chapter of the ES assesses the likely significant effects of the Proposed Development in terms of waste.

15.02 For the purpose of this assessment, 'waste' is defined as:

“any substance or object the owner discards, intends or is required to discard.”

15.03 This definition is as specified under the Waste Framework Directive (European Directive (WFD) 2006/12/EC), as amended by the WFD (Directive 2008/98/EC, which came into force in December 2010) (Ref. 15.1).

15.04 In the context of the Proposed Development, waste is anticipated to comprise the following:

- Construction waste arising from site clearance, excavation and construction activities;
- Household waste generated by residents;
- Commercial waste generated by businesses and people using the local facilities; and
- Organic waste from the maintenance of soft landscaped areas.

15.05 This chapter describes the assessment methodology; the baseline conditions at the Application Site and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after the measures have been employed.

Legislative and Planning Policy Context

15.06 A summary of planning policy, legislation and key guidance documents relevant to waste management for the Proposed Development is provided below.

Legislation and Regulation

15.07 The relevant statutory framework includes:

- The Waste (England and Wales) Regulations 2011 (as amended) (Ref. 15.2);
- The Hazardous Waste (England and Wales) (Amendment) Regulations 2009 (Ref. 15.3); and
- Revised Waste Framework Directive (2008) (Ref. 15.1).

Local Policy

Aylesbury Vale District Local Plan (January 2004) (Ref. 15.4)

15.08 The Aylesbury Vale District Local Plan (AVDLP) applies to the whole of the District and covers the period to 2011. Some of its policies were subsequently subject to a saving direction by the Secretary of State and constitute the development plan for the area.

15.09 There are no policies in the AVDLP that are of relevance to the Proposed Development from a waste management perspective.

Plan:MK 2016 – 2031 (Adopted March 2019) (Ref. 15.5)

15.10 Plan:MK sets out Milton Keynes Council's strategy for meeting the Borough's needs until 2031.

15.11 The following extract is of relevance to the Proposed Development:

"Policy SC1

Sustainable Construction

A. Development proposals will be required to demonstrate how they have implemented the principles and requirements set out below. With the exception of requirements K.2/3/5, non-residential development of 1000 sq.m or more that is demonstrated to achieve a BREEAM Outstanding rating will not be required to meet the requirements below.

Materials and waste

B. Reuse land and buildings wherever feasible and consistent with maintaining and enhancing local character and distinctiveness.

C. Reuse and recycle materials that arise through demolition and refurbishment, including the reuse of excavated soil and hardcore within the site.

...

F. Consider the lifecycle of the building and public spaces, including how they can be easily adapted and modified to meet changing social and economic needs and how materials can be recycled at the end of their lifetime.

G. Space is provided and appropriately designed to foster greater levels of recycling of domestic and commercial waste."

Buckinghamshire Minerals and Waste Local Plan 2016-2036 (Ref. 15.6)

15.12 The Buckinghamshire Minerals and Waste Local Plan forms the land use planning strategy for minerals and waste development within the administrative area of Buckinghamshire County. It provides guidance regarding industry investment, the level of minerals and waste development needed to support the development of sustainable communities and infrastructure and where in the county such development should go. The Plan also addresses the design and impact of development and how it can best relate to the surrounding land use(s) and link with the wider community in order to optimise beneficial outcomes.

15.13 The following policy is of relevance to the Proposed Development:

"Policy 10: Waste Prevention and Minimisation in New Development

Proposals for new development should support the efficient use and recovery of resources throughout the life of the development including construction and operation and/or occupation through:

- *Design principles and construction methods that minimise the use of primary minerals and encourage the use of building materials made from recycled and alternative materials; and*
- *Construction and demolition methods that minimise waste production, maximise the reuse and recovery of materials (as far as practicable) on-site and minimise off-site disposal; and*
- *Design and layout that complements sustainable waste management by providing appropriate storage and segregation facilities.*

Proposals for major development should identify measures to support implementation of the waste hierarchy during construction and demolition (where applicable), including quantity and type(s) of waste expected to be generated.

Proposals for major development that seeks to deliver the housing requirement or employment land will be encouraged to incorporate neighbourhood waste management facilities (where appropriate)."

Vale of Aylesbury Local Plan 2013-2033: Proposed Submission Plan (November 2017) as Proposed to be Modified (October 2019) (showing main and additional modifications) (Ref. 15.7)

- 15.14 The Vale of Aylesbury Local Plan (VALP), once adopted, will form the main part of the development plan for the district, replacing the 2004 Local Plan saved policies. It sets out the long-term vision and strategic context for managing and accommodating growth within the district until 2033.
- 15.15 The draft VALP has been subject to independent examination and the Inspector has issued his interim findings. In November and December 2019, AVDC carried out consultation on the proposed main modifications to the VALP. It is anticipated that the VALP will be adopted in 2020.
- 15.16 The following extracts are of particular relevance to the assessment in this chapter:
“Strategic objectives
...
2.6 In order to accommodate growth and deliver development in accordance with the vision: Objectives
...
7. The council will manage development in a way that ensures that climate change is adapted to and mitigated against, including:
...
c. reduction in waste generation and increase in recycling and reuse of materials and resource efficiency.
...
C3 Renewable Energy
All development schemes should look to achieve greater efficiency in the use of natural resources.
...
The Council will seek to ensure that all development schemes achieve greater efficiency in the use of natural resources, including measures minimise energy use, improve water efficiency and promote waste minimisation and recycling. Developments should also minimise, reuse and recycle construction waste wherever possible.”

National Policy and Guidance

National Planning Policy Framework (2019) (Ref. 15.8)

- 15.17 The National Planning Policy Framework (NPPF) sets out the Government’s planning policies for England and how these should be applied.
- 15.18 The following extracts are of relevance to the Proposed Development:
“2. Achieving sustainable development
...
8. Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):
...
c) an environmental objective – 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.”

“17. Facilitating the sustainable use of minerals

...

204. Planning policies should:

...

b) so far as practicable, take account of the contribution that substitute or secondary and recycled materials and minerals waste would make to the supply of materials, before considering extraction of primary materials, whilst aiming to source minerals supplies indigenously;”

National Planning Policy for Waste (2014) (Ref. 15.9)

- 15.19 The National Planning Policy for Waste replaced Planning Policy Statement 2010: Planning for Sustainable Waste Management (PPS10) and is to be considered alongside other national planning policy for England - such as in the NPPF and Our Waste, Our Resources: A Strategy for England. As its primary focus is on planning for waste management facilities, it is not considered relevant to the Proposed Development.

Our Waste, Our Resources: A Strategy for England (2018) (Ref. 15.10)

- 15.20 The strategy sets out how England will preserve the stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. At the same time, the country will minimise the damage caused to the natural environment by reducing and managing waste safely and carefully, and by tackling waste crime.
- 15.21 It combines actions the country will take now, with firm commitments for the coming years and gives a clear longer-term policy direction in line with the 25 Year Environment Plan. This is the blueprint for eliminating avoidable plastic waste over the lifetime of the 25 Year Plan, doubling resource productivity, and eliminating avoidable waste of all kinds by 2050.

Waste Hierarchy

- 15.22 The Waste Hierarchy requires avoidance of waste in the first instance followed by reducing the volume that requires disposal after it has been generated.
- 15.23 It gives an order of preference for waste management options to minimise the volume for disposal
- 15.24 The main principles of the Waste Hierarchy are:
- Waste should be prevented or reduced at source as far as possible;
 - Where waste cannot be prevented, waste materials or products should be reused directly or refurbished and then reused;
 - Waste materials should be recycled or reprocessed into a form that allows them to be reclaimed as a secondary raw material;
 - Where useful secondary materials cannot be reclaimed, the energy content of the waste should be recovered and used as a substitute for non-renewable energy resources; and
 - Only if waste cannot be prevented, reclaimed or recovered, should it be disposed of into the environment and this should only be undertaken in a controlled manner.
- 15.25 The Waste Hierarchy has been implemented in England and Wales by the Waste (England and Wales) Regulations 2011. These regulations require that an establishment or undertaking that imports, produces,

collects, transports, recovers or disposes of waste must take reasonable steps to apply the Waste Hierarchy when waste is transferred or disposed of.

Recycling and Waste: Advice Note for Developers 2019 (Ref. 15.11)

15.26 AVDC issued their advice note for developers in order to assist developers and planning applicants on the provision and design of appropriate recycling and waste management facilities for new residential and commercial developments. This note is used as the principal source of guidance for waste management associated with the Proposed Development.

Assessment Methodology

Scope of the Assessment

15.27 The potential effects of the Proposed Development on waste include:

- Waste arisings during construction (i.e. demolition, excavation and construction waste); and
- Waste arisings during operation (i.e. waste from households and commercial premises).

15.28 The scope of work for the assessment of waste management effects associated with the Proposed Development comprises the following:

- Consideration of the issues associated with waste delivery and acceptance procedures (including delivery of prohibited wastes) for the chosen disposal methods;
- Determination of the quantities and trends of waste arisings and their respective waste disposal streams in the District and/or County (current baseline conditions);
- Assessment of the effects of waste arisings during construction works and following completion of the Proposed Development;
- Consideration of the mitigation and waste reduction measures; and
- Identification of residual effects.

Methodology

15.29 An assessment of the waste streams generated during the construction phase has been undertaken using applicable construction waste arisings benchmark data from the Building Research Establishment (BRE). Opportunities for reducing, reusing, segregation and recycling of waste materials, together with an assessment of any residual construction waste streams, will be identified.

15.30 The BRE has developed indicators to aid in the calculation of construction waste arisings at the design stage of a variety of development types. The Environmental Performance Indicators (EPIs) measure the volume in tonnes of construction waste per 100 sqm of floorspace. These are shown in Table 15.1.

Table 15.1 BRE Waste Benchmark Data for New Build Construction (Ref. 15.12)

PROJECT TYPE	AVERAGE TONNES / 100sqm
Residential	16.8
Public Buildings	22.4
Leisure	21.6
Industrial Buildings	12.6
Healthcare	12.0

PROJECT TYPE	AVERAGE TONNES / 100sqm
Education	23.3
Commercial Other	7.0
Commercial Offices	23.8
Commercial Retail	27.5

- 15.31 The indicators applicable to the Proposed Development have been used to measure construction waste generation and relate to rates where no minimisation, reuse or recycling of materials has taken place. This will provide the baseline figure against which a reduction in waste arisings would then be planned.
- 15.32 The future operations at the Proposed Development will generate household and commercial waste. The likely volume and type of waste materials generated from operational activities will be estimated using current local household waste data and formulas sourced from British Standards for commercial waste.
- 15.33 The magnitude of change and sensitivity of the affected receptor/receiving environment are both assessed on a scale of high, medium, low and negligible. Determination of magnitude will reflect judgements as to the scale of the predicted change and deviation from the established baseline conditions. The significance of effects reflects judgements as to the magnitude of effect against the sensitivity of the affected receptor(s).

Assessing the Magnitude of Impact

- 15.34 As there is currently no single and unified method for assessing the magnitude of impact from the generation and disposal of waste, WSP has established the likely ability of waste management facilities to manage, and maximise landfill diversion of, the volumes of waste expected over the duration of the construction project and during operation. The criteria for assessing the magnitude of the predicted impact is given in Table 15.2 below.

Table 15.2 Criteria for Assessing Magnitude of Impact on Waste Management Receptors

MAGNITUDE	IMPACT
Major	The Proposed Development generates more than 50,000 tonnes of waste per annum
Moderate	The Proposed Development generates more than 5,000 tonnes but less than 50,000 tonnes of waste per annum
Minor	The Proposed Development generates more than 500 tonnes but less than 5,000 tonnes of waste per annum
Negligible	The Proposed Development generates less than 500 tonnes of waste per annum
No Impact	The Proposed Development generates no waste

Assessing the Sensitivity of Receptors

- 15.35 The criteria for assessing the sensitivity of the local waste treatment and disposal facilities are set out in Table 15.3.

Table 15.3 Criteria for Assessing Sensitivity of Receptors

SENSITIVITY	RECEPTORS
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High	The waste generated comprises large volumes of hazardous, non-hazardous or inert waste and local waste facilities are severely restricted (i.e. there are less than three facilities in the study area).
Moderate	The waste generated comprises moderate volumes of hazardous, non-hazardous or inert waste and local waste facilities are restricted (i.e. there are less than 10 facilities in the study area).
Low	The waste generated comprises small volumes of hazardous waste, or medium volumes of non-hazardous waste or inert waste and local waste facilities are less restricted (i.e. there are more than 10 facilities but less than 20 facilities in the study area).
Negligible	The waste generated comprises no or negligible volumes of hazardous waste, or minor volumes of non-hazardous or inert waste and local waste facilities are unrestricted (i.e. there are more than 20 facilities in the study area).

Determining the Significance of Effect

15.36 The significance of effects has been assessed according to the following scale shown in Table 15.4.

Table 15.4 Matrix for Determining the Significance of Effect

SENSITIVITY	Very High	Major	Moderate	Moderate	Negligible	No impact
	High	Major	Moderate	Minor	Negligible	
	Medium	Moderate	Minor	Minor	Negligible	
	Low	Minor	Minor	Negligible	Negligible	
		Major	Moderate	Minor	Negligible	No Impact
MAGNITUDE OF IMPACT						

15.37 Effects of moderate and above are considered to be 'significant'.

15.38 It should be noted that the current spare capacities of local waste treatment and disposal facilities is commercially sensitive information and therefore not publicly available on the Environment Agency's registers. The magnitude of change from the Proposed Development has taken into account the estimated volumes of waste arisings generated, the nature of the material, (e.g. whether it is hazardous, non-hazardous etc.), the ease of handling and the implications for treatment and disposal (e.g. whether facilities are easily available or whether treatment or disposal capacity is expected to be restricted). The magnitude of change has been based on professional judgement on the likely ability of waste facilities to manage waste based on the factors outlined above.

Baseline Conditions

Current Site Baseline Conditions

15.39 A site visit was undertaken, comprising an unaccompanied site inspection of key areas.

- 15.40 The Application Site currently generates minor volumes of agricultural waste associated with the existing land uses and management regime. It is assumed that organic waste would mainly be composted on site, with other waste materials being transferred to suitably licensed local waste treatment and disposal facilities.

Current Regional Baseline

Construction & Demolition Waste

- 15.41 Approximately 1.13 million tonnes of Construction, Demolition and Excavation (CD&E) waste was produced within Buckinghamshire in 2016 and it is anticipated that annual arisings will remain the same up to 2033 (Ref. 15.6). This figure includes a portion of CD&E waste exported from London.
- 15.42 Recent national studies suggest that over three quarters of CD&E waste is currently recycled or otherwise recovered, with less than a quarter disposed of to landfill. A significant proportion (around a third) of inert waste is reused, with over half of this thought to be reused on exempt sites. This 'unseen capacity' is assumed to continue to be available, however, it is anticipated that the amount of waste captured under exempt categories will decrease in line with revision of the Environmental Permitting system providing a more rounded view of management of this waste in the future. In addition, some inert waste is utilised at non-hazardous landfill for engineering purposes.
- 15.43 Based on current working methods, a significant opportunity exists for segregating non-inert CD&E waste streams for reuse/recycling at the Application Site. It is likely that the key waste streams generated by the construction phase of the development that have the potential to be reused/recycled will predominantly comprise soils, concrete, bricks, metal, glass, plastic and timber.
- 15.44 It is anticipated that waste treatment and recycling facilities, inert, non-hazardous and hazardous landfill sites would be the main sensitive receptors during the site preparation and construction phase of the Proposed Development. These sensitive receptors are collectively referred to as waste management infrastructure within this chapter.

Commercial & Industrial Waste

- 15.45 A 2009 national survey (Ref. 15.13) of commercial and industrial (C&I) waste arisings and management methods was the most comprehensive set of national and regional data available, however, this publication was withdrawn by the Government in 2015 and current information on C&I waste is provided in DEFRA's UK Statistics on Waste, 2020 edition (Ref. 15.14).
- 15.46 This report does not provide a regional breakdown of C&I arisings as the 2009 survey did, but instead states that approximately 37.2 million tonnes of C&I waste was generated in England in 2018
- 15.47 For context, the 2009 survey stated that the South-East region generated approximately 6.3 million tonnes of C&I waste in 2009 (13% of the national total), with recycling and land disposal being the main waste management methods used.
- 15.48 C&I waste is currently collected within the Study Area by a large number of private waste companies and the trade waste services provided by AVDC. There is a large network of waste facilities that are used to bulk, transfer, treat and dispose of C&I waste.

Household Waste

- 15.49 Table 15.6 outlines the household waste figures and percentage of waste recycled/composted for Aylesbury Vale district, in comparison to England, between 2015-16 and 2018-19, which is the most current data publicly available at the time of writing (Ref. 15.15).

Table 15.6 Household Waste Figures for Aylesbury Vale District, in Comparison to England Average

Period	Household Waste		
	Total collected in Aylesbury Vale district (tonnes)	Recycled / composted by AVDC (%)	Average recycled / composted in England (%)
2018-19	61,076	51.1	44.7
2017-18	64,131	49.7	45.2
2016-17	69,717	50.3	44.9
2015-16	57,273	52.0	44.3

- 15.50 According to the data, the household waste tonnages generated in Aylesbury Vale district from 2015-16 to 2016-17 showed a significant increase, before decreasing in 2017-18 and again in 2018-19.
- 15.51 Aylesbury Vale district has consistently recycled/composted a higher proportion of its household waste compared to the average for England. Recycling rates are expected to increase, or maintain, at the very least, in the future due to policy drivers and waste management provisions at the Proposed Development must therefore cater for this trend.
- 15.52 The calculation of future household waste generation has been estimated using Defra municipal waste statistics and Aylesbury Vale district data.
- 15.53 At this stage in the design process the figures can only be considered indicative as a variety of factors, such as the on-going promotion of waste prevention, minimisation and recycling, consumer habits and population changes etc. will impact on waste generation rates in future years.
- 15.54 Table 15.7 outlines how the mean waste generation per household per year was established.

Table 15.7 Mean household waste generation for Aylesbury Vale district

Total household waste generated within Aylesbury Vale district in 2018-19 (tonnes)	61,076
Total number of households within Aylesbury Vale boundary (2017)	78,847
Estimated mean waste generation per household per year (tonnes)	0.77

15.55 The estimated mean waste generation per household per year in Aylesbury Vale district was 0.77 tonnes in 2018-19.

15.56 Table 15.8 outlines the waste management services that are currently provided by Aylesbury Vale district.

Table 15.8 Waste management services provided by Aylesbury Vale district

SERVICE	DETAILS
Refuse collection	Green-lidded wheeled bins collected alternate weekly
Recycling collection	Blue-lidded wheeled bins collected alternate weekly
Food waste collection	Food bins collected weekly
Garden waste collection	Subscription service. Brown wheeled bin collected fortnightly
Bulky waste collection	Chargeable collection service
Recycling banks	Numerous locations across the district

Household Recycling Centres (HRCs)

15.57 The three HRCs operating within Aylesbury Vale district are managed by Buckinghamshire County Council:

- Aston Clinton, College Road North, HP22 5EZ;
- Raban's Close, Raban's Lane, Aylesbury, HP19 8RS; and
- Yonder Slade, Buckingham Industrial Park, Buckingham, MK18 1RZ.

15.58 The three sites provide the means for residents to deposit general household waste, cardboard, car batteries, domestic batteries, car tyres, cooking oil, engine filters and waste engine oil, glass bottles and jars, garden waste, gas bottles, fluorescent tubes, hardcore (e.g. bricks, rubble), household electrical goods, paper, plasterboard or plaster (Aston Clinton and Aylesbury), scrap metal including fridges, foil and drinks cans, soil, textiles and wood. The sites will also accept certain domestic, hazardous wastes.

Likely Significant Effects

- 15.59 The following sections outline the likely significant effects associated with the construction and operation of the Proposed Development.

Site Clearance

- 15.60 The Applicant's earthworks strategy for the Proposed Development will be to retain all material on site, therefore, the volume of excavated material that will require removal from the Application Site is expected to be negligible.
- 15.61 Although there are a larger number of inert landfills in the South East region, there are currently only a small number of suitably licensed facilities accepting hazardous waste in the UK (this is due to the European Landfill Directive in 2004, whereby the number of hazardous waste landfills was reduced from 279 to 17). Of this number, only two facilities in the Southern and South East regions accept hazardous waste (Dartford and Thamesmead), the former is for asbestos-containing material only. This may have an impact on the disposal routes for any contaminated material that is excavated and cannot be remediated on-site.
- 15.62 Due to the site's current use as agricultural land, it is likely that the risk of contamination will be minimal.
- 15.63 Based on the low expected volume of waste arisings generated by the site clearance, it is anticipated that the Proposed Development will have a temporary impact on waste management infrastructure of minor adverse significance, prior to the implementation of mitigation measures.

Construction Phase

- 15.64 As the current planning application is in Outline only, a detailed accommodation schedule for the residential dwellings is unavailable. For the purposes of this assessment, an average total floor area for a 3-bed residential dwelling was assumed across all units on the development, in order to calculate total construction waste. For the South East, the average total floor area calculated by The Royal Institute of British Architects (RIBA) is 93.9 sqm, set against a national average of 88.9sqm (excluding London) (Ref. 15.16).
- 15.65 These figures represent a worst-case scenario for construction waste generation at the Proposed Development, given that the conclusions of the Buckinghamshire 2016 Housing and Economic Delivery Needs Assessment (HEDNA) reported in paragraph 5.6 of the draft VALP that 73% of all market housing and 91% of all affordable housing should be 3-bed or smaller.
- 15.66 Tables 15.9 and 15.10 show the estimated construction waste arisings for the residential and non-residential elements of the Proposed Development respectively, based on assumptions for gross floor areas for buildings and the relevant EPI from the BRE.

Table 15.9 Estimated Construction Waste Arisings (Residential)

PROJECT TYPE	NO. UNITS	INDICATIVE TOTAL FLOOR AREA (SQM)	TONNES /100SQM OF FLOOR AREA (BRE)	CONSTRUCTION WASTE (TONNES)
Residential	1,855*	174,185	16.8	29,263

* Assumed average total floor area per dwelling of 93.9 sqm. 1,795 residential units + 60 extra care units.

Table 15.10 Estimated Construction Waste Arisings (Non-Residential)

DESCRIPTION	ASSUMED BRE PROJECT TYPE	ESTIMATED TOTAL FLOOR AREA (SQM)	TONNES / 100SQM OF FLOOR AREA (BRE)	ESTIMATED CONSTRUCTION WASTE (TONNES)
Employment	Commercial Offices	20,700	23.8	4,927
Local Centre	Commercial Retail	6,700	27.5	1,843
Primary School	Education	15,000*	23.3	3,495
Secondary School	Education	26,700**	23.3	6,221
Total	-	-	-	16,486

Note: The following non-residential land use budgets have not been included in the calculations, due to the expectation that they would generate no or negligible construction waste (e.g. Allotments, Green Infrastructure) or due to there being no waste benchmarks for estimating construction waste for certain land uses (e.g. Grid Road Reserve, Infrastructure, Water Attenuation, and Highway Improvements).

* Assumption that 50% of total land use budget for the Primary School (3 ha, 30,000 sqm) is built on.

** Assumption that 30% of total land use budget for the Secondary School (8.9 ha, 89,000 sqm) is built on.

- 15.67 On review of the estimated construction waste arisings, approximately 29,263 tonnes would be generated from the residential elements. Approximately 16,486 tonnes would be generated from the non-residential elements. In total, this equates to approximately 45,749 tonnes of construction waste that would require management over the duration of the construction works (starting in 2021/22 with completion in 2031). This equates to approximately 4,575 tonnes per year, although this will vary according to the construction programme and final phasing of the Proposed Development.
- 15.68 The information provided in Tables 15.9 and 15.10 above is based on standard waste management practices in the UK and an estimate of gross floor areas. The actual floor areas of the various uses are not known at this Outline application stage, and waste generation could be significantly reduced when further details of the final layout of the site has been refined. As the assessment is based on worst-case assumptions, there is also significant potential to reduce waste generation through best practice on-site waste prevention, minimisation and management.
- 15.69 The estimated waste arisings data can be used as an indicator for measuring and monitoring waste generated. This will enable the setting of realistic and attainable waste minimisation and management targets.
- 15.70 From the assessment criteria outlined previously, the predominance of treatment (e.g. segregation of recyclable materials) of significant quantities of construction waste on-site (for both environmental and economic reasons), is operated on the vast majority of sites, thus reducing the need to send waste to landfill.

- 15.71 The sensitivity of local waste treatment and disposal facilities is considered to be medium, and the magnitude of impact prior to mitigation, is considered to be moderate, as it has been estimated that less than 50,000 tonnes of waste would be generated each year. Therefore, there is likely to be a direct, temporary, effect on local waste treatment and disposal facilities of minor negative significance, prior to the implementation of mitigation measures.

Operational Phase: Household Waste

- 15.72 The average household waste generation rate (from Table 15.7) was used to provide an estimate of the waste arisings from the future residents of the Proposed Development. This is outlined in Table 15.11.

Table 15.11: Estimated Household Waste Arisings

TYPE	NO. UNITS	AVERAGE WASTE GENERATION PER HOUSEHOLD PER ANNUM (TONNES)	TONNES / ANNUM	TONNES / WEEK
Residential	1,855*	0.77	1,428	27

* 1,795 residential units + 60 extra care units

- 15.73 It is estimated that if current waste generation levels remained constant, the Proposed Development could potentially generate approximately 1,428 tonnes of household waste per annum (27 tonnes per week), assuming that the maximum number of units will be constructed and occupied.
- 15.74 Based on the above estimation of household waste arisings and the current waste generation rate for Aylesbury Vale district as a whole, it has been considered that the Proposed Development would have a noticeable effect on the quantity of waste generated.
- 15.75 The sensitivity of local waste treatment and disposal facilities is considered to be medium, and the magnitude of impact prior to mitigation, is considered to be minor, as it has been estimated that more than 500 tonnes but less than 5,000 tonnes of waste would be generated each year. Therefore, there is likely to be a direct, permanent, effect on local waste treatment and disposal facilities of minor negative significance, prior to the implementation of mitigation measures.

Operational Phase: Commercial and industrial waste

- 15.76 Table 15.12 summarises the estimated waste generation from the non-residential elements of the Proposed Development, based on floorspace and appropriate benchmarks from British Standard (BS) 5906:2005 Waste management in buildings – Code of practice (Ref. 15.17) unless otherwise stated.

Table 15.12 Estimated Commercial Waste Arisings

LAND USE	ESTIMATED TOTAL FLOOR AREA (SQM)	FORMULA FOR WEEKLY WASTE	ESTIMATED WASTE PER WEEK (TONNES)	ESTIMATED WASTE PER ANNUM (TONNES)
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GENERATION (BS5906:2005)				
Employment *	20,700	Volume arising per employee [50 l] x number of employees	3.31	172
Local Centre	6,700	Volume per m ² of floor area [10 l] x floor area	3.05	158
LAND USE	NO. PUPILS	FORMULA FOR ANNUAL WASTE GENERATION	-	-
Primary School **	420	Volume arising per pupil: primary school (45kg) ***	0.48	19
Secondary School	600	Volume arising per pupil: secondary school (22kg) ***	0.34	13
Total	-	-	7.18	577
* Assumption that waste-generating floor area is 75% of total and each employee uses 8 sqm of this floor area.				
** Assumption that the Primary School is 2FE, has 30 pupils per form and seven year groups.				
*** Source: WRAP (2008) The nature and scale of waste produced by schools in England.				

- 15.77 If current waste generation levels remain constant, the Proposed Development could generate up to approximately 577 tonnes of commercial waste per annum (up to 7.2 tonnes per week), with the maximum gross floorspace constructed and occupied.
- 15.78 The sensitivity of local waste treatment and disposal facilities is considered to be medium, and the magnitude of impact prior to mitigation, is considered to be minor, as it has been estimated that more than 500 tonnes but less than 5,000 tonnes of waste would be generated each year. Therefore, there is likely to be a direct, permanent, effect on local waste treatment and disposal facilities of minor negative significance, prior to the implementation of mitigation measures.

Mitigation Measures

- 15.79 The following sections outline the mitigation measures proposed to reduce the effects associated with the construction and operation of the Proposed Development.

Site Clearance

- 15.80 In order to plan for the minimisation and management of the volume of waste generated during the site clearance, the appointed contractor will prepare Site Waste Management Plans (SWMPs) which will include measures to minimise waste generation and reduce the amount of waste being sent for disposal where possible. The SWMPs will be secured by planning condition.

- 15.81 Material deemed suitable for reuse on the Proposed Development will be retained and stockpiled where possible to incorporate such materials into the subsequent construction process.
- 15.82 If materials cannot be reused on-site, then the feasibility of reusing them off-site will be explored.
- 15.83 The contractor will establish a number of key performance indicators (KPIs) specifically for waste management at the Proposed Development which will be regularly monitored.

Construction Phase

- 15.84 Adherence to the waste hierarchy by reusing and/or recycling waste materials will reduce the significance of the effect. The best practice measures and recommendations for the minimisation and management of waste as set out below will be incorporated into a CEMP and provided to AVDC prior to commencement of works on site.
- 15.85 To ensure that the system of waste minimisation, reuse and recycling is effective the setting of on-site waste targets for the Proposed Development and a suitable programme of monitoring at regular intervals to focus upon the following will be secured by planning condition:
- Quantifying raw material wastage;
 - Quantifying the generation of each waste stream;
 - Any improvements in current working practices;
 - Methods by which the waste streams are being handled and stored; and
 - The available waste disposal routes used, e.g. landfill, waste transfer stations.
- 15.86 The contractor will be responsible for the setting and review of waste targets from the outset to ensure that high standards are maintained with the emphasis being on continual improvement.
- 15.87 Specific waste quantification and monitoring (i.e. through the SWMPs) will assist in determining the success of waste management initiatives employed and progress against these targets should be relayed back to the Project Team.
- 15.88 As for the site clearance works, the waste arisings during construction will be controlled and monitored through the SWMPs which will contain targets for construction phase waste generation.
- 15.89 All construction works on the Application Site will be undertaken in accordance with the Considerate Constructors Scheme. This is a national initiative set up by the construction industry. Sites that register with the Scheme sign up to and are monitored against a Code of Considerate Practice designed to encourage best practice beyond statutory requirements.
- 15.90 The Considerate Constructors Scheme is concerned about any area of construction activity that may have a direct or indirect impact on the image of the industry as a whole. The main areas of concern fall into three main categories: the environment, the workforce and the general public. Waste management is a key area of focus and on-site considerations may include:
- How waste is avoided, reduced, reused, and/or recycled;
 - Whether there is a SWMP and how this is monitored; and
 - What type of feedback is received (if any) as to how much waste on-site is diverted from landfill.

- 15.91 As part of the encouragement of on-site best practice, there will also be a need to ensure that suppliers of raw materials for the projects are committed to reducing surplus packaging associated with the supply of any raw materials. This includes the reduction of plastics (i.e. shrink wrap and bubble wrap), cardboard and wooden pallets. This may involve improved procurement and consultation with selected suppliers regarding commitments to waste minimisation, recycling and the emphasis on continual improvement in environmental performance. Where practicable, the off-site manufacture of building components will be undertaken to help minimise the generation of on-site construction waste. These mitigation measures will be secured through contractual obligations with the Principal Contractor, and also between the Principal Contractor and appropriate sub-contractors.

Operational Phase: Household Waste

- 15.92 The residential elements of the Proposed Development will be designed in accordance with AVDC's guidance document Recycling and Waste: Advice Note for Developers 2019 (Ref. 15.11).
- 15.93 Design measures for the Proposed Development will ensure that all residents have access to both internal and external waste and recycling storage facilities. These facilities will be located within the curtilage of each dwelling and in suitably designed enclosures on ground level for flats. These facilities will be easily accessible for residents and collection crews.
- 15.94 Waste segregation and storage facilities will be designed to be convenient and simple to use, to encourage residents to recycle and to maximise recycling rates.
- 15.95 AVDC provides a weekly kerbside food waste collection service.
- 15.96 The garden waste collection scheme provided by AVDC is chargeable, indicating that home composting will remain a requirement for some residents. As a result of these issues, sufficient exterior storage space will be provided to enable the installation by residents of a home composting bin/food digester in the gardens of private houses.

Operational Phase: Commercial Waste

- 15.97 The non-residential elements of the Proposed Development will be designed in accordance with AVDC's guidance document Recycling and Waste: Advice Note for Developers 2019 (Ref. 15.11).
- 15.98 They will be provided with dedicated or shared waste storage areas for waste segregation for recycling and non-recyclable refuse for disposal as appropriate.
- 15.99 All waste storage areas will be clearly labelled to ensure that cross contamination of refuse and recycling is minimised.
- 15.100 Retailers and commercial tenants will be required through tenancy agreements to undertake and implement their own 'waste audit' and set targets for reducing, reusing and recycling their waste streams.
- 15.101 It is assumed that collection of commercial waste will be undertaken via external waste management contractors. It will be the responsibility of the occupiers to arrange for refuse and recycling to be collected from their premises.

- 15.102 The frequency of waste collection will be dependent upon several factors including the volume of waste generated; the storage method (i.e. whether balers and waste compactors are used); and the schedule of the appointed waste contractor.

Residual Effects

- 15.103 The following sections outline the likely residual effects associated with the construction and operation of the Proposed Development.

Site Clearance & Earthworks

- 15.104 The reuse of earthworks waste within the site will significantly reduce the quantity of such waste requiring disposal. The sensitivity of the waste management infrastructure is medium and the magnitude of change, following mitigation, is low.
- 15.105 Therefore, following the implementation of mitigation measures, the temporary effect on waste management infrastructure is negligible and not significant.

Construction Phase

- 15.106 The sensitivity of local waste treatment and disposal facilities is medium, and the magnitude of impact, following mitigation, is negligible. Therefore, there is likely to be a direct, temporary, residual effect on local waste treatment and disposal facilities of negligible significance.
- 15.107 This is based on professional judgement given the current level of landfill diversion for CD&E waste nationally and the propensity to treat these materials as a resource rather than send them for disposal.
- 15.108 The mitigation measures outlined above will ensure that a significant proportion of construction waste can be separated for recycling, coupled with the arrangements for maximising diversion of waste from landfill. Therefore, the temporary effect on waste management infrastructure is not significant.

Operational Phase: Household Waste

- 15.109 The sensitivity of local waste treatment and disposal facilities is low, and the magnitude of impact, following mitigation, is negligible. Therefore, there is likely to be a direct, permanent, residual effect on local waste treatment and disposal facilities of negligible significance.
- 15.110 The mitigation measures outlined above will ensure that a significant proportion of waste can be separated for recycling by residents, thereby maximising recycling opportunities and reducing the waste contributions for disposal. Therefore, the long-term effect on waste infrastructure is not significant.

Operational Phase: Commercial Waste

- 15.111 The sensitivity of local waste treatment and disposal facilities is low, and the magnitude of impact, following mitigation, is negligible, as less than 500 tonnes of waste would be generated. Therefore, there is likely to be a direct, permanent, residual effect on local waste treatment and disposal facilities of negligible significance.
- 15.112 The mitigation measures outlined above will ensure that a significant proportion of commercial waste can be separated for recycling by occupiers and users, thereby maximising recycling opportunities and reducing the waste contributions for disposal. Therefore, the long-term effect on waste infrastructure is not significant.

Cumulative Effects

- 15.113 Development schemes which have been identified in the consideration of cumulative effects are included in Chapter 4.
- 15.114 The cumulative impact of the construction programme for the identified committed developments in proximity to the Proposed Development has been qualitatively assessed; due to the lack of details in the accessible planning documents which refer to waste management, during construction or operation.
- 15.115 The Proposed Development will generate excavation and construction waste which will require consideration in relation to existing demands placed on waste management infrastructure by the committed development in the vicinity of the Application Site.
- 15.116 Discussions with the appointed waste management contractors for the Proposed Development will be required to determine the likely cumulative impacts associated with waste transportation. In terms of waste generation and disposal, the identified cumulative scheme, in addition to the Proposed Development, will be required to implement a Construction Environmental Management Plan (CEMP) and Site Waste Management Plan (SWMP) which incorporate measures for the prevention, minimisation and sustainable management of excavation and construction waste.
- 15.117 As a consequence of these measures, the quantity of material requiring disposal will be minimised as far as practicable. Considering these factors and the scale of the Proposed Development in relation to the existing construction projects in the area, the resulting cumulative impact on existing waste management infrastructure is anticipated to be of minor adverse significance.

Summary

- 15.118 The most significant effects of the Proposed Development from a waste management perspective include the generation of waste materials during site clearance, construction activities and subsequent operation. The proposed construction approach and strategy has sought to minimise waste generation.
- 15.119 The Proposed Development is not expected to result in a significant quantity of excavated materials being generated from excavation, as the majority would be reused on site.
- 15.120 The Proposed Development will result in the generation of a considerable quantity of construction and operational waste, even following implementation of measures to minimise the generation of waste.
- 15.121 With the majority of construction waste appropriately reused or recycled off-site and SWMPs prepared and implemented, the residual temporary effect on waste management infrastructure is minor and is therefore not significant.
- 15.122 Following the implementation of mitigation measures, the long-term effect of waste on waste management infrastructure during operation of the Proposed Development is minor and is therefore not significant.

References

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16. GROUND CONDITIONS

Introduction

- 16.1 This chapter reports the outcome of the assessment of the likely significant effects of the Proposed Development in terms of ground conditions, including geology, soils and contamination.
- 16.2 The assessment of this topic area considers potential impacts relating to the following receptors:
- effects on geology, soils and contamination;
 - effects on human health (site users and adjacent site users including construction workers); the disturbance of potentially contaminated soils and the potential for construction to establish pathways between contaminants and receptors;
 - effects on infrastructure in the operational phase (new building foundations and buried service pipes);
 - effects on controlled waters, specifically from the mobilisation of contaminants to controlled waters is considered. Chapter 8 Drainage discusses drainage and the water environment in more detail.
- 16.3 Effects on ecological receptors are reported in Chapter 7 Ecology.
- 16.4 This chapter describes the assessment methodology; the baseline conditions at the Application Site and surroundings; the likely significant environmental effects; the mitigation measures required to prevent, reduce or offset any significant adverse effects; and the likely residual effects after the measures have been employed.
- 16.5 This Chapter is intended to be read as part of the wider ES with particular reference to Chapter 7 Ecology, Chapter 8 Drainage, Chapter 13 Human Health, Chapter 15 Waste and the following documents:
- **Appendix 16.1** – Interpretative Environmental Desk Study Report prepared by WSP Ltd, reference 70069442-014 dated May 2020.
 - **Appendix 16.1** (see Annex C) - Phase I Review and Strategic Phase II Geo-Environmental Assessment Report prepared by GEG Ltd, reference GEG-17-514/PI_PII dated 14th December 2017.

Legislative and Planning Policy Context

Legislation and Regulation

The Environmental Protection Act 1990

- 16.6 The Environmental Protection Act 1990 defines, within England, Wales and Scotland, the fundamental structure and authority for waste management and control of emissions into the environment. The Environmental Protection Act 1990 was intended to strengthen pollution controls and support enforcement with heavier penalties.
- 16.7 Part 2A of the Environmental Protection Act 1990 was inserted into that Act by s57 of the Environment Act 1995 and contains a regulatory regime for the identification and remediation of contaminated land. In addition to the requirements contained in the primary legislation, operation of the regime is subject to regulations and statutory guidance. The main objective underlying the introduction of the Part 2A contaminated land regime was to provide an improved system for the identification and remediation of land where contamination is

causing unacceptable risks to human health or the wider environment, assessed in the context of the current use and circumstances of the land. It also works alongside planning rules to help ensure that this land is made suitable for use following development. Development of land will have to take into account Part 2A because a change in the use of the land may bring the development inside the statutory definition of contaminated land by creating new or different receptors and/or pathways, resulting in new contaminant linkages.

- 16.8 This Chapter addresses the needs of the Environmental Protection Act through the ground investigation, human health and controlled waters risk assessments and preparation of a conceptual site model to assess sources of contamination, receptors and pathways, culminating in an assessment of contaminant linkages.

Model Procedures: Contaminated Land Report 11- Environment Agency

- 16.9 Another key piece of guidance is the Environment Agency's Model Procedures; Contaminated Land Report 11 (CLR 11) (Ref. 16.1), which indicates that a Conceptual Site Model (CSM) should identify those contamination sources, pathways and receptors which are "likely" to represent an "unacceptable" risk either to human health or the surrounding environment. It should be noted that CLR11 has been archived by the Environment Agency while a replacement document is in progress. CLR11 will be formally withdrawn once a replacement is published but until that time, contaminated land assessment should adhere to CLR11.

Investigation of Potentially Contaminated Site. Code of Practice: BS10175:2011+A2:2017

- 16.10 With regard to the investigation of potentially contaminated land, British Standard BS10175:2011+A2:2017) (Ref. 16.2) is the primary guidance.

Local Policy

Aylesbury Vale District Local Plan (AVDLP) 2004

- 16.11 The Aylesbury Vale District Local Plan (AVDLP) applies to the whole of the District and covers the period to 2011. Some of its policies were subsequently subject to a saving direction by the Secretary of State and constitute the development plan for the area.
- 16.12 There are no policies in the AVDLP that are of relevance to the Proposed Development from a geology and soils perspective.

Plan: Milton Keynes 2016 - 2031

- 16.13 Section 12 Environment, Biodiversity and Geodiversity deals with contaminated land and agricultural land. Specifically, Policy NE6 and NE7 are applicable.
- 16.14 Policy NE6 Environmental pollution states the following:-

'A - When considering development proposals, the Council will adopt the approach set out below to ensure that pollution will not have an unacceptable impact on human health, groundwater, general amenity, biodiversity or the wider natural environment. Contaminated land and soil pollution.

B - Planning applications for proposals for the following sites must be accompanied by a Preliminary Contaminated Land Risk Assessment to determine the likelihood of any ground, groundwater or gas contamination of the sites:

1. Land formerly used for industrial, commercial or utilities purposes.

2. Land which is considered to be potentially contaminated, contaminated or impacted by adjacent contamination.

3. Land where the proposed use is particularly vulnerable to the presence of contamination.

C - Proposals which, by their nature, risk contributing to soil and water pollution will be required to demonstrate how this risk will be avoided or mitigated to an acceptable level’.

- 16.15 Policy NE7 Protection of the best and most versatile agricultural land states the following:- ‘In assessing proposals for the development of greenfield sites, the Council will take into account the economic and other benefits of the best and most versatile agricultural land. Development involving the loss of agricultural land should seek to use areas of poorer quality land (grades 3b, 4 and 5 of the Agricultural Land Classification) in preference to that of a higher quality unless other sustainability considerations suggest otherwise’.

Draft Vale of Aylesbury Local Plan (VALP) 2013 – 2033

- 16.16 The draft VALP has been subject to independent examination and the Inspector has issued his interim findings. In November and December 2019, AVDC carried out consultation on the proposed main modifications to the VALP. It is anticipated that the VALP will be adopted in 2020.
- 16.17 Section 9 Natural Environment of the VALP (2013-2033) discusses contamination and its potential effect on the environment as well as agricultural land and the need to minimise the loss of best and most versatile agricultural land.

National Policy and Guidance

National Planning Policy Framework (2019)

- 16.18 The National Planning Policy Framework (NPPF) (Ref 16.3) Section 15 provides guidance on conserving and enhancing the natural environment and paragraphs 170 and 178 to 180 specifically reference contaminated land.
- 16.19 Sub-sections (e) and (f) of Paragraph 170 of the NPPF states that:
- “Planning policies and decisions should contribute to and enhance the natural and local environment by:
- e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans; and
- f) remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land, where appropriate”.
- 16.20 Paragraph 178 of the NPPF states that:
- “Planning policies and decisions should ensure that:
- a site is suitable for its proposed use taking account of ground conditions and any risks arising from land instability and contamination. This includes risks arising from natural hazards or former activities such as mining, and any proposals for mitigation including land remediation (as well as potential impacts on the natural environment arising from that remediation);
- b) after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990; and

c) adequate site investigation information, prepared by a competent person, is available to inform these assessments.”

16.21 Paragraph 179 of the NPPF states that:

“Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner”.

16.22 Paragraph 180 of the NPPF states 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 the potential sensitivity of the site or the wider area to impacts that could arise from the development”.

16.23 This Geology, Soils and Contamination Chapter conforms to the policy framework by assessing soil and water pollution and proposing remediation / mitigation where appropriate. Where remediation is proposed this must not result in the site being capable of being determined as contaminated land under Part 2A of the Environmental Protection Act 1990. Adequate site investigation is available and has been used to inform these assessments. The Chapter assesses the likely impacts and likely significant effects of the Proposed Development on geology and soils and also assesses the likely significant effects of contamination / pollution on human health and the natural environment.

Assessment Methodology

Scope of the Assessment

16.24 This section sets out the scope of the assessment and evidence base which has developed following further assessment since the original scoping report and scoping opinion.

Method of Baseline Assessment

Desk Study

16.25 An Interpretative Environmental Desk Study Report was prepared by WSP Ltd in 2020 and is presented as **Appendix 16.1**. This updates a 2014 Phase 1 Geo-Environmental Desk Study Report prepared by Pell Fischmann. The objective of the desk study is to assess the potential environmental risks, constraints and liabilities associated with the Scheme and includes: an interpretation of the information obtained from a GroundSure Report, and a preliminary assessment of potential geo-environmental risks following the methodology of CLR11.

16.26 The Interpretative Environmental Desk Study Report used information from historical Ordnance Survey maps and environmental data reports together with published and internet based information sources.

16.27 An understanding of the likely existing environmental setting in terms of geology, soils and contamination has been established with reference to the following sources of information:

- British Geological Survey (BGS) – geological mapping including bedrock and superficial geology information;
- Environment Agency – aquifer designation information; and

- GroundSure Insight report comprising historical Ordnance Survey maps and environmental data reports obtained from GroundSure Ltd.

16.28 The assessment has followed the guidance presented in DMRB LA109 Geology and Soils (Ref 16.4) and has been supplemented by the assessment procedures contained within BS10175:2011 and CLR11.

Site Visit

16.29 A site visit was undertaken on 12th March 2020 for the purposes of the Interpretative Environmental Desk Study Report (Appendix 16.1). This site visit was in addition to the previous site visit completed by Pell Frischmann in 2014.

Ground Investigation Surveys

16.30 A preliminary ground investigation was carried out by GEG Ltd in 2017 for Hallam Land Management, Connolly Homes, Taylor Wimpey Strategic Land, William Davis Ltd and Bellcross Homes to provide information on ground conditions. The findings, including human health and controlled waters quantitative risk assessments are reported in the GEG Ltd Phase I Review and Strategic Phase II Geo-Environmental Assessment Report reference GEG-17-514/PI_PII dated 14th December 2017. A copy of this report is presented in Appendix 16.1 (see Annex C)

16.31 The ground investigation comprised the following scope of works;

- 7 window sample holes (five with gas and groundwater monitoring wells),
- 24 trial pits,
- 7 CBR (California bearing ratio),
- Soil samples for geotechnical and chemical testing,
- 8 infiltration tests,
- Gas and groundwater monitoring visits on three occasions on completion of the trial pits.

16.32 The human health, controlled waters and ground gas risk assessments have assessed the potential contaminant linkages. This has resulted in the development of a conceptual site model (CSM) (presented in **Appendix 16.1 - Interpretative Environmental Desk Study Report**) identifying potential source-pathway-receptor contaminant linkages.

Consultation

16.33 An EIA Scoping Report for the Proposed Development was submitted to Aylesbury Vale District Council in 2013 by Pell Frischmann Ltd. A Formal Scoping Opinion was provided in September 2013 from Aylesbury Vale District Council containing the following response regarding Ground Conditions and Land Contamination from the relevant stakeholders:

"Due to the scale of the development and the proposed redevelopment of the site into residential use I recommend that as a minimum a desk study in relation to contaminated land must be submitted with the full planning application. Depending on the outcome of the desk study further investigative work may be required. This is in order to accurately quantify the risks to end users and to the wider environment from the presence of potentially contaminated land

In addition, if a full planning application is submitted, depending on the information submitted with the application I would recommend that the following conditions are placed on the application.

CON1 Development shall not commence until a contaminated land assessment and associated remedial strategy, together with a timetable of works, has been submitted to and approved in writing by the LPA. The agreed remediation works shall be fully completed before any other construction work commences.

The assessment/strategy shall include the following:

The contaminated land assessment shall include a desk study which shall detail the history of the site uses and propose a site investigation strategy based on the relevant information discovered by the desk study.

The site investigation, including relevant soil, soil gas, surface and groundwater sampling, shall be carried out by a suitably qualified and accredited consultant/contractor in accordance with a Quality Assured sampling and analysis methodology.

A site investigation report detailing all investigative works and sampling on site, together with the results of analysis, risk assessment to any receptors and a proposed remediation strategy shall be submitted to the LPA. The LPA shall approve such remedial works as required prior to any remediation commencing on site. The works shall be of such a nature as to render harmless the identified contamination given the proposed end-use of the site and surrounding environment including any controlled waters.

RE59 to ensure that the potential contamination of the site is properly investigated, the risks to the planned end-user group(s) quantified, and its implication for the development approved fully taken into account.

CON2 The approved remediation works shall be carried out in full on site under a quality assurance scheme to demonstrate compliance with the proposed methodology and best practice guidance. If during the works contamination is encountered which has not previously been identified then the additional contamination shall be fully assessed and an appropriate remediation scheme agreed with the LPA.

Within 1 month of completion of the remediation works, a validation report shall be submitted to and approved in writing by the LPA. The validation report shall include details of the completed remediation works and quality assurance certificates to show that the works have been carried out in full in accordance with the approved methodology. Details of any post-remedial sampling and analysis to demonstrate that the site has reached the required clean-up criteria shall be included in the validation report together with the necessary documentation detailing what waste materials have been removed from the site.

RE59A To ensure that the potential contamination of the site is properly dealt with and the risks to the end user group(s) minimised."

Extent of the Study Area

- 16.34 The Application Site covers an area of approximately 145ha, centred at grid reference 483257, 232690. The study area for the assessment includes a 250m search area beyond the boundary of the Application Site to include sites such as gasworks, landfills, bleach works and dye works which can be particularly contaminated and from which contamination could have migrated into the Application Site.
- 16.35 The boundary of the study area also includes a 1,500m search area from the Application Site boundary for sites of geological interest which could be impacted by the Proposed Development.

Assessing the Magnitude of Impact

- 16.36 The criteria for assessing the magnitude of the predicted impact is based on that provided in DMRB LA109 and is summarised in table 16.1 below.

Table 16.1 Criteria for Assessing Magnitude of Impact on Receptors

MAGNITUDE	IMPACT
Major	<p>Geology: loss of geological feature / designation and/or quality and integrity, severe damage to key characteristics, features or elements.</p> <p>Soil: physical removal or permanent sealing of soil resource or agricultural land.</p> <p>Contamination:</p> <p>1) human health: significant contamination identified. Contamination levels significantly exceed background levels and relevant screening criteria (e.g. category 4 screening levels) SP1010 with potential for significant harm to human health. Contamination heavily restricts future use of land;</p> <p>2) surface water: use sensitivity criteria in Road drainage and water environment LA 113 (Ref.16.5); and</p> <p>3) groundwater: use sensitivity criteria in Road drainage and water environment LA 113.</p>
Moderate	<p>Geology: partial loss of geological feature / designation, potentially adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.</p> <p>Soils: permanent loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g through degradation, compaction, erosion of soil resource.)</p> <p>Contamination:</p> <p>1) human health: contaminant concentrations exceed background levels and are in line with limits of relevant screening criteria (e.g. category 4 screening levels) SP1010. Significant contamination can be present. Control / remediation measures are required to reduce risks to human health / make land suitable for intended use;</p> <p>2) surface water: use sensitivity criteria in Road drainage and water environment LA 113; and</p> <p>3) groundwater: use sensitivity criteria in Road drainage and water environment LA 113.</p>
Minor	<p>Geology: minor measurable change in geological feature / designation attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.</p> <p>Soils: temporary loss / reduction of one or more soil function(s) and restriction to current or approved future use (e.g through degradation, compaction, erosion of soil resource.)</p> <p>Contamination:</p> <p>1) human health: contaminant concentrations are below relevant screening criteria (e.g. category 4 screening levels) SP1010. Significant contamination is unlikely with a low risk to human health. Best practice measures can be required to minimise risks to human health;</p> <p>2) surface water: use sensitivity criteria in Road drainage and water environment LA 113; and</p> <p>3) groundwater: use sensitivity criteria in Road drainage and water environment LA 113.</p>
Negligible	<p>Geology: very minor loss or detrimental alteration to one or more characteristics, features or elements of geological feature / designation. Overall integrity of resource not affected.</p> <p>Soils: no discernible loss / reduction of soil function(s) that restrict current or approved future use.</p> <p>Contamination:</p>

MAGNITUDE	IMPACT
	1) human health: contaminant concentrations substantially below levels outlined in relevant screening criteria (e.g. category 4 screening levels) SP1010. No requirement for control measures to reduce risks to human health / make land suitable for intended use; 2) surface water; use sensitivity criteria in Road drainage and water environment LA 113; and 3) groundwater: use sensitivity criteria in Road drainage and water environment LA 113.
No Impact	Geology: no temporary or permanent loss / disturbance of characteristics features or elements. Soils: no loss / reduction of soil function(s) that restrict current or approved future use. Contamination: 1) human health: reported contaminant concentrations below background levels; 2) surface water; use sensitivity criteria in Road drainage and water environment LA 113; and 3) groundwater: use sensitivity criteria in Road drainage and water environment LA 113.

Assessing the sensitivity of receptors

- 16.37 The criteria for assessing the sensitivity of the identified receptors follows that provided in DMRB LA109 and is summarised in table 16.2 below.

Table 16.2 Criteria for Assessing Sensitivity of Receptors

SENSITIVITY	RECEPTORS
Very High	<p>Geology: very rare and of international importance with no potential for replacement (e.g. UNESCO World Heritage Sites, UNESCO Global Geoparks, SSSI's and GCR where citations indicate features of international importance). Geology meeting international designation citation criteria which is not designated as such.</p> <p>Soils:</p> <p>1) soils directly supporting an EU designated site (e.g. SAC, SPA, Ramsar); and / or</p> <p>2) ALC grade 1 & 2 or LCA grade 1 & 2</p> <p>Contamination:</p> <p>1) human health: very high sensitivity land use such as residential or allotments;</p> <p>2) surface water: relevant sensitivity criteria from Table 3.70 in Road drainage and water environment LA 113; and</p> <p>3) groundwater: use sensitivity criteria in Road drainage and the water environment LA 113.</p>
High	<p>Geology: rare and of national importance with little potential for replacement (e.g. geological SSSI, ASSI, National Nature Reserves (NNR)). Geology meeting national designation citation criteria which is not designated as such.</p> <p>Soils:</p> <p>1) soils directly supporting a UK designated site (e.g. SSSI); and / or</p> <p>2) ALC grade 3a, or LCA grade 3.1.</p> <p>Contamination:</p> <p>1) human health: high sensitivity land use such as public open space;</p> <p>2) surface water: use sensitivity criteria in Road drainage and water environment LA 113; and</p> <p>3) groundwater: use sensitivity criteria in Road drainage and water environment LA 113.</p>
Medium	<p>Geology: of regional importance with limited potential for replacement (e.g. RIGS). Geology meeting regional designation citation criteria which is not designated as such.</p> <p>Soils:</p> <p>1) soils supporting non-statutory designated sites (e.g. Local Nature Reserves (LNR), LGS's, Sites of Nature Conservation Importance (SNCIs)); and / or</p> <p>2) ALC grade 3b or LCA grade 3.2.</p> <p>Contamination:</p> <p>1) human health: medium sensitivity land use such as commercial or industrial;</p> <p>2) surface water: use relevant sensitivity criteria in Table 3.70 of Road drainage and water environment LA 113; and</p> <p>3) groundwater: use relevant sensitivity criteria in Table 3.70 Road drainage and water environment LA 113.</p>
Low	<p>Geology: of local importance / interest with potential for replacement (e.g. non designated geological exposures, former quarry's / mining sites).</p> <p>Soils:</p> <p>1) ALC grade 4 & 5 or LCA grade 4.1 to 7; and / or</p> <p>2) soils supporting non-designated notable or priority habitats.</p> <p>Contamination:</p> <p>1) human health: low sensitivity land use such as highways and rail;</p> <p>2) surface water: use sensitivity criteria in Road drainage and water environment LA 113; and</p> <p>3) groundwater: use sensitivity criteria in Road drainage and water environment LA 113.</p>

Negligible	<p>Geology: no geological exposures, little / no local interest.</p> <p>Soils: previously developed land formerly in 'hard uses' with little potential to return to agriculture.</p> <p>Contamination:</p> <p>1) human health: undeveloped surplus land / no sensitive land use proposed;</p> <p>2) surface water: use sensitivity criteria in Road drainage and water environment LA 113; and</p> <p>3) groundwater: use sensitivity criteria in Road drainage and water environment LA 113.</p>
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Determining the Significance of Effect

- 16.38 The approach to deriving impact significance from receptor value and magnitude of effects has been undertaken in accordance with DMRB LA 104 Environmental Assessment and Monitoring (Ref. 16.6). Effects classified as moderate and above are considered to be significant.

Table 16.3 Matrix for Determining the Significance of Effect

SENSITIVITY	Very High	Major	Major	Moderate	Minor	Neutral
	High	Major	Moderate	Minor	Minor	No impact
	Medium	Moderate	Moderate	Minor	Negligible	
	Low	Minor	Minor	Negligible	Negligible	
	Negligible	Minor	Negligible	Negligible	Negligible	
		Major	Moderate	Minor	Negligible	No Impact
MAGNITUDE OF IMPACT						

Baseline Conditions

- 16.39 The following sections present a summary of the current baseline conditions as identified in the Interpretative Environmental Desk Study Report (**Appendix 16.1**) and the GEG Ltd Strategic Phase II Geo-Environmental Assessment Report (**Appendix 16.1** – see Annex C).

Current Uses of the Site and Surrounding Area

- 16.40 The Application Site is dominated by farmland/grassland, with a number of small farm-type buildings and several country lanes/footpaths.
- 16.41 The Application Site is bound to the north by two main roads (A421 and B4034), to the east by residential properties, to the south by a disused railway line and to the west by Whaddon Road.
- 16.42 Surrounding land use to the north and east is predominantly a mixture of residential and industrial/commercial uses. To the south and west, surrounding land use is predominantly open grassland with minor developments.

WSP Walkover

- 16.43 A walkover was undertaken by WSP Ltd on 12th March 2020 and identified the following:-
- Onsite farm buildings (stable / barns) contain asbestos cement panels,
 - Localised impact to shallow soils on site from the following:-
 - Fly tipped material (mixed wastes and earth bund);
 - Burning of waste (polycyclic aromatic hydrocarbons (PAHs) and heavy metals);
 - Potential historic leaks and spills from localised above ground liquid chemical / fuel storage – old oil drum noted adjacent to one of the barns;
 - Made Ground within the vicinity of the onsite buildings and on trackways (although deep areas of Made Ground are not expected).

Historical Land Uses of the Site and Surrounding Area

- 16.44 Historically, the Application Site was largely used as farmland, with two minor tracks and a footpath occupying part of the area.
- 16.45 A detailed review of historical land uses of the Application Site and the surrounding area, together with a copy of historical maps, are presented in the Interpretative Environmental Desk Study Report.

Geology

- 16.46 BGS geology maps indicate that the majority of the Application Site is underlain by Glacial Till deposits predominantly comprising clay with occasional oversized gravel which in turn are underlain by clays and mudstones of the Oxford Clay Formation.
- 16.47 The minor historical development (farm buildings) means there is a possibility that localised Made Ground may be present.

Land Stability

- 16.48 The GroundSure Report presented in the Interpretative Environmental Desk Study Report (Appendix 16.1 – see Annex D), provides the following details on land stability. The Application Site is not underlain by historical mining, coal mining activities, non-coal mining activities, non-coal mining cavities, natural cavities, brine extraction, gypsum extraction, tin mining, kaolin or ball clay and none are recorded within 1,000m of the study area.
- 16.49 The GroundSure Report also provides the following information on natural ground subsidence:
- Shrink-swell clay: Low risk across the majority of the site. Very low risk in the western corner and moderate risk in the eastern corner;
 - Running sands: Very low risk across the majority of the site. Negligible risk in the eastern corner. Low risk in the western corner;
 - Compressible deposits: Negligible across the majority of the site. Moderate risk in the western corner;
 - Collapsible deposits: Very low risk across the majority of the site. Negligible risk in the western corner;
 - Landslides: Very low risk across the whole site.
- 16.50 The Proposed Development involves some earthworks and the sand and gravel Superficial geology could lead to localised stability issues during construction although significant excavations for foundations or services are

not envisaged. With suitable foundation design and construction working practices, land stability issues are not considered likely to exist and are not considered further.

Agricultural Land Classification

- 16.51 Provisional agricultural land survey classification information published by Natural England (available as a layer on www.magic.defra.gov.uk) indicates the site is classified as Grade 3 agricultural land. Land immediately to the north and south is classified as Grade 4, land to the west is classified as Grade 3 and land to the east is classified as Urban.
- 16.52 Another agricultural land survey layer is also available on www.magic.defra.gov.uk and is titled Post 1988 Agricultural Land Classification (England). This indicates that the majority of the site is Grade 3A although 3 small areas (approximately equal in size and occupying approximately 20% of the site area) are classified as Grade 3B.
- 16.53 Further assessment of agricultural land is provided in Chapter 6 – Agricultural Land.

Hydrogeology

- 16.54 According to the Environment Agency's website there are no groundwater bodies in the vicinity of the site that have been given a current quantitative chemical quality. The Glacial Till and Oxford Clay Formation are described as non-productive strata.
- 16.55 The Application Site is not located in, or near to, a Source Protection Zone for potable water supply.
- 16.56 There is a single licensed groundwater abstraction within 1000m of the Application Site. The licence is located to the west of the site and allows the abstraction of groundwater for 'general farming and domestic' purposes.

Hydrology

- 16.57 There are three minor unnamed streams on the Application Site, and an unnamed secondary river, 20m to the north of the site boundary at its nearest point.

Environmentally Sensitive Designations

- 16.58 No designated environmentally sensitive sites have been identified within proximity of the Application Site.

Ground Investigation

- 16.59 A GI was undertaken by GEG Ltd and the findings are reported in the Phase 1 Review and Strategic Phase II Geo-Environmental Assessment dated December 2017 and prepared by GEG Ltd (Appendix 16.1 – see Annex C). The following findings and conclusions are reported:-
- The GI broadly confirmed the published geology. No made ground was recorded and topsoil was recorded to a maximum depth of 0.3m below ground level. Beneath this, clay was recorded to at least 6.45m. The underlying Oxford Clay bedrock was not encountered.
 - Groundwater was encountered during the GI within the Glacial Till between 2.2m depth and 6.45m depth and varied from wet soil to slow seepage. During the post monitoring site works, groundwater varied from not-present to 1.99m depth.
 - No visual or olfactory evidence of contamination was recorded.

- The generic human health risk assessment for a residential with home grown produce end use did not identify any elevated soil contaminants.
- A gas risk assessment undertaken for low rise traditional housing indicates no special gas protection measures are required in new buildings.

16.60 The GEG Ltd report concludes the following;

- no significant sources of contamination identified;
- no potential risks to human health;
- no potential risks to controlled waters;
- Arisings are likely to be classified as inert waste and as such arisings should be suitable for use as general fill on other development sites or for other infill / cover requirements.
- Topsoil is suitable for re-use.
- No specific remedial measures are required for human health or controlled waters.

Future Baseline

16.61 Future baseline is not envisaged to change over the lifespan of the Proposed Development. Loss of agricultural soils across the Application Site will occur as a result of the Proposed Development, but general baseline geology and soils will not change.

Potential Receptors

16.62 The potential receptors and their sensitivity are detailed in Table 16.4 below

Table 16.4 Receptor Sensitivity

RECEPTOR	SENSITIVITY
Geology	Negligible – No exposure and no local interest
Soils (agricultural)	High – Grade 3 agricultural soils
Construction Workers	High – Construction workers working on and with the soil
Future Site Users	Very High – proposed residential development (most sensitive end use within the Proposed Development.
Surface Waters	Low – Watercourses are minor and un-named.
Aquifer Waters	Low – unproductive strata underlies the site.

Establishing the Scenario for Assessment

16.63 Chapter 2 Application Site & Project Description details the Proposed Development including the construction and operational phases.

Construction Phase

16.64 The key aspects of the construction phase which informs this geology and soils chapter are:

- Earthworks.

- Foundations.

16.65 Mitigation during the construction phase will be secured through the CEMP and will comprise the following: -

- Risks to human health from contamination will be managed through the CDM Regulations and will include the development of method statements and risk assessments for the various construction activities and use of good construction practices.
- Good working practices and housekeeping during construction such as sealing or covering stockpiles of contaminated soils to minimise the risk of generating dust.
- The Scheme will adhere to pollution prevention guidance and good practice during the construction phase.
- Discharges to watercourses from dewatering activities will be controlled via existing pollution control legislation.
- Temporary shoring to be used in excavations where there is a risk of collapse.
- Construction workers to wear appropriate personal protective equipment (PPE), monitoring equipment and Respiratory Protective Equipment (RPE) where required to mitigate the potential risk of exposure to hazardous gas / vapour and / or depleted oxygen levels when working in excavations or confined spaces.
- Areas with a greater risk of spillage (e.g. vehicle maintenance and storage areas for hazardous materials) would be carefully sited (e.g. away from drains or areas where surface waters may pond);
- Measures would be put in place to prevent pollution from construction plant, vehicles and machinery including refuelling in designated areas, on an impermeable surface, away from drains and watercourses; plant to be maintained in a good condition with wheel washing in place, all refuelling would be supervised and carried out in a designated area;
- Concrete wash out would only take place at designated concrete washout areas;
- Surface water run-off and excavation dewatering would be captured and settled out prior to disposal to sewer as appropriate. Any contaminants would be removed prior to disposal; and
- All fuel, oil and chemicals would be stored in a designated secure area, with secondary containment provided.
- Should asbestos containing materials be encountered, appropriate Health and Safety Plans would need to be developed as required under the Construction (Design and Management) Regulations 2007 to remove and dispose of any asbestos in an appropriate and safe manner.
- Use of any dust suppression techniques, including water spraying of access roads and stockpiled in dry weather;
- Provision of wheel washing facilities for vehicles leaving the Application Site;
- Vehicles used to transport materials and aggregates would be enclosed.

Operational Phase

16.66 The key aspects of the operational phase which informs this geology and soils chapter are:

- Site users and their interaction with the landscaping and garden areas.
- Foundations and their interaction with geology and soils.

16.67 No embedded mitigation in addition to that undertaken for the construction phase is considered possible during the operational phase.

Assessment of Likely Effects

16.68 The likely effects of the Proposed Development on the identified receptors have been segregated into effects that relate to the construction phase of the Proposed Development and those that relate to the operational phase of the Proposed Development.

- 16.69 Where a potential pollution linkage is incomplete, an environmental effect is unlikely to exist. Where potential pollution linkages have been identified it is considered likely that an environmental effect may exist. The significance of the effect has been quantified and the Significance Criteria have been applied.

Construction

Potential effects on Geology and Soils

- 16.70 No geologically designated sites or exposed geological stratigraphy has been identified within the Application Site. In addition, the ground investigation did not identify any sources of contamination which could impact the Proposed Development or the identified receptors.
- 16.71 The sensitivity of the geology receptor is considered to be negligible and the magnitude of the effect is considered to be negligible. Therefore, there is likely to be no impact on geology.
- 16.72 The Proposed Development will result in the loss of in excess of 100ha of Grade 3 agricultural land.
- 16.73 The sensitivity of the soil receptor is considered to be high and the magnitude of the effect is considered to be major. Therefore, there is likely to be a major adverse (significant) effect on soils.

Potential effects on Human Health Receptors

- 16.74 During construction works, workers on the Application Site could be exposed to ground contamination. Construction works, particularly any earthworks associated with the excavation of foundations and service routes could disturb and expose construction workers to potentially localised ground contamination, including asbestos containing materials. These activities could create plausible pollutant linkages through dermal contact, inhalation and / or ingestion pathways
- 16.75 In areas of bulk excavations and stockpiled material, dust could be generated during dry and windy conditions. Under these conditions, users of the Proposed Development and the general public using footpaths adjacent to the Application Site could temporarily be exposed through inhalation of potentially contaminated dust.
- 16.76 The sensitivity of the human health receptor is considered to be high. The magnitude of the effect on human health is considered to be **negligible**. Therefore, there is likely to be a **Minor** effect on human health.

Potential effects on Controlled Waters

- 16.77 Construction works could disturb any contamination within the upper strata, potentially creating a pollutant linkage through downward migration between near surface soils to the unnamed surface water streams and secondary river. However, the GI did not identify any potential sources of contamination that could impact controlled waters.
- 16.78 To facilitate construction works, it is anticipated that new potential sources of contamination could be introduced and stored on the Application Site in the form of, for example; diesel fuel, oils, chemicals and construction materials. As a result, there would be a risk of leakages or spillages directly or indirectly (for example, via the surface water drainage systems) into the ground, although the likelihood and frequency of occurrence is considered to be low.
- 16.79 In the absence of any identified sources of ground contamination, any potential risks to controlled waters are likely to be temporarily introduced during the construction phase.

- 16.80 The sensitivity of the surface water and groundwater is considered to be low. The magnitude of the effect on surface waters is considered to be negligible and the magnitude of the effect on groundwater is considered to be no impact. Therefore, there is likely to be a Minor effect on surface waters and no impact on groundwater.

Operation

Potential effects on Geology and Soils

- 16.81 No further operational effects are considered likely. All effects on geology and soils have been realised at the construction stage.
- 16.82 The sensitivity of the geology receptor is negligible, and the magnitude of the effect is no impact. Therefore, there is considered to be no impact on geology.
- 16.83 The sensitivity of the soil receptor is high, and the magnitude of the effect is major. Therefore, there is considered to be a Major adverse (significant) effect on soils.

Potential effects on Human Health Receptors

- 16.84 Site users and maintenance workers are potentially at risk from contaminated soils at or near the surface in garden and landscaping areas through dermal contact, ingestion and /or inhalation of fugitive dust.
- 16.85 No made ground or contamination sources were identified during the GI and GEG considered no remedial actions were necessary.
- 16.86 The sensitivity of the human health receptor is considered to be high. The magnitude of the effect on human health is considered to be negligible. Therefore, there is likely to be a Minor effect on human health.

Potential effects on Controlled Waters

- 16.87 Large parts of the Development would be drained hardcover (i.e. buildings, roads and pedestrian routes), which would prevent the majority of infiltration into the ground. In gardens and soft landscaped areas rainwater would infiltrate the ground. However, no sources of contamination were identified during the GI and GEG Ltd considered remedial measures were unlikely to be required.
- 16.88 The sensitivity of the surface water and groundwater is considered to be low. The magnitude of the effect on surface waters is considered to be negligible and the magnitude of the effect on groundwater is considered to be no impact. Therefore, there is likely to be a Minor effect on surface waters and no impact on groundwater

Additional Mitigation Measures

- 16.89 In addition to the embedded mitigation measures detailed above, the following additional mitigation measures would be implemented in advance of and possible during the construction phase to mitigate risks. These additional mitigation measures will be included in the outline CEMP and secured through planning conditions following consultation with the Environment Agency and Milton Keynes Council.

Construction

Potential Risks to Geology and Soils

16.90 No additional mitigation is considered to be necessary to mitigate risks to geology.

16.91 The loss of agricultural soils cannot be mitigated against therefore there are no additional measures that can be undertaken to mitigate against the loss.

Potential Risks to Human Health

16.92 The GI undertaken by GEG Ltd did not identify any potential risks to human health and no remedial measures were considered necessary. However, further GI at detailed design stage is recommended to confirm consistency of the strata.

16.93 In addition to mitigation detailed above, the following additional mitigation will be implemented during the construction phase to mitigate risks to human health:-

- Earthworks and re-use of site won soils to be completed in accordance with a Materials Management Plan (MMP) or similar protocol to ensure re-used materials do not pose a risk to human health or the environment and are also re-used in accordance with waste management protocols.
- It would be prudent for the construction Contractor to maintain a watching brief during construction and to have a contingency plan should potentially contaminated materials be encountered during construction to ensure they are dealt with safely and efficiently.

Risks to Controlled Waters

16.94 The GI undertaken by GEG Ltd did not identify any potential risks to controlled waters and no remedial measures were considered necessary. However, further GI at detailed design stage is recommended to confirm consistency of the strata.

16.95 In addition to the embedded mitigation detailed above, the following additional mitigation measures will be implemented during the construction phase to mitigate risks to controlled waters from contamination:-

- A temporary surface water drainage strategy for the construction phase will include managed of contamination or contaminated run-off,
- Covering / sealing of stockpiles so as not to give rise to a significant increase in sediment of contaminant load to the drainage network.

Operation

Potential Risks to Geology and Soils

16.96 No additional mitigation is considered possible for the geology and soil receptors

Potential Risk to Human Health

16.97 From the findings of the 2017 GEG Ltd ground investigation, no unacceptable risks to human health from contaminated land were identified. However, further intrusive ground investigation and contaminated land assessment is required to fully assess the potential risks.

16.98 In addition to the embedded mitigation detailed above, the following additional mitigation measures will be implemented during the construction phase to mitigate risks to human health from contamination during the operational phase:-

- Subject to the findings of a further phase of ground investigation, earthworks will be undertaken in accordance with a suitable remediation strategy (if required) which may include contamination hotspot removal and / or provision of clean inert topsoil and subsoil within landscaping areas as necessary.

Risks to Controlled Waters

- 16.99 From the findings of the GI. no unacceptable risks to controlled waters are considered to exist from contaminated land.
- 16.100 Any unexpected ground conditions encountered during the construction works will need to be assessed and a remediation strategy produced and agreed with the Environment Agency. If implemented correctly, no unacceptable risks to controlled waters are considered to exist.
- 16.101 No additional mitigation measures are therefore considered to be necessary based on the information available.

Residual Effects

Construction

Potential risks to Geology and Soils

- 16.102 The sensitivity of the geology receptor is considered to be negligible and the magnitude of the effect is considered to be negligible. Therefore, there is likely to be no impact on geology following the implementation of additional mitigation.
- 16.103 The Proposed Development will result in the loss of in excess of 100ha of Grade 3 agricultural land and no mitigation is possible.
- 16.104 The sensitivity of the soils receptor is considered to be high and the magnitude of the effect is considered to be major. Therefore, there is likely to be a Major adverse (significant) effect on soils.

Potential Risk to Human Health

- 16.105 The sensitivity of the human health receptor is considered to be high and the magnitude of the change following mitigation is negligible. Therefore, there is likely to be a negligible effect on human health following the implementation of additional mitigation.

Potential Risk to Controlled Waters

- 16.106 The sensitivity of the surface water and groundwater is considered to be low. The magnitude of the effect on surface waters and controlled waters is considered to be no impact. Therefore, there is likely to be no impact on controlled waters.

Operation

Potential Risks to Geology and Soils

16.107 The sensitivity of the geology receptor is considered to be negligible and the magnitude of the effect is considered to be negligible. Therefore, there is likely to be no impact on geology following the implementation of additional mitigation.

16.108 The sensitivity of the soils receptor is considered to be high and the magnitude of the effect is considered to be major. Therefore, there is likely to be a Major adverse (significant) effect on soils.

Potential Risk to Human Health

16.109 The sensitivity of the human health receptor is considered to be high and the magnitude of the change following mitigation is negligible. Therefore, there is likely to be a negligible effect on human health following the implementation of additional mitigation.

Potential Risk to Controlled Waters

16.110 The sensitivity of the surface water and groundwater is considered to be low. The magnitude of the effect on surface waters and controlled waters is considered to be no impact. Therefore, there is likely to be no impact on controlled waters.

Cumulative Effects

16.111 No cumulative effects relating to ground conditions and land contamination are anticipated. There is likely to be a cumulative effect on soils from the loss of Grade 3b agricultural land as a result of the draft allocation of Shenley Park for development within the draft VALP, should that development proceed. Agricultural land soil grade information is not available for either the Tattenhoe Park or Kingsmead South developments.

Summary

16.112 The main effects relating to potential soil and controlled water contamination result from the management of waste, fuel, chemical storage and use of plant during construction and the potential for fuels, oils and suspended solids to enter drainage systems.

16.113 The GI did not identify any sources of contamination that pose an unacceptable risk to human health or Controlled Waters and did not identify any potentially significant geotechnical risks.

16.114 Mitigation measures are likely to be limited to PPE for construction and maintenance workers, interceptors within the drainage system and appropriately designed foundations to accommodate any ground risks.

16.115 The Contractor should keep a watching brief during construction to ensure any unexpected contamination encountered during construction is dealt with efficiently and appropriately.

16.116 When all mitigation measures are implemented, overall there is likely an effect of negligible significance / no impact except for the loss of agricultural land which is considered to be major adverse and cannot be mitigated against.

16.117 A further phase of ground investigation is recommended at the detailed design stage to reduce the spacing between the existing locations and confirm the ground conditions identified in 2017 by GEG Ltd.

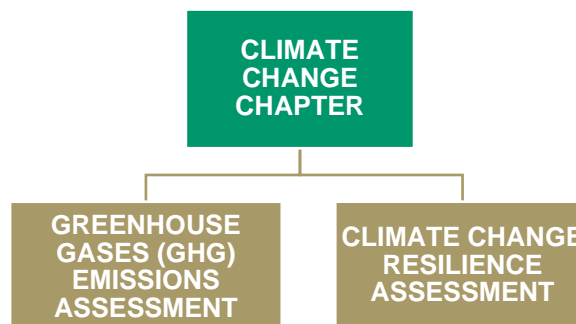
References

- Ref. 16.1: Department for the Environment, Food and Rural Affairs and Environment Agency, 2004. Model Procedures for the Management of Land Contamination (CLR 11), Department for the Environment, Food and Rural Affairs and Environment Agency;
- Ref. 16.2: British Standards Institution, 2011. BS10175:2011+A2:2017 – Investigation of Potentially Contaminated Sites – Code of Practice. British Standards Institution.
- Ref. 16.3: Ministry of Housing, Communities and Local Government, 2019. National Planning Policy Framework. Ministry of Housing, Communities and Local Government;
- Ref. 16.4 – Highways England, 2019. Design Manual for Roads and Bridges LA109 Geology and Soils. Highways England.
- Ref. 16.5 - Highways England, 2019. Design Manual for Roads and Bridges LA113 Road Drainage and the Water Environment. Highways England.
- Ref. 16.6 – Highways England, 2019. Design Manual for Roads and Bridges LA104 Environmental Assessment and Monitoring. Highways England.

17. CLIMATE CHANGE

Introduction

- 17.1 This chapter reports the outcome of the assessment of likely significant effects of the Proposed Development on climate and the effects of climate on the Proposed Development.
- 17.2 The requirement to consider a project's impact on, and vulnerability to, climate change results from the 2014 amendment to the EIA Directive (2014/52) (Ref 17.1). The Directive has been fully transposed into UK law in the Town and Country Planning (Environmental Impact Assessment) Regulations 2017 and came into force in the UK on the 16 May 2017. The Directive and Regulations require: "A description of the likely significant effects of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change."
- 17.3 As such this chapter considers the impacts and effects of the Proposed Development in terms of:
- The contribution of the Proposed Development to climate change: the greenhouse gas (GHG) emissions assessment (climate change mitigation); and
 - The vulnerability of the Proposed Development to climate change (climate change resilience and adaptation).
- 17.4 The chapter is split into the two aspects above, as shown in the figure below and describes for each the assessment methodology and the baseline conditions relevant to the assessment, which have been used to identify the likely significant effects.



- 17.5 This chapter (and its associated figures and appendices) should be read as part of the wider ES.

Legislative and Planning Policy Context

Legislation and Regulation

- 17.6 The following legislation and policy have been considered in defining the scope and focus of the assessment presented in this chapter:

Climate Change Act 2008 (2050 Target Amendment)

- 17.7 The Climate Change Act 2008 (Ref 17.2) sets targets for reducing the UK's impacts on climate change and the need to prepare for its impacts. The Act sets a target of 80% CO₂ emissions reduction by 2050 (against a 1990 baseline) and sets interim targets to ensure progress towards this target. The Act also requires a Climate Change Risk Assessment to be used to assess the risks from the impact of climate change to the UK.

Planning and Energy Act 2008

- 17.8 The Planning and Energy Act 2008 (Ref 17.3) enables local planning authorities to set requirements for energy use and energy efficiency in local plans. The Act requires (a) a proportion of energy used in developments to be energy from renewable sources in the locality of the development; (b) a proportion of energy used in development to be low carbon energy from sources in the locality of the development and (c) the development to comply with energy efficiency standards that exceed the energy requirements of building regulations.

The Carbon Plan: Delivering our Low Carbon Future, 2011

- 17.9 The Carbon Plan (Ref 17.4) sets out how the UK will achieve decarbonisation within the framework of our energy policy; to make the transition to a low carbon economy while maintaining energy security, and minimising costs to consumers, particularly those in poorer households.

UK Climate Change Risk Assessment, 2017

- 17.10 The Climate Change Act 2008 requires the Government to compile every five years its assessment of the risks and opportunities arising for the UK from climate change. The first UK Climate Change Risk Assessment (CCRA) (Ref 17.5) was presented to Parliament by the Government in January 2012, with the second presented in January 2017. The overall aim of the Evidence Report is to assess the urgency of further action to tackle current and future risks, and realise opportunities, arising for the UK from climate change.

Carbon Budgets, 2016

- 17.11 Carbon budgets place restrictions on the amount of GHG the UK can emit over a five-year period. The UK is the first country to set legally binding carbon budgets. Every tonne of GHG emitted between now and 2050 will be counted towards the budget. If emissions rise in one sector, the UK will have to reduce emissions in another sector to balance the budget. The carbon budget for the 2018–2022 budgetary period is 2,544 MtCO₂e, for the 2023–2027 budgetary period is 1,950 MtCO₂e and the Government has set the fifth budgetary period covering 2028 to 2032 at 1,725 MtCO₂e (Ref 17.6).

Building Regulations

- 17.12 The Building Regulations Part L govern the conservation of fuel and power in both new construction and refurbishment of the England and Wales building stock. Compliance with the Building Regulations is a regulatory requirement for all new developments. Carbon emissions of a development comparative to compliance with Part L is the key performance indicator for achieving many carbon targets.
- 17.13 The current versions of the Approved Documents are Part L1A for new dwellings and Part L2A for new buildings other than dwellings, which are both applicable to the Proposed Development; these were published in 2013 with 2016 amendments.

Local Policy

- 17.14 The site sits almost entirely within the administrative area of Buckinghamshire Council (formerly Aylesbury Vale District Council (AVDC)) although two access points would be within Milton Keynes.
- 17.15 Both Aylesbury Vale and Milton Keynes have progressed new local plans to replace extant developments plans. Once adopted the VALP will replace the saved policies of the Aylesbury Vale Local Plan; the adopted Plan: MK has replaced both the Core Strategy (2013) and saved policies of the Local Plan (2005).

Aylesbury Vale District Local Plan (adopted January 2004)

- 17.16 There are no saved policies within the AVDLP with specific references to the energy performance of new developments, nor to CO₂ emissions, nor to sustainable design and construction (Ref 17.9).

PLAN:MK (Adopted March 2019)

- 17.17 Milton Keynes Council adopted Plan: MK 2016-2031 as the new Local Plan in March 2019. The key policies relating to energy within Plan: MK are Policies SC1, SC2, SC3 and SD15. Policy SD15 provides guidance on the place-making principles for sustainable urban extensions in adjacent local authorities bordering Milton Keynes. The principles include:
Create a sustainable, safe and high-quality urban extension which is well integrated with and accessible from the existing city. Its structure and layout should be based on the principles that have shaped the existing city, especially the grid road system, the linear parks and strategic flood water management.
- 17.18 Plan: MK also expects that the Low Carbon Action Plan followed by MKC will be updated soon to take into account the long-term objective of the updated Imagine MK2050 Strategy, which aims for a near zero carbon Milton Keynes by 2050.
- 17.19 This chapter assesses the impact of the Proposed Development on the climate in the context of these policies.

Draft Vale of Aylesbury Local Plan (proposed submission, November 2017)

- 17.20 The Proposed Submission Draft Vale of Aylesbury Local Plan (Ref 17.8) was published in November 2017. The key policy relating to energy is Policy C3, which promotes an 'energy hierarchy' and 10% carbon reduction. This chapter assesses the impact of the Proposed Development on the climate in the context of this policy.

National Policy and Guidance

- 17.21 Planning policy at the national and local level is presented in Chapter 3: Policy Context & Alternatives which examines the merits of the Proposed Development against the relevant planning policy. A summary of the planning policy relevant to this chapter is provided below.

National Planning Policy Framework, 2019

- 17.22 The National Planning Policy Framework (NPPF) 2019 (Ref 17.7) sets out the Governments planning policies for England and how these are to be applied. Guidance relating to the reduction of greenhouse gases and ways to minimise vulnerability and improve resilience to climate change impacts is mainly set out in Section 14 "Meeting the Challenge of Climate Change, Flooding and Coastal Change". Within paragraph 8, the document confirms that the purpose of the planning system is to contribute to the achievement of sustainable development, which includes economic, social and environmental dimensions.

- 17.23 The main relevant policies are set out in paragraphs 8, 20, 148, 150 and 154 which all support the reduction of greenhouse gas emissions.
- 17.24 In addition, this Chapter has been prepared in the context of the Government's Planning Practice Guidance, which under section "Climate Change Guidance" advises how to identify suitable mitigation and adaptation measures in the planning process to address the impacts of climate change.

Assessment Methodology

Guidance

- 17.25 The following guidance documents have been used during the preparation of this chapter:
- Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (IEMA) (Ref 17.11)
 - Environmental Impact Assessment Guide to Climate Change Resilience and Adaption (IEMA, 2015) (Ref 17.12)

Scope of the assessment

- 17.26 The scope of this chapter has been established through an ongoing scoping process. Schedule 4 of the EIA Regulations 2017 identifies the topics that should be addressed in an ES. There are three environmental topics that were not assessed in the previous ES but are included in this ES to reflect the updated requirements in the 2017 EIA Regulations; these are as follows: human health, climate change and disaster management.
- 17.27 The next part of this chapter is divided into the following sections:
- Greenhouse Gas (GHG) Emissions Assessment
 - Climate Change Resilience Assessment

GREENHOUSE GASES (GHG) EMISSIONS ASSESSMENT

- 17.28 Current best practice is reflected in IEMA's (2017) Environmental Impact Assessment Guide to Assessing Greenhouse Gas Emissions and Evaluating their Significance (Ref 17.11).
- 17.29 In line with the guidance, this section sets out the methodological approach that has been taken to address GHG emissions associated with the Proposed Development. This means providing the assessment approach, calculating the baseline, determining the significance of each GHG emission source and setting out strategies for mitigation.
- 17.30 The consideration of effects is consistent with the framework for the quantification of GHG emissions presented in BS EN 15978:2011 'Sustainability of construction works - Assessment of environmental performance of buildings - Calculation method' (Ref 17.13) and 'PAS 2050' (Ref 17.16).

Elements Scoped out of the GHG Assessment

- 17.31 Figure 17.1 describes typical emissions associated with different phases of a development's lifecycle. The figure is interpreted from the report on low carbon construction for HM Government by the Innovation and Growth Team (Ref. 17.15) as referenced in RICS methodology (Ref. 17.19).

Figure 17.1 - Carbon Life Cycle Phases of a Building and their Contributions to the Overall UK Carbon Emissions



- Design: emissions occurring from outset of a project through the process of design (energy and transport use by architects, planners and engineers, for example). However, the real scope for this sector to reduce CO₂ is through the impact design makes on emissions from occupation and use.
- Manufacture: emissions associated with the domestic production of construction products/materials as well as emissions embodied in imported products/materials.
- Distribution: emissions as materials and people are transported to and from site.
- Construction: direct and indirect CO₂ emissions (combustion and energy use) from on-site operations – but excluding refurbishment and demolition, which are accounted for separately below.
- Operation (in use): emissions resulting from the occupation and use of the asset, heavily influenced by occupier behaviour.
- Refurbishment/ Demolition: direct and indirect emissions (again, combustion and energy use) from the process of refurbishment and from eventual demolition and disposal.

17.32 Using the principles set out on page 5 of PAS2050:2011 (Ref 17.16), a material contribution to GHG emissions is described as being a contribution from any one source resulting in more than 1% of the total anticipated life cycle emissions. Under the threshold section of PAS2050:2011 it is stated that the assessment should include at least 95% of the anticipated life cycle GHG emissions and therefore the elements that can be excluded from the calculations must not exceed more than 5% of the total emissions.

17.33 Where an emissions source is likely to represent less than 1% of total emissions it is reasonable to exclude this source as it will not have a significant bearing on the overall footprint. That approach is consistent with the IEMA Guidance (Ref. 17.12) par 5.5.2 “Cut off rules (exclusions)” which states:

“Activities that do not significantly change the result of the quantification can be excluded, however the total excluded input or output flows per lifecycle module would generally be expected to be a maximum of 5% energy use and mass”

17.34 Specific elements of the lifecycle of the project are therefore excluded from the total associated with the Proposed Development. Those excluded consist of the Design, Distribution and Refurbish/Demolish elements, which individually produce no more than 1% of emissions and collectively produce less than 3% of overall emissions. These elements have therefore been scoped out of the assessment.

Elements Scoped into the GHG Assessment

17.35 Both direct (owned and controlled sources) and indirect (those which occur at sources owned or controlled by others) GHG emissions have been considered in line with GHG reporting guidance. These include the emissions associated with Construction, Manufacture and Operation, and have been reported in CO₂ equivalents (CO₂e). The baseline and future emission scenarios have been split by source.

17.36 Emissions likely to have a significant effect have been split into three sources:

1. Embodied carbon: The carbon emissions (CO₂e) associated with materials production, transport and assembly (construction phase);
2. Operational building: Carbon emissions (CO₂e) associated with the energy used for heating, cooling, lighting and ventilation (operational phase). Both regulated and unregulated emissions are included. Regulated energy is the result of fixed building services and fittings, including space heating and cooling, hot water, ventilation and lighting while unregulated energy consists of sources not included within Building Regulations such as cooking and appliances. The calculation of both regulated and unregulated emissions have been based on the calculations carried out under 'The Building Regulations 2010, Approved Document L1A: conservation of fuel and power in new dwellings, 2013 edition with 2016 amendments' (Ref 17.17) and 'The Building Regulations 2010, Approved Document L2A: conservation of fuel and power in new buildings other than dwellings, 2013 edition with 2016 amendments'; (Ref 17.18) and
3. Operational transport: Carbon emissions (CO₂e) associated with vehicle trips during the operational phase.

Method of Baseline Data Collation

17.37 Data has been sourced from the following locations:

- Royal Institute of Chartered Surveyors (RICS), 2012 Methodology to calculate embodied carbon of materials (Ref 17.19)
- Updated Energy Statement;
- Updated Transport Assessment;
- Department for Business, Energy & Industrial Strategy, 2019 Government GHG Conversion Factors for Company Reporting (Ref 17.20)
- Department for Business, Energy & Industrial Strategy, 2005 to 2017 UK local and regional CO₂ emissions - data tables, 2019 (Ref 17.21)

GHG Methodology

Construction Phase

Embodied Carbon Emissions

- 17.38 To inform the assessment during the construction stage, an assessment of embodied carbon emissions has been undertaken.
- 17.39 The RICS Methodology to calculate embodied carbon of materials suggests that, for early stage projects (RIBA A (Appraisal)/B (Design Brief)/C (Concept)), the recommended methodology is to multiply the floor area of the Proposed Development by the benchmark values provided.
- 17.40 For later stages, the recommended methodology is more complex and requires the calculation/summing of the mass of construction materials and multiplying the results by the relevant embodied carbon factors, which can be sourced, for example, from the Institution of Civil Engineers database.
- 17.41 While the latter method should be used for increased accuracy, for the purposes of this report and understanding the scale of the carbon emissions, the former methodology has been used. The closest match of building typology was used from the benchmark data (e.g. for medium rise apartment buildings, the benchmark value of 970 kg CO₂e/m² was considered appropriate).

Operational Phase

Building Emissions

- 17.42 For the regulated carbon emissions from the new buildings during the operational stage, accredited software was used to model the annual energy consumption.
- 17.43 For the pre-mitigation stage, building energy use has been assumed to be compliant with Part L (Conservation of Fuel and Power) of the Building Regulations. For post-mitigation the effects of energy efficiency improvements and the low carbon technologies have been considered.

Transport Emissions

- 17.44 In order to calculate the operational traffic associated with the Proposed Development, the generated vehicle volumes and distance travelled have been multiplied by emissions factors for each key vehicle type. The 2019 Defra emission factors (Ref 17.20) selected for each vehicle type represents the closest match. This is summarised in Table 17.1. For the average trip length, data from the National Travel Survey 2018 (Ref 17.22) was used.

Table 17.15 Transport Emissions Calculation Methodology

METRICS	UNIT	CAR	L G V	B U S	R A I L
Total Distance	km/year	$A=C \times D$	$A=C \times D$	$A=B \times D$	$A=B \times D$
Total Person Trips (B)	people trips/year	-	-	B	B
Total Vehicle Trips (C)	vehicle trips/year	C	C	-	-
Average Trip Length (D)	km/trip	13.2	13.2	8.5	4.67
Emissions Factor Description		Average car, unknown fuel, per km	Diesel, High, V, Rigid (3.5-7.5 tonnes), per km	Low, bus (not London), passenger, per km	National Rail, passenger, per km
Emissions Factor Value	kg CO ₂ e/km	0.1649	0.2498	0.12	0.0412
Total	kgCO ₂ e				

Significance Criteria

- 17.45 The approach adopted by the ES, has been to attribute a significance level based on the sensitivity/value of the affected receptor(s) and the magnitude of change arising from the Proposed Scheme. Throughout the ES Chapters, the sensitivity of the affected receptor is assessed on a scale of high, medium, low and negligible, and the magnitude of change is assessed on a scale of large, medium, small, negligible and no change.

- 17.46 However, due to the prevailing lack of guidance on assigning significance with respect to GHG emissions from IEMA, a slightly altered approach has been adopted in this chapter.
- 17.47 In relation to GHG emissions, there is only one receptor, the climate, which has a consistent sensitivity no matter the location of the emissions source. Therefore, in this chapter the sensitivity of receptor is not used to assess significance.
- 17.48 With regards to assigning significance, the IEMA principles document provides a section on how to assess GHG emissions in EIA and states:

“When evaluating significance, all new GHG emissions contribute to a significant negative environmental effect; however, some projects will replace existing development that have higher GHG profiles. The significance of a project’s emissions should therefore be based on its net impact, which may be positive or negative.....

.... Whilst there is no single preferred method to evaluate significance, extensive research is being undertaken to explore significance, thresholds for GHG emission assessments, and science-based targets. “

- 17.49 In the absence of being able to assign a significance level, IEMA further provides some guidance on contextualising a project’s GHG emissions:

“Under the principle that all GHG emissions might be considered significant, and the ongoing research of how to actually measure significance, it is down to the practitioner’s professional judgement on how best to contextualise a project’s GHG impact.

Generating a project’s carbon contribution, will enable the impact of your project, to be contextualised against sectoral, local or national carbon budgets. This will provide the practitioner and the LPA with a sense of scale.”

- 17.50 Therefore, to contextualise the project’s carbon emissions, we have compared these to respective UK carbon budgets (see Table 17.2).

Table 17.2 National Carbon Budgets set by the Government

Carbon Budget Period		UK Carbon Budget
Third: 2018-2022		2,544 MtCO _{2e}
Fourth: 2023-2027		1,950 MtCO _{2e}
Fifth: 2028-2032		1,725 MtCO _{2e}

Determining the significance of effect

- 17.51 As explained in the previous section, we have contextualised the project’s overall carbon emissions (operational, embodied and transport) following a generally accepted approach in the profession, by comparing these to National Carbon Budgets.
- 17.52 Based on the above contextualisation, we have then used professional judgement to define the overall significance of effect of the Proposed Development on Climate as follows:
- **Major effect:** where the Proposed Scheme could be expected to have a considerable effect (either positive or negative) on the achievement of national, regional or local carbon budgets;

- **Moderate effect:** where the Proposed Scheme could be expected to have a noticeable effect (either positive or negative) on the achievement of national, regional or local carbon budgets;
- **Minor effect:** where the Proposed Scheme could be expected to result in a small barely noticeable effect (either positive or negative) on the achievement of national, regional or local carbon budgets; and
- **Negligible:** where the Proposed Scheme could be expected to have no discernible effect on the achievement of national, regional or local carbon budgets.

Sensitive Receptors

- 17.53 The sensitive receptor which has been assessed in the first part of this chapter is Climate (via the creation or release of greenhouse gases).

Baseline Conditions

Current Land Use

- 17.54 The Proposed Development Site is primarily agricultural land and is broadly subdivided by Weasel Lane into two segments; north and south. The site is typified by gently undulating fields of differing sizes the majority of which are delineated by hedgerows and isolated trees. As the Site is an existing agricultural land, it is not likely to generate any significant traffic flows or emissions from existing buildings and therefore, it was assumed that there are no/limited transport, demolition and building emissions associated with the baseline.

Future Land Use

- 17.55 In the absence of the Project, the potential alternative use of the land is uncertain. If the land use and use of transport would remain unchanged, we should assume that GHG emissions associated with the Site will also be unchanged.

Milton Keynes/ Aylesbury Vale Borough GHGs

- 17.56 According to the 'UK local authority and regional carbon dioxide emissions national statistics: 2005 to 2017' (latest 2019 revision) the overall carbon emissions for the year 2017 were 881 ktCO₂ for AVDC area and 1,380 ktCO₂ for MKC area.

Likely Significant Effects

Construction Phase

Embodied Carbon Emissions

- 17.57 CO_{2e} emissions arise throughout a development lifecycle from the initial design to the refurbishment or eventual demolition. These emissions can be identified and quantified to produce a carbon lifecycle footprint for a development, which can then be used to plan an effective reduction strategy.
- 17.58 Materials or product manufacture cradle-to-gate emissions are those associated with the production of construction products/materials. The emissions arise from the energy used in extracting materials, refining them, transporting and processing them to produce a finished product. The GHG emissions resulting from these processes are often referred to as embodied carbon.

- 17.59 Emissions from the demolition/ construction stage also include energy and fuel consumption during transportation of material to and from site, enabling works, remediation, clearance, removal/demolition of existing structures, ground improvements, earthworks, assembly.
- 17.60 Activities during the demolition and construction stage will generate GHG emissions, particularly from the manufacture of construction materials.
- 17.61 The calculations for the GHG emissions generated are provided in Table 17.3.

Table 17.3 GHG Emissions – Embodied Carbon

Type	Total area (m²)	Building Type (from RICS benchmark values)	kg CO ₂ e / m ² rate	Total kgCO ₂ e	Total tCO ₂ e
Domestic					
Dwellings (no 1,855 units)	141,950	Low rise residential development	970	137,691,500	137,692
Non-Domestic Accommodation					
A1/A2/A3/A4, B1(a), D1/D2	22,845	Mixed use city block (Ground floor commercial, offices, leisure, primary & secondary school)	720	16,448,400	16,448
			Overall Total		154,140

17.62 The area of the domestic and non-domestic units was based on the parameter plans and was calculated taking into account the number of units and industry standard areas for each unit type.

Operational Phase

Buildings Emissions

17.63 The calculations for the GHG emissions generated from the predicted energy consumption associated with building use are provided in Table 17.4.

Table 17.4 Annual Overall Baseline Emissions (Post-Mitigation)

	Regulated Emissions (tCO ₂)	Unregulated Emissions (tCO ₂)	Total Emissions (tCO ₂)
After mitigation measures (Be Green)	3,476	3,476	6,952

	Regulated Emissions (tCO ₂)	Unregulated Emissions (tCO ₂)	Total Emissions (tCO ₂)
After mitigation measures (Be Green)	3,476	3,476	6,952

- 17.64 The total tonnes of carbon estimated to be generated over the operational stage from buildings is **7,859 tCO₂e per annum**. For more information please refer to the updated Energy Statement submitted in support of the Application/Appeal. In the context of the overall operational emissions for the next 30 years (until 2050 – the date set for UK decarbonisation) the development will emit **208,560 tCO₂e** as a worst case scenario. The worst case scenario does not take into account the annual decarbonisation benefit for the constant decarbonisation of the grid and uses a flat rate calculation of CO₂ emissions multiplied by 30 years.

Transport Emissions

- 17.65 The calculations for the GHG emissions generated from the operational energy associated with transport are provided in Table 17.5. This equates to **9,933 tCO₂e** per annum. The assessment has been undertaken using traffic flow data as detailed in Chapter 10: Transport and Transport Assessment in **Appendix 10.1**. In the context of the overall operational emissions for the next 30 years (until 2050 – the date set for UK decarbonisation) the development will emit **297,990 tCO₂e** as worst case scenario. The worst case scenario does not take into account the annual decarbonisation benefit for the constant decarbonisation of the UK vehicles and uses a flat rate calculation of CO₂ emissions multiplied by 30 years.

Table 17.5 Annual GHG Emissions – Transport Operational Phase

Metric	Unit	Car	Large Goods Vehicle	Bus	Rail
Total Distance	km/year	52,761,839	1,536,704	3,097,514	11,573,460
Total Person Trips	people trips/year			363,558	247,985
Total Vehicle Trips	vehicle trips/year	3,997,109	116,417		
Average Trip Length	Km/trip	13.2	13.2	8.5	46.7
Emissions Factor Description		Average car, unknown fuel, per km	Diesel HGV, Rigid (3.5-7.5 tonnes), per km	Local bus (not London), per passenger km	National Rail, per passenger km

Emissions Factor Value	kgCO ₂ e/km	0.1649	0.2498	0.1201	0.0412
Total	kgCO ₂ e	8,700,427	383,869	371,919	476,827

Mitigation Measures

Construction Phase

Embodied Carbon Emissions

17.66 Mitigation opportunities for reducing embodied carbon will be identified through all the life cycle stages of the Proposed Development. Most of the emissions associated with this stage are related to the Product and Use stages of BS EN 15978:20114. Consideration will be given to the following measures, which will be secured through the phase-specific CEMPs at the appropriate time:

- Manufacturer selection, to include options that use less energy intensive materials, more robust and durable components, recycled materials and minimising packaging and wasted materials;
- Supplier selection, including the use of local suppliers to minimise transport-related emissions; and
- End-of-life use, including whether materials are reusable or recyclable.

Operational Phase

Building Emissions

17.67 The Proposed Development has been developed in accordance with the desire to achieve an energy efficient and sustainable development. Primary mitigation measures have been identified at each stage of the Energy Hierarchy to reduce the GHG emissions arising from operational energy:

Be Lean

17.68 The dwellings will be designed to achieve optimum energy performance and will incorporate the following design features secured through planning conditions:

- All dwellings will exceed the minimum fabric requirements of Part L1A (2013) of the Building Regulations;
- All dwellings will include 100% low energy lighting; and
- All dwellings are proposed to be naturally ventilated.
- Buildings associated with these non-residential uses will incorporate building fabric that is in line with notional values and high efficiency LED lighting. External lighting is also intended to consist of high efficiency LED.

Be Green

17.69 Air source heat pumps are currently proposed for both the residential and non-residential uses of the Proposed Development; and other renewable technologies viable at the site will be reconsidered for inclusion as the design develops.

17.70 Whilst the exact design and specification is still in process, the local policy requirements are being met by a combination of efficiency measures (fabric first approach) and renewable technologies. These will exceed the 10% generation requirement as set out by the Local Plan.

- 17.71 Mitigation measures have reduced the carbon emissions by **12%** (compared with the no-mitigation scenario). Mitigation measures will be secured through an appropriate Planning Condition, as required.

Transport Emissions

- 17.72 A Travel Plan is provided with the Application/Appeal to be secured through a planning condition, which aims to reduce the number of vehicle movements to the site and encourage the use of sustainable transport modes and forms a secondary mitigation measure. Initial targets have been set for reductions in vehicle use and increases in other modes.
- 17.73 With the Travel Plan measures in place, the vehicular percentage split falls by 12% to 63%. This 12%-point reduction has been distributed between public transport (6%), cycling (3%) and walking (3%).
- 17.74 The following primary mitigation measures have been proposed in the travel plan:
Encourage the use of more sustainable modes of transport, such as walking, cycling and using public transport;
Reduce the need to travel; and
Encourage the use of sustainable travel by improving facilities and providing information.

Overall Emissions

- 17.75 The Overall emissions for the Proposed Development are illustrated in Table 17.6. The UK Fifth Carbon budget has been selected as appropriate for comparison as the development is not expected to be fully operational before 2027 and as worst-case scenario. The reality is that the emissions for the Proposed Development should be split between the fourth and potentially the third carbon budget if works start on site before 2022.

Table 17.6 Overall Emissions and UK Context

	Carbon Emissions (tCO ₂)
Embodied Carbon	154,140
Building Emissions	208,560
Transport Emissions	297,990
Total Emissions	660,690
UK Fifth Carbon Budget (FCB)	1,725,000,000
Percentage over FCB	0.04%

Residual Effects

- 17.76 The emission of greenhouses gases from the Proposed Development will lead to a long-term adverse impact (global warming) on an international receptor (the Climate). However, emissions during construction and operation are expected to contribute to less than 0.04% in the UK Carbon Budgets. The Proposed Scheme is expected to result in a small barely noticeable adverse effect on the achievement of national, regional or local carbon budgets. According to the significance criteria set in the sections above the effect is assessed as Minor Effect.

17.77 However, due to the complex and far-reaching effects of global warming and the presence of a scientifically established and globally agreed environmental limit, all emissions are regarded as important and should be mitigated as far as possible.

Cumulative Effects

17.78 Details of committed developments to be considered are:

East West Rail project

Proposed allocation of land at Shenley Park

17.79 The cumulative effects of committed schemes would include additional transport associated with greater development and the impacts of embodied carbon and building use.

17.80 It is not possible to provide a more detailed assessment accounting for the cumulative effects of the committed schemes with the Proposed Development due to the global nature of climate change and the proportionally small contribution of emissions that these schemes will contribute.

17.81 However, the impact on climate change from the Proposed Development in conjunction with the aforementioned schemes is considered to be minimal, as each of the cumulative schemes will have produced Flood Risk Assessments, Transport Assessments and Energy Strategies to help them adapt to and mitigate climate change.

Summary

17.82 The GHG emissions reported within this assessment have been split into three sources: embodied carbon; operational building; and operational transport. A summary of the effects and mitigation measures are provided in Table 17.7.

Table 17.7 Summary

RECEPTOR	POTENTIAL EFFECT	MITIGATION	RESIDUAL EFFECT
During Construction			
Embodied Carbon	Significant adverse	Consideration of: Manufacturer selection; Supplier selection; and End-of-life use.	Minor adverse
During Operation			
Building Emissions	Significant adverse	Improving energy efficiency of buildings using: Fabric first design; and High performance MEP building services Maximising clean energy using renewable energy, including Heat Pumps	Minor adverse
Transport Emissions	Significant adverse	Encourage the use of more sustainable modes of transport,	Minor adverse

RECEPTOR	POTENTIAL EFFECT	MITIGATION	RESIDUAL EFFECT
		such as walking, cycling and using public transport; Reduce the need to travel; and Encourage the use of sustainable travel by improving facilities and providing information.	

CLIMATE CHANGE RESILIENCE ASSESSMENT

17.83 This section details the impact of climate on the Proposed Scheme by providing an assessment of the vulnerability of the Proposed Scheme to climate change.

Assessment Methodology

- 17.84 The climate change vulnerability assessment has been undertaken in line with industry guidelines. Information on this assessment methodology is presented in this section.
- 17.85 The assessment has followed guidance within the Institute of Environmental Management and Assessment (IEMA) Environmental Impact Assessment guide to Climate Change Resilience and Adaptation (Ref. 17.23), and BREEAM 2018 assessment criteria Waste 05 Adaptation to Climate Change (Ref. 17.24).
- 17.86 Baseline data for the above impacts have been gathered using the United Kingdom's Climate Impact Programme 15 (UKCIP) to establish the climatic data surrounding current seasonal temperatures and precipitation. This stage of the assessment will be used to analyse the current climate and compare these findings, in relation to the Proposed Development, to the climate change projections identified in the UK Climate Change Projections 2018 (UKCP18) (Ref.17.25).
- 17.87 The UKCP18 high and low emissions scenarios have been assessed for a set of key climate change parameters.
- 17.88 The UKCP18 is the sixth generation of climate change information developed for the UK, underpinned by a unique methodology developed by the Met Office. This methodology reflects scientists' best understanding of how the climate system operates and how this might change in the future. This information will be used to identify the risks the Proposed Development may be exposed to and when, while highlighting what actions need to be taken to adapt the Proposed Development to the effects of a changing climate.
- 17.89 In addition, the UK Climate Change Risk Assessment: Government Report 2017 (CCRA) (Ref. 17.26) outlines how well-established risk-based decision approaches to assess risks have been applied to climate change and what priority actions are needed and how to respond to these. The CCRA report sets out the main priorities for adaptation in the UK under six key themes identified in the CCRA Evidence Report: Natural environment & natural assets; Infrastructure, People & built environment; Business; International dimensions and Cross-cutting issues.
- 17.90 The risk assessment applied to the Proposed Development covers the following stages:
- Hazard identification;
 - Hazard assessment;
 - Risk estimation;

- Risk evaluation; and
- Risk management.

- 17.91 Once the hazards to the Proposed Development have been identified, the impact of these risks will be evaluated and the tolerable thresholds will be determined. Following this, the sensitivity of the risk assessment will be assessed, identifying areas where the risks are unacceptable in health and safety, life cycle assessment and financial terms.
- 17.92 This aspect of the chapter will focus on the impact of extreme weather events arising from climate change, and where appropriate, mitigate against these impacts. The guidance set out in the BREEAM 2018 New Construction – Non-domestic Buildings, Waste 05 Adaptation to Climate Change will provide the framework for assessment.

Significance Criteria

- 17.93 As the Climate Resilience methodology is a risk-based assessment that considers the risk of climate change on the Proposed Development, then the usual EIA significance ratings cannot apply and it falls out of this ES's overall 'significance of effect' methodology.
- 17.94 The usual EIA significance ratings cannot apply but the risks to the Proposed Scheme must still be fully estimated and evaluated. This is done using the hazards already assessed for the Proposed Development in conjunction with the risks set out in the CCRA and baseline climate data projections.
- 17.95 Each risk identified has been assessed against three variables (as shown in Table 17.9 - Risk (R) severity/ magnitude/ consequence; Probability (P); and Level of Influence (I) over the risk/ opportunity).
- 17.96 Using this methodology, each risk is assigned a score (Total Risk Score = $R \times P \times I$) between 1 (no or very low risk) to 27 (very high risk) for the future high emission scenario.
- 17.97 Scoring risks against three different timescales provides an indication of when action may need to be taken to adapt and increase resilience so the asset in question is able to perform effectively for its intended useful design life. For some risks, action should be taken early to avoid significant disruption and economic impact. Other risks only need to be addressed either shortly before or as they occur. For example, the risk of severe and widespread flooding may need to be addressed early through planning and design activities (such as installing high drainage capacities and flood protection). Risks and discomfort to occupants due to increased summer temperatures may only need a response when these events start to become more severe and frequent.
- 17.98 The scores for Risk severity/magnitude/consequence (R), Probability (P) and Influence (I) are established through the understanding of the specific risk and the level of resilience or exposure of the Proposed Development to climate change, and through a review of relevant literature and climate change data. These are shown in Table 17.8 below.
- 17.99 Total Risk Scores ($R \times P \times I$) are categorised as follows:
- Total Risk Score of 18-27 – Very High Risk for the specified time period (Major Negative Effect);
 - Total Risk Score of 12-17 – High Risk for the specified time period (Moderate Negative Effect);
 - Total Risk Score of 8-11 – Medium risk for the specified time period (Minor Negative Effect); and
 - Total Risk Score of <8 – Low Risk for the specified time period (Neutral Effect).

Table 17.8 Risk, Probability and Influence Factors

FACTOR	COMMENTS
Risk (R) – severity, magnitude and likely consequences of the risk to the asset/ service/ investment in question. The impact may be related to the following types: operations, cost/ finance, regulation, service, safety, environment and/ or insurance and legal issues. The Risk (R) score represents the impact of the risk assuming it was to happen and does not reflect the probability of it occurring.	<p>1 = Unknown or relatively low impact expected</p> <p>2 = Moderate impact expected across one or more impact type</p> <p>3 = Significant impact expected across one of more impact type</p>
Probability (P) – likelihood of the impact occurring over the specified time period.	<p>1 = Unknown or relatively low probability of the impact occurring</p> <p>2 = There is some evidence of the impact, and the severity and magnitude of the impact is likely to increase over time</p> <p>3 = There is significant evidence of the impact, and there is a high probability that the severity and magnitude of the impact will increase over time</p>
Influence (I) – level of influence and responsibility of the Promoter on managing the risk or opportunity and on adapting the service, asset or investment in question to the projected impacts of future climate change.	<p>1 = No or minimal influence and/ or responsibility</p> <p>2 = Moderate influence and/ or responsibility</p> <p>3 = Significant or total influence and/ or responsibility</p>

17.100 Those risks and opportunities that scored 12 or above have been assessed further to identify potential adaptation responses that could be implemented to reduce the likelihood, magnitude, severity and consequences(s) of the impact.

Assumptions and Limitations

17.101 The UKCP18 projections of the future climate are based on the current understanding of the climate system; however, there may be scientific unknowns incorporated within the predictions which would affect the information provided. The data scenarios, therefore, should be interpreted as climate projections that will have some variance as models and observed impacts are recorded.

Baseline Conditions

17.102 As the methodology employed uses modelled datasets and climate projections, it is necessary to use the timescales set out within these datasets. Therefore, this section does not make use of the baseline year as used in other chapters within this ES, but instead uses baseline conditions relevant to the climate datasets used.

17.103 The UKCP18 highlights the key climate projections over the next 50+ years and summarises these as follows:

- Summers will become hotter and drier;

- Winters will become milder and wetter;
- Soils will become drier on average;
- Snowfall and the number of very cold days will decrease;
- Sea levels will rise; and
- Storms, heavy and extreme rainfall, and extreme winds will become more frequent.

17.104 These changes are set to have substantial impacts on the construction and maintenance of buildings and also on the natural environment. For example, drier and hotter summers will lead to more incidences of heat damage to structures and equipment; more frequent heavy rainfall events will result in increased incidences of flooding in low-lying areas; and increased variability in soil moisture levels will lead to increased incidences of subsidence. These impacts will lead to disruption to businesses and increased operational, maintenance and emergency repair costs.

17.105 In adapting to future climatic conditions, a number of wider opportunities will result including:

- Reducing the risks to business continuity, to delivery of services and economic and reputational risk;
- Reducing, but not eliminating, exposure to extreme weather damage;
- Increasing the long-term sustainability of investment decisions;
- Reducing environmental pollution and enhancing environmental protection; and
- Creating a safer and more comfortable working environment for employees and travelling environment for the public.

Likely Significant Effects

Hazard Identification

17.106 The Proposed Development is within a residential location plus local retail, commercial and community facilities, and public realm. In this context, the following potential hazards have been identified applying the risk-based approach outlined in the CCRA:

- Urban Heat Island effect;
- Increased flood risk;
- Water shortage and drought;
- Subsidence; and
- Extreme weather events.

Hazard Assessment

17.107 In UKCP18, the probabilistic projections provide local low, central and high changes across the UK, corresponding to 10%, 50% and 90% probability levels. These local values can be averaged over the UK to give a range of average warming between the 10% and 90% probability levels. By 2070, in the high emission scenario, this range amounts to 0.7°C to 4.2°C in winter, and 0.9°C to 5.4°C, in summer. For precipitation, corresponding ranges of UK average changes are -1% to +35% for winter, and -47% to +2% for summer, where positive values indicate more precipitation and negative values indicate reduced precipitation.

17.108 Hot summers are expected to become more common. In the recent past (1981-2000) the probability of seeing a summer as hot as 2018 was low (<10%). The probability has already increased due to climate change and is now estimated to be between 10-20%. With future warming, hot summers by mid-century could become even more common (with probabilities of the order of 50% depending on the emissions scenario followed).

17.109 The UKCP18 Projections for the Proposed Scheme as it is located in Central England are shown below in Table 17.9.

17.110 All results are for the 10th-90th percentile range for the 2060-2079 period relative to 1981-2000.

Table 17.9 Emissions Scenarios for UKCP18 Projections for a Location in Central England- Summer and Winter Changes by 2070s

EMISSIONS SCENARIOS	SUMMER RAINFALL CHANGE	WINTER PRECIPITATION CHANGE	SUMMER TEMPERATURE CHANGE	WINTER TEMPERATURE CHANGE
Low emission scenario	41% drier to 9% wetter	3% drier to 22% wetter	No change to 3.3 °C warmer	-0.1 °C cooler to 2.4 °C warmer
High emission scenario	57% drier to 3% wetter	2% drier to 33% wetter	1.1 °C warmer to 5.8 °C warmer	0.7 °C warmer to 4.2 °C warmer

17.111 The results presented in Table 17.11 are also aligned with the more detailed weather analysis conducted for the Proposed Site using the UKCP User Interface (UKCP UI) Tool. For further information refer to **Appendix 17.1**.

Risk estimation and evaluation

Using the hazards identified and assessed using the UKCP18 data, a set of risks for the Proposed Development have been identified as below:

- Surface water flooding to public realm and ground floor properties;
- Building damage due to droughts and ground movement;
- Damage to buildings or impacts on pedestrian comfort associated with increased extreme weather;
- Overheating in homes/UHI effect in public areas and associated health implications;
- Increased energy needs for cooling for commercial and residential units;
- Soft landscaping failure and associated loss of services; and
- Water shortages for public use and for landscaping.

17.112 To develop the risks, the high emissions scenario data in Table 17.19 was used to estimate the risk prior to any adaptation measures because this would present the worst-case scenario in terms of impact severity and therefore ensure that all risks were fully evaluated.

17.113 Each of these risks has been estimated using the scoring methodology set out in Table 17.10 and evaluated using the R x P x I calculation to produce an associated level of risk.

17.114 The results of the risk estimation and evaluation are displayed in Table 17.10.

Table 17.10 Total Risk Score of the Proposed Development

RISK	RISK SEVERITY (R)	PROBABILITY (P)	INFLUENCE (I)	TOTAL RISK SCORE (RxPxI)	RISK/ EFFECT RESULT
Surface water flooding to public realm and ground floor properties	2	2	3	12	Moderate Negative
Building damage due to droughts and ground movement	3	1	2	6	Neutral
Damage to buildings or impact on pedestrian comfort associated with increased extreme weather	3	2	2	12	Moderate Negative
Overheating in homes / urban heat island effect in public areas and associated health implications	3	3	3	27	Major Negative
Increased energy needs for cooling for commercial and residential units	3	3	3	27	Major Negative
Soft landscaping failure and associated loss of services	2	2	3	12	Moderate Negative
Water shortages for public use and landscaping	3	2	2	12	Moderate Negative

Identification and Evaluation of Significant Risks

17.115 Using the calculated risk scores in Table 17.10 above, impacts associated with climate change on the built environment at the Proposed Development will result in Major Negative or Moderate Negative effects on the following key areas:

- **Flooding** – Moderate Negative risk by 2070s High Emission Scenario - the Proposed Development is located in a low risk flood zone (The site is specifically referenced in the Aylesbury Vale Level 2 SFRA as site 'NLV001' and identifies that 99% of the site is located in Flood Zone 1 as per Chapter 8: Drainage) but it is still at risk of surface water flooding and therefore public realm and ground floor land uses may be affected by climate changes effects with regards to the increase and severity of flooding events in future climate scenarios;
- **Urban Heat Island Effect** – Major Negative risk by 2070s High Emission Scenario - the Proposed Development consists of residential, commercial and retail buildings within an urban environment. With increased ambient and peak summer temperatures, this will increase the likelihood and severity of the Urban Heat Island Effect with consequent overheating and need for additional cooling;
- **Increased water shortages** – Moderate Negative risk by 2070s High Emission Scenario – the Proposed Development will be affected by the increased likelihood of water shortages as a result of reduced total rainfall and increased severe rainfall events in the Central England. With the increase in severity of rainfall events, more surface water runoff occurs with less opportunity for natural infiltration and aquifer recharge; and
- **Soft landscaping failure / increased maintenance** – Moderate Negative risk by 2070s High Emission Scenario – increases in extreme temperatures and rainfall events will cause damage to the proposed extensive landscaping features if they have not been selected to withstand reduced water balances and

higher ambient temperatures. Replacement of vegetation that dies off will be necessary to maintain the landscaping features.

Mitigation Measures

17.116 To address the Major and Moderate Negative risks identified in Table 17.10, adaptation measures have been developed. These measures have been assessed to understand their suitability for implementation and potential ability to reduce the level of risk severity and to increase operational and economic resilience of the Proposed Development.

17.117 The following measures have been incorporated into the design to increase resilience against the risks associated with increased frequency of flooding, storms and heavy/prolonged precipitation, as well as increased seasonal variation in precipitation:

- It is proposed to implement a Sustainable Drainage Systems (SuDS) to sustainably manage surface water run-off within the Proposed Development in line with current best practice recommendations;
- The principal aim is to direct exceedance flows away from properties and along defined corridors. At a local level, this may mean water being conveyed along a length of highway, as long as the predicted flow depths and velocities are acceptable. More strategically, the implementation of conveyance corridors is important in avoiding deep and high velocity flows that present a high risk;
- The Proposed Development will incorporate measures to manage the surface water runoff. It will utilise attenuation basins to provide surface water attenuation management and conveyance swales. Flows will be limited, via a flow control device (e.g. vortex flow control) to ensure that maximum peak discharge rates do not exceed the QBar event for any event up to and including the 1 in 100 year plus climate change event. (+ 40%CC) with free board, and some protection for events in excess of this;
- A surface water drainage strategy is detailed in the FRA (in ES **Appendix 8.1**), which demonstrates that there is a betterment on the existing surface water runoff rates by the development attenuating the 100 year plus climate change flows down to QBar and that the Site does not increase the risk to surface water flooding to any of the adjacent locations;
- Use of a surface water drainage network, which utilises swales and attenuation ponds to provide the necessary volumetric storage prior to discharge to the ordinary watercourses within the site boundary.
- Permeant water bodies (i.e. wildlife ponds and micro pools in SuDS basins).

17.118 The following measures have been incorporated into the design to increase resilience against the risks associated with the Urban Heat Island effect and consequent overheating:

- Passive measures to reduce internal heat gains including highly efficient lighting systems;
- Passive measures to reduce external heat gains including external shading from façade design, cooling benefit from landscaping and low u-values and detailing to promote high levels of airtightness, stopping unwanted infiltration of heat and hot air;
- Active measures to counterbalance heat gains including mechanically ventilating spaces sensitive to overheating and selecting low-energy cooling systems; An overheating risk assessment was carried out using the Standard Assessment Procedure (SAP) for Energy Rating of Dwellings information of which can be found in the submitted Energy Statement, as well as using dynamic modelling assessment; the areas identified at the highest risk of overheating had their design amended to optimise thermal comfort and reduce the overheating risk;
- Green infrastructure and landscaping that provides natural cooling is an integral part of the landscape design;

- Planting of a substantial number of new tree belts and woodland blocks;
- At detailed design stage, the species chosen for these tree belts, woodland blocks and other plants across the Site can be selected by choosing those that have the best tolerance to changeable climate and a possible increase in extreme weather events. This will ensure that the trees and other plants have the best chance of reaching maturity;
- Native tree and shrub species will be planted to encourage species to withstand changes in climate conditions.

17.119 The following measures have been incorporated into the design to increase resilience against the risks associated with water shortages as a result of increased incidences of drought and increased frequency and severity of heat waves:

- Measures to promote the re-use and recycling of water within the Proposed Development will be encouraged so as to reduce overall demand – such as the inclusion of private water butts for rainwater harvesting;
- Measures to reduce the consumption and discharge of water from the Proposed Development will also be encouraged, such as low water consumption units and fixtures (e.g. toilets and taps) fitted with water efficiency and cut-off features;
- The inclusion of a surface water drainage strategy, with an attenuated release to the unnamed ordinary watercourses within the Site boundary, means that waters are being directed away from a sewer infrastructure, thereby reducing demand.

17.120 The following measures have been incorporated into the design to increase resilience against the risks associated with soft landscaping failure and associated maintenance requirements as a result of extreme temperature and rainfall events:

- The proposed planting scheme has been designed to provide shelter, thus providing shade for people and also shading the soil so as to reduce evaporation, keep soils moist and thereby improve growing conditions for other plants, which will improve the soil structure by ensuring a wider variety of plants can grow in it;
- Vegetation has a five-year establishment period. This will allow the frequency of watering operations to be adopted in periods of drought or heavy rainfall;
- Maintenance strategies will be in place for all areas of soft landscaping to ensure that they are maintained to the highest standards and are therefore more resilient to any extreme weather events.

Residual Effects

17.121 The detail of the residual effects following climate change adaptation cannot be stated given the uncertainties inherent in climate science and projections. However, the adaptation measures identified are considered best practice in order to minimise the residual impact of climate change on the Proposed Development from a scale of moderate to minor or even neutral by reducing the likelihood and magnitude of potential impacts.

17.122 In addition, the extreme weather-related incidents should be recorded by the Borough to assist in identifying thresholds which, when exceeded, require maintenance. Inspections should be carried out following an intense rainfall event or heatwave to monitor any damage and implement appropriate mitigation as necessary.

Summary

17.123 The climatic conditions over the next 50 years will change as a result of increased anthropogenic CO₂ levels resulting in the following effects:

- Summers will become hotter and drier;
- Winters will become milder and wetter;
- Soils will become drier on average;
- Snowfall and the number of very cold days will decrease;
- Sea levels will rise; and
- Storms, heavy and extreme rainfall, and extreme winds will become more frequent.

17.124 Given the location of the Proposed Development, potential impacts were identified resulting in:

- Urban Heat Island effect;
- Increased flood risk;
- Water shortage and drought;
- Subsidence; and
- Extreme weather events.

17.125 These were assessed with regards to the overall risk they presented against future climatic conditions using UKCP18 scenarios that identified that risks from flooding, overheating, the heat island effect and impacts to soft landscaping all required consideration in climate change adaptation and mitigation.

17.126 The Proposed Development has therefore been designed to:

- Provide Green Infrastructure including generation of shade to the residential and commercial units to address potential for overheating and contributing to the heat island effect;
- Include passive measures to minimise internal and external heat gains and therefore limit overheating potential;
- Include measures for flood prevention including Sustainable Drainage Systems (SuDS), attenuation basins, conveyance swales and flow control device; and
- Reduce water use through the use of low water consumption units, fitted with water efficiency and cut-off features.

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18. MAJOR ACCIDENTS AND DISASTERS

Introduction

- 18.1 This chapter reports the outcome of the assessment of likely significant effects arising from the vulnerability of the Proposed Development to major accidents and/or disasters (MA&D). The chapter considers:
- The vulnerability of the Proposed Development to MA&D; and/or
 - The Proposed Development's potential to cause a MA&D.
- 18.2 The chapter describes the assessment methodology, the scoping of risks of MA&D events to be considered, any embedded mitigation adopted for the purposes of the assessment, the additional mitigation measures required to avoid, prevent, reduce or offset any significant negative effects, and the likely residual effects on MA&D risks after the additional mitigation measures have been employed.
- 18.3 To date, there is no specific guidance on how to consider MA&D within the context of EIA. However, this assessment considers emerging EIA good practice, which refers to other relevant documentation, including the Cabinet Office's National Risk Register (NRR) of Civil Emergencies (Ref 18.1).
- 18.4 The assessment of MA&D identifies whether an appropriate risk management structure is in place, for both health and safety, and environmental risks. It also reports on whether the potential for MA&D events to impact on human health and/or the environment has been identified and how it will be managed to be as low as reasonably practicable by the Applicant. This has been achieved through a review of available documentation and wider regulatory requirements. The purpose of the assessment is to identify risks which require additional precautionary mitigation measures beyond those already embedded into the design, construction and operational phases of the Proposed Development.
- 18.5 MA&D is not one of the "environmental factors" in the Regulations and therefore the structure of this chapter does not conform to the typical structure applied to environmental topics that is outlined in Chapter 4 of this ES. Instead this chapter signposts receptors and assessments from other topic chapters, regulatory frameworks and documentation where these risks have been or will be addressed. For example, health and safety requirements within existing legislation already identify risks and help to protect human and environmental receptors. This chapter is intended to be read as part of the ES, with particular reference to all environmental topic chapters (Chapters 5 to 17). The intent of the assessment is to conduct an analysis of the ES to ascertain if mitigation measures outlined in the ES adequately address potential MA&D risks. To the extent that any risks have not been adequately addressed, this chapter identifies these risks and considers whether additional mitigation measures may be necessary.
- 18.6 The terminology for elements of MA&D are presented in the table below. This terminology is based on that defined in the EU Directive 2012/18/EU (Ref 18.2).

Table 18.1 MA&D Terminology

Term	Definition
Risk	The likelihood of an impact occurring combined with the effect or consequences of the impact on a receptor if it does occur.
Major Accident	An event that threatens immediate or delayed serious damage to human health, welfare and / or the environment. Serious damage includes the loss of life or permanent injury and / or permanent long-lasting damage to an environmental receptor that cannot be restored through minor clean-up and restoration efforts. The significance of this effect will take into account the extent, severity and duration of harm and the sensitivity of any receptors.
Disaster	A naturally occurring phenomenon such as extreme weather event or ground-related hazard event with the potential to cause an event or situation that meets the definition of a major accident as defined above.

Legislative & Planning Policy Context

18.7 A summary of all applicable legislation, policy and guidance of relevance to this assessment is outlined below:

Legislation and Regulation

The EIA Directive 2014/52/EU

18.8 Recital 15 of the Directive States:

“In order to ensure a high level of protection of the environment, precautionary actions need to be taken for certain projects which, because of their vulnerability to major accidents, and / or natural disasters (such as flooding, sea level rise, or earthquakes) are likely to have significant adverse effects on the environment. For such projects, it is important to consider their vulnerability (exposure and resilience) to major accidents and / or disasters, the risk of those accidents and / or disasters occurring and the implications for the likelihood of significant adverse effects on the environment”.

Town and Country Planning (Environmental Impact Assessment) Regulations 2017

18.9 Schedule 4, Paragraph 8 of the EIA Regulations, requires environmental statements to contain:

“A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and / or disasters which are relevant to the project concerned. Relevant information available and obtained through risk assessments pursuant to EU legislation such as Directive 2012/18/EU of the European Parliament and of the Council or Council Directive 2009/71/Euratom or UK environmental assessments may be used for this purpose provided that the requirements of this Directive are met. Where appropriate, this description should include measures envisaged to prevent or mitigate the significant adverse effects of such events on the environment and details of the preparedness for and proposed response to such emergencies”.

Local Policy

Aylesbury Vale District Local Plan

- 18.10 The Aylesbury Vale District Local Plan (AVDLP) applies to the whole of the District and covers the period to 2011. Some of its policies were subsequently subject to a saving direction by the Secretary of State and constitute the development plan for the area.
- 18.11 There are no policies in the AVDLP that are of relevance to the Proposed Development from a MA&D perspective.

Milton Keynes Adopted Local Plan – Plan:MK 2016-2031

- 18.12 Plan:MK sets out Milton Keynes Council's strategy for meeting the Borough's needs until 2031.
- 18.13 There are no policies in Plan:MK that are of relevance to the Proposed Development in relation to MA&D. 16.118 Draft Vale of Aylesbury Local Plan 2013-2033
- 18.14 The Vale of Aylesbury Local Plan (VALP), once adopted, will form the main part of the development plan for the district, replacing the 2004 Local Plan saved policies.
- 18.15 This document is the latest stage in the preparation of the VALP, which sets out the long-term vision and strategic context for managing and accommodating growth within the district until 2033.
- 18.16 The draft VALP has been subject to independent examination and the Inspector has issued his interim findings. In November and December 2019, AVDC carried out consultation on the proposed main modifications to the VALP. It is anticipated that the VALP will be adopted in 2020.
- 18.17 There are no policies in the Draft VALP that are of relevance to the Proposed Development in relation to MA&D.

National Policy and Guidance

The National Planning Policy Framework

- 18.18 The National Planning Policy Framework (NPPF) 2019 refers to considerations of MA&D events to be made by Local Planning Authorities:

- Paragraph 45 states:

“Local planning authorities should consult the appropriate bodies when considering applications for the siting of, or changes to, major hazard sites, installations or pipelines, or for development around them”; and

- Paragraph 95 states:

“Planning policies and decisions should promote public safety and take into account wider security and defence requirements by: (a) anticipating and addressing possible malicious threats and natural hazards, especially in locations where large numbers of people are expected to congregate. Policies for relevant areas (such as town centre and regeneration frameworks), and the layout and design of developments, should be informed by the most up-to-date information available from the police and other agencies about the nature of potential threats and their implications. This includes appropriate and proportionate steps that can be taken to reduce vulnerability, increase resilience and ensure public safety and security”.

The Cabinet Office, National Risk Register (NRR) of Civil Emergencies 2017

- 18.19 The Government produced this document to provide information on events that would “[...] cause widespread damage and would require some form of government response” and provide guidance on how to prepare for such events. The document is divided into four sections; identifying risks, describing consequences, details risks and management strategies. It outlines a methodology for identifying, assessing and prioritising risks. The NRR is based on information from the National Risk Assessment, a classified assessment of risks to the UK over a five-year period, of which the 2017 edition was the latest available at the time of preparing this chapter.

Defra, Guideline for Environmental Risk Assessment and Management 2011

- 18.20 This document provides generic guidance for the assessment and management of environmental risks. A cyclical framework for risk management is provided which identifies four main components of risk assessment:

- Formulating the problem;
- Carrying out an assessment of the risk;
- Identifying and appraising the management options available; and
- Addressing the risk with a risk management strategy.

- 18.21 A source-pathway-receptor model is suggested as a tool to assist in risk scoping and the following applied to prioritise significant hazards for further investigation.

International Standards Organisation (ISO) 31000:2009 Risk Management – Principles and Guidelines

- 18.22 The guidelines identify a number of principles that need to be satisfied to make risk management effective. If standards are adopted and applied the management of any risk should help minimise losses, improve controls and the identification of opportunities and threats.

- 18.23 The guidelines state that when defining risk criteria, the following factors should be considered:

- The nature and types of causes and consequences that can occur and how they will be measured;
- How likelihood will be defined;
- The timeframes of the likelihood and / or consequences;
- How the level of risk is to be determined;
- The views of stakeholders;
- The level at which risk becomes acceptable or tolerable; and
- Whether combination of multiple risks should be taken into account and, if so, how and which combination should be considered.

Assessment Methodology

- 18.24 The potential for identified MA&D to result in a significant environmental effect differs from that in Chapter 4 of the ES (see paragraph 5) as it has been evaluated using a risk-based approach as set out in guidance listed above. The approach considers the environmental consequences of a risk scenario; the likelihood of these consequences occurring, taking into account planned design and mitigation, and the acceptability of the subsequent risk to the environment. The process followed includes:

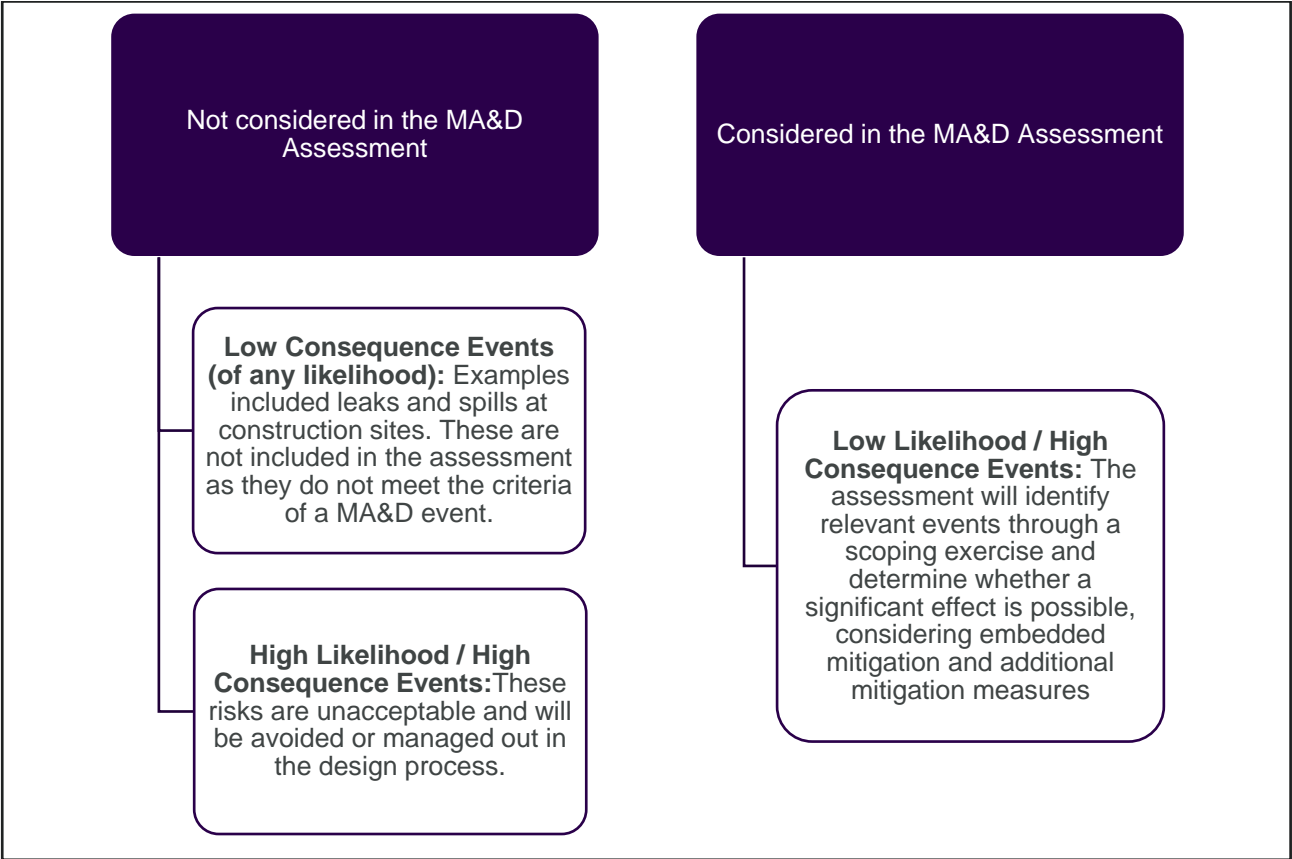
- Identifying and classifying risks;
- Scoping these risks;
- Defining the impact;
- Assessing the risk; and
- Outlining risk management (mitigation) options.

Scope of the Assessment

Excluded Effects

- 18.25
- Non-MA&D health and safety risks, such as accidents associated with construction plant / equipment, are scoped out of this assessment as managing the risks to employees is already covered by detailed H&S legislation which includes:
 - The Health and Safety at Work Act (HSWA) 1974;
 - The Management of Health and Safety at Work Regulations 1999;
 - The Occupier’s Liability Act 1984;
 - The Supply of Machinery (Safety) Regulations 2008; and
 - The Construction (Design and Management) (CDM) Regulations 2015.
- 18.26
- High likelihood / high consequence events are not included in this assessment. The nature of these events, having the potential to occur at a relatively high frequency with serious consequences, is assumed to be at an unacceptable level of risk for the Proposed Development to have received approval for construction. As a result, it has been assumed that the design of the Proposed Development and regulatory risk assessment processes will have identified, avoided and / or managed these risks accordingly (see Figure 18.1) and as such no further assessment is required.

Figure 18.1 Summary of Risk Events Considered in the Scope of Assessment for MA&D



Study Area

- 18.27 The extent of the Study Area for the assessment is the Site and a 1km buffer around the red line boundary. This extent has been used in order to account for adjacent external factors that may be present in either Milton Keynes or Aylesbury Vale.

Identifying and Classifying Risks

- 18.28 Risk identification has used existing sources of information wherever possible, such as risk events identified within the NRR.
- 18.29 Definitions of risk, accidents and disasters can be found in Table 18.1.
- 18.30 In order to identify whether a risk event has the potential to result in a MA&D event, which also has the potential to have a significant adverse effect on an environmental and / or human receptor, three components need to be present as identified by Defra in the 'Guideline for Environmental Risk Assessment and Management' (2011) (Ref 18.3):
- Source: The source is the original cause of the hazard, which has the potential to cause harm;
 - Receptor: The receptor, which is the specific component of the environment that could be adversely affected, if the source reaches it; and
 - Pathway: The pathway is the route by which the source can reach the receptor.

Scoping Risks

- 18.31 The following scoping process has been used to identify those risk events that may require further consideration within the assessment.
- Identifying Risk – Review of existing risk assessment / registers to identify potential risks (as described above);
 - Location Risk – Is there a potential source, and / or pathway and / or receptor? If not, no further assessment is required;
 - Proposed Development Risk – What is the nature of the potential impact? Is there the potential for significant adverse effects on or as a result of the Proposed Development?; and
 - Scoping Decision – Scope in or out of the assessment based on the above.

- 18.32 For the potential MA&D events not scoped out during this process, a full assessment has been undertaken. This assessment forms the basis for recommending additional mitigation measures, if and where appropriate.

Method of Baseline Data Collation

- 18.33 The assessment has collected baseline information from other chapters of the ES to identify the sensitive receptors and the Proposed Development's risk to MA&D.
- 18.34 In accordance with Schedule 4, Paragraph 8, of the EIA Regulations, available safety assessments were used to inform the identification and assessment of likely significant environmental effects. For the purposes of the Proposed Development, this includes the review of sources of information such as the NRR.

Assessment of Risk and the Significance of Effect

- 18.35 The risk and resulting significance of effects associated with MA&D has been assessed using the following criteria, as appropriate to the effect concerned:
- The presence and nature of embedded / additional mitigation measures;
 - The nature of the realistic worst-case impact (reasonable worst consequence); and
 - The reversibility and duration of effects.
- 18.36 Where required, the assessment of risk and the determination of the significance of effects has relied on the professional judgement of the competent expert and environmental specialists were consulted.
- 18.37 A significant adverse effect is considered to mean risk of an event resulting in the loss of life or permanent injury, and / or permanent or long-lasting damage to an environmental receptor. For the purposes of the assessment the risk of a MA&D event is considered to be either significant or not significant.
- 18.38 A significance rating has been provided for both pre-mitigation and residual scenarios.

Risk Management (Mitigation) Options

- 18.39 The assessment has considered, in consultation with relevant environmental specialists, whether the identified risk is managed through existing mitigation measures. If any identified risk is identified but there is no demonstratable risk management, additional measures may be required and have been proposed.
- 18.40 Risk management options fall into one of the following categories consistent with the mitigation hierarchy used for the EIA. Full details of risk management will be signposted where relevant:
- Eliminate (avoid) the risk, by adopting alternative processes in order to eliminate the source of the hazard, or remove the receptor;
 - Reduce the risk by adapting the Proposed Development such that either the likelihood or the impact of the MA&D events can be reduced;
 - Isolate the risk, by using physical measures to ensure that should the risk event occur, it can be effectively isolated such that there is no pathway;
 - Control the risk, by ensuring that appropriate control measures are in place so that should a risk event occur, it can be appropriately managed and controlled; and
 - Exploit the risk, if it presents potential benefits or new opportunities.

- 18.41 Risk management options can be implemented both before and after the MA&D event occurs, such as through intervention and barriers (pre-event measures) or mitigation and controls (post-event measures).
- 18.42 Risk management options, for the purposes of this assessment, fall into two classes:
- Embedded Mitigation: Existing mitigation measures included within the Proposed Development design, as a result of other assessments or legislation / policy with relevance to the Proposed Development; and
 - Additional Mitigation: Measures proposed as a result of the assessment, where gaps in embedded mitigation have been identified.

Baseline Conditions

- 18.43 Additional baseline information has been gathered on features external to the Proposed Development which could contribute a potential source of hazard to the Proposed Development.
- 18.44 Future baseline data, where practicable and appropriate to assess, has been considered in ES chapter assessments. The relevant environmental chapter should be consulted for this information.
- 18.45 The baseline relevant to this topic comprises:
- Baseline receptors in the ES;
 - Features external to the Proposed Development that contribute a potential source of hazard to the Proposed Development; and
- 18.46 Future baseline data, where practicable to assess, has been considered in ES chapter assessments. The relevant environmental topic chapter should be consulted for this information.

Baseline Receptors in this ES

- 18.47 Full baseline conditions in relation to environmental and human receptors are found in the following ES chapters and supplementary documents:
- Chapter 2: Application Site and Project Description;
 - Chapter 7: Ecology;
 - Chapter 8: Drainage;
 - Chapter 9: Landscape and Visual Impacts;
 - Chapter 10: Traffic and Transport
 - Chapter 11: Air Quality;
 - Chapter 12: Noise and Vibration;
 - Chapter 13: Socio-economic;
 - Chapter 14: Services and Utilities;
 - Chapter 15: Waste;
 - Chapter 16: Ground Conditions;
 - Chapter 17: Climate Change;
 - Flood Risk Assessment (FRA); and
 - Health Impact Assessment (HIA).

18.48 Additional receptors are identified in Table 18.2.

Baseline Features that Contribute a Potential Source of Hazard

- 18.49 As far as is reasonably practicable, the route of the Proposed Development has been designed to avoid existing features that have the potential to present a hazard to the construction and operation of the Proposed Development.
- 18.50 Features external to the Proposed Development that lie within, adjacent and / or in the vicinity of the land required for the Proposed Development which present a potential source of hazard, either during the construction or operation phase include, but are not limited to, those outlined in the table below.

Table 18.2 External Influencing Factors

External Influencing Factor	Summary
BPA UKOP Pipeline	Existing oil pipeline that runs underneath the central portion of the site from the northern to southern extent.
Gas Pipeline	Existing gas pipeline that runs underneath the eastern portion of the site from the northern to southern extent.
Milton Keynes	Bounds the site to the east. Directly connects the site to residential properties and the urban environment.
Railway	Bounds the site to the south. Currently disused but the East West Rail upgrades will lead to an operational railway by 2024. For the purposes of the assessment the railway has assumed to be operational.
Road Network	Bounds the site to the north.

- 18.51 While the assessment does not deal with specific receptors, broader identification of sensitive receptors is provided to place the assessment in context. These sensitive receptors related to MA&D events are listed below and are taken from the Chapters listed in Paragraph 18.34 and Table 18.2:

- Members of the public, pedestrians and local communities;
- Construction workers;
- BPA UKOP pipeline;
- Gas mains pipeline
- Agricultural soils;
- Watercourses and water resources;
- Motorised vehicle users;
- Railway users;
- Ecological receptors (designated sites such as Local Wildlife Sites (LWS), habitats such as woodlands and hedgerows, protected species such as bats and birds);
- Industrial, residential and commercial properties (urban environments); and
- Services and utilities.

Scoping Risks – Initial Risk List

- 18.52 The initial risk list forms the main component of the scoping process by ruling out any potential MA&D events that are considered not having the potential to occur based on the source, pathway receptor model outlined in 18.17. The scoping process illustrates that due account has been taken of the full range of potential accidents and disasters and that the assessment process is fully transparent.
- 18.53 Table 18.3 provides an initial scoping list of MA&D events for consideration in the assessment. This list has been based on the NRR, the nature and scale of the Proposed Development (the 'Proposed Development Risk') and the site of the Proposed Development (the 'Location Risk'). The potential for a Location Risk and Scheme Risk is recorded in a yes / no format, with additional information provided where relevant. Any event that does not have a Location Risk and Scheme Risk has been scoped out have had justification provided. Those that have both a Location Risk and Scheme Risk have been carried forward for the assessment.

Table 18.3 Initial Risk List

MA&D Event	Location Risk	Proposed Development Risk (and phase)	Scoping for Further Assessment
Flooding	Yes – Areas of the site are within Flood Zone 3 and Flood Zone 2.	Yes (construction) - Works may be vulnerable to flooding Yes (operation) - Proposed Development has potential to both be vulnerable to flood risk and increase flood risk.	Scope In
Severe Weather (storms, gales, extreme temperatures and drought)	Yes – The south-east of England is an area vulnerable to drought and extreme temperatures under climate change scenarios.	Yes (construction) – Construction activities are at risk of effects of extreme weather Yes (operation) – The site will be exposed to risks from Climate Change.	Scope In
Space Weather	Yes – The site is above ground.	No (construction and operation) – Due to the nature of the Proposed Development, it is not vulnerable to space weather.	Scope Out
Geophysical	No – Geophysical events do not occur within the UK of sufficient magnitude to lead to major damages.	No (construction and operation) – The site will not create environments at additional risk of geophysical events.	Scope Out
Poor Air Quality	Yes – Proximity to the road network.	Yes (construction and operation) – Construction activities and operational road network and Proposed Development contain human receptors, vulnerable to poor air quality.	Scope In
Wildfires	Yes – The vegetated nature of the site.	Yes (construction) – Agricultural conditions of the baseline site.	Scope In (construction)

MA&D Event	Location Risk	Proposed Development Risk (and phase)	Scoping for Further Assessment
		No (operation) – Operational site is no longer a rural environment.	Scope Out (operation)
Urban Fires	Yes – Location of site near Milton Keynes and infrastructure.	No (construction) – The construction site is not an urban environment. Yes (operation) – Urban environment of the completed Proposed Development.	Scope Out (construction) Scope In (operation)
Human Diseases	Yes – The presence of people within and adjacent to the site.	Yes (construction and operation) – Both phases phase will generate human interactions.	Scope In
Animal Diseases	Yes – Baseline conditions of agricultural land.	No (construction and operation) – The Proposed Development will not generate interactions with animals.	Scope Out
Power Failure	Yes – The site is and will be connected to the national grid and will be susceptible to power failures.	Yes (construction and operation) – Disruption to construction activities due to power loss and disruption to operational properties and road network.	Scope In
System Failure (utilities and telecommunications)	Yes – Utilities present on site such as the gas pipeline.	Yes (construction) – Existing system components present during construction phase. Yes (operation) – Proposed Development integrated with utilities network.	Scope In
Major Traffic Accidents	Yes – The presence of the local road network and future East West Rail network adjacent to the site.	Yes (construction and operation) – The Proposed Development will generate additional traffic in both phases and remains in proximity to the rail network throughout the phases.	Scope In
Major Naval Accidents	No – No naval or maritime traffic within the vicinity of the Proposed Development.	No (construction and operation) – No naval traffic.	Scope Out
Industrial and Urban Accidents	Yes – Presence of BPA UKOP oil pipeline and gas pipeline within the Site	Yes (construction and operation) – The Proposed Development will create an urban environment that is	Scope In

MA&D Event	Location Risk	Proposed Development Risk (and phase)	Scoping for Further Assessment
	and the proximity of Milton Keynes.	vulnerable to industrial or other urban accidents.	
Pollution Accidents	Yes – Presence of BPA UKOP oil pipeline within the site.	Yes (construction and operation) – Both phases of the Proposed Development are vulnerable to pollutions incidents associated with the oil pipeline.	Scope In
Industrial Action	No – No nearby industrial sites at risk of striking action.	No (construction and operation) – Proposed Development will not create conditions to increase this risk.	Scope Out
Public Disorder	Yes – Site is located near a major population centre.	No (construction and operation) – Proposed Development will not create conditions to increase risk of disorder and is 6 km from Milton Keynes Centre where any disorder is likely to focus.	Scope Out
Malicious Attacks / Terrorism	No – The site is not located in a densely populated urban centre, other public or transport hub, nor near Government buildings.	No (construction and operation) – Proposed Development will not create conditions to increase this risk.	Scope Out
Unexploded Ordnance	No – According to Zetica UXO risk maps, the Site has low UXO risk.	No (construction and operation) – Proposed Development will not create conditions to increase this risk.	Scope Out

Assessment of Significant Effects and Mitigation

Embedded Mitigation

18.54 Several mechanisms are in place that reduce the vulnerability of the Proposed Development to MA&D events or mitigate significant effects on the environment and human receptors should they occur. These are outlined in other assessments / documentation relating to the Planning Application or are otherwise requirements pursuant to other statutory regimes. These measures are treated as ‘embedded mitigation’ for the purpose of this assessment.

18.55 Embedded Mitigation comprises two categories, outlined below:

- The Proposed Development: Embedded Mitigation measures are set out where relevant in the MA&D Significance Record. Further information on these mitigation measures can be found in the following documents:
 - Chapter 8: Drainage;

- Chapter 10: Traffic and Transport
 - Chapter 11: Air Quality;
 - Chapter 13: Socioeconomics;
 - Chapter 14: Services and Utilities;
 - Chapter 16: Ground Conditions;
 - Chapter 17: Climate Change;
 - Drainage Strategy;
 - FRA;
 - Health Impact Assessment (HIA);
 - Transport Assessment; and
 - Construction Environmental Management Plan (CEMP).
- Other Sources: Other embedded mitigation measures detailed in the MA&D Significance Record, the assessment of whether the risk of MA&D events occurring is significant to or as a result of the Proposed Development, which rely on legislation and / or strategies of external jurisdiction to the Planning Application, for example:
 - Employees have the obligation to protect construction and maintenance workers through compliance with existing H&S legislation; and
 - Design Codes, Safety Codes and Building Regulations (such as the *Building Regulations 2010*) that the Proposed Development and other facilities (such as the BPA UKOP pipeline and gas mains pipeline) has been designed to and are obliged to comply with.

Additional Mitigation Requirements

- 18.56 Gaps in mitigation (MA&D event risk not mitigation for by embedded mitigation measures) are outlined in the MA&D Significance Record as 'Additional Mitigation' and are proposed to fill any gaps highlighted in the assessment.

Residual Significance

- 18.57 The residual risk significance of potential MA&D events after mitigation is recorded in the MA&D Significance Record for the construction and operation phases outlined in Tables 18.4 and 18.5.

Table 18.4 - MA&D Significance Record – Construction Phase

Risk Event	Hazard Description	Hazard Source and / or Pathways	Reasonable Worst Consequence	Embedded Mitigation	Risk Significance	Additional Mitigation	Residual Risk Significance
Flooding	Flooding of elements of the site resulting in damage and / or disruption to construction activities and / or injury / death to construction workers.	Precipitation and nearby surface water course (unidentified stream). Areas of the site are within Flood Zone 3 and Flood Zone 2.	Could cause loss of life or permanent injury, local area evacuation, significant damage to equipment.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); Mitigation Measures (Chapter 8: Drainage); Milton Keynes Emergency Response Planning (Ref 18.4) and/or Aylesbury Vale District Council emergency plan (Ref 18.5) Emergency Response plans are responsible for coordinating local authority level responses and plans to major events. The construction site and activities will be in contact with the local authorities and adhere to event response strategy; Mitigation Measures (Drainage Strategy and FRA); and Mitigation Measures (CEMP). 	Not Significant – mitigation would prevent severe consequences including loss to life, injury and evacuation. Event likely to be short term, reversible and limited to damage to construction equipment or temporary works.	No mitigation required	Not Significant
Severe Weather (extreme temperatures and drought)	Damage, disruption, delay and / or injuries to construction activities / workers due to severe weather effects.	The UK climate.	Could result in disruption to construction activities.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); Emergency procedures to address risk (CEMP); and Milton Keynes Emergency Response Planning and/or Aylesbury Vale District Council emergency plan Emergency Response plans are responsible for coordinating local authority level responses and plans to major events. The construction site and activities will be in contact with the local authorities. and adhere to event response strategy. 	Not Significant – mitigation would prevent severe consequences including injury. Event likely to be short term and reversible.	No mitigation required.	Not Significant
Poor Air Quality	Health impact to construction workers and residents as a result of exposure to concentrated areas of poor air quality during construction activities.	Construction plant and activities, nearby road network.	Death as a result of pre-existing health conditions and pressure on local healthcare facilities.	<ul style="list-style-type: none"> Mitigation Measures (Chapter 11: Air Quality); Existing H&S Legislation (18.44);Mitigation Measures (HIA); and Mitigation Measures (CEMP). 	Not Significant – mitigation would prevent adverse consequences and localised health risks associated with activities. Event likely to be short term and reversible.	No mitigation required.	Not Significant
Wildfires	Disruption, damage and injury / death to construction activities and / or workers resulting from fires.	Vegetation vulnerable to ignition.	Could cause loss of life or permanent injury, significant damage to equipment, damage to surrounding property and infrastructure, disruption to essential services.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); and Emergency procedures to address risk (CEMP). 	Not Significant – mitigation would prevent severe consequences of loss of life and damage to site. Event likely to be short term and reversable.	No mitigation required.	Not Significant
Human Diseases	Contraction of a disease (most likely pandemic flu) by construction workers during construction activities.	Respiratory, vector-borne, blood-borne and food-borne transmission by construction workers.	Could result in health impact and / or death to human receptors and facilitate the spread of a pandemic flu strain.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); Mitigation Measures (Chapter 16: Ground Conditions); and Emergency Response Plan and Hygiene Measures (CEMP). 	Not Significant – Secured mitigation measures would prevent the contraction and spreading of diseases.	No mitigation required.	Not Significant
Power Failure	Disruption to construction activities and / or accidents risking injury / death	Human error, severe weather, electricity overload, utilities installations.	Injury and disruption to construction workers / activities.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); and Mitigation Measures (Chapter 14: Services and Utilities). 	Not Significant - mitigation would prevent accidents likely to cause severe consequences of loss of life	No mitigation required.	Not Significant

	resulting from local / regional power failures.				and damage to site. Event likely to be short term and reversible.		
System Failure	Disruption to users of the Proposed Development due to utilities and failures.	Human error, severe weather, mechanical or electronic failure, utilities installations failures.	Injury and disruption to construction workers / activities.	<ul style="list-style-type: none"> Mitigation Measures (Chapter 14: Services and Utilities); and Existing H&S Legislation (18.44). 	Not Significant - mitigation would prevent accidents likely to cause severe consequences of loss of life and damage to site. Event likely to be short term and reversible.	No mitigation required.	Not Significant
Major Traffic Accidents	Collisions between road vehicles or between construction plant / workers and rail vehicles resulting in injury / death to human receptors and / or damage to construction equipment and delays to construction activities / railway operation.	Construction vehicles, vehicles using the adjacent road network and the adjacent rail network.	Loss of life and or permanent injury, significant damage to equipment, damage to surrounding property, agriculture, and infrastructure.	<ul style="list-style-type: none"> Existing H&S Legislation (18.14); Network Rail buffer fencing; East West Rail Design Codes and H&S; Construction Traffic Management measures (CEMP); and Mitigation Measures (Transport Assessment). 	Not Significant - mitigation would prevent severe consequences of loss of life and damage to site.	No mitigation required.	Not Significant
Industrial and Urban Accidents	Accidents resulting in fires and / or explosions (with the associated risk of injury and / or death and damage to surrounding construction activities) and the release of contaminants to the environment.	Construction workers, BPA UKOP pipeline, gas mains pipeline, workers at industrial and commercial facilities, industrial and commercial facilities, construction equipment and plant, adjacent surface water bodies and nearby agricultural land.	Loss of life or permanent injury, significant damage to equipment, permanent damage to the site of the Proposed Development, Damage and fire / explosion risk to the BPA UKOP pipeline, evacuation of staff, damage to surrounding property agriculture and infrastructure and environmental contamination.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); Mitigation Measures (Chapters 8: Drainage); Mitigation Measures (Chapter 14: Services and Utilities); Mitigation Measures (Chapter 16: Ground Conditions); and Additional emergency procedures to address risk (CEMP). 	Not Significant - mitigation would prevent or limit accidents and the severe consequences of loss of life and damage to site.	No mitigation required.	Not Significant
Pollution Accidents	Accidents during construction activities that result in the release of contaminants to the environment.	Construction plant and activities, contact with nearby industrial and commercial facilities, BPA UKOP Pipeline, storage of pollutants, adjacent surface water bodies and nearby agricultural land.	Adverse impacts to human health and environmental contamination.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); Mitigation Measures (Chapter 8: Drainage); Mitigation Measures (Chapter 16: Ground Conditions); Mitigation Measures (Drainage Strategy and FRA); Mitigation Measures (CEMP); and Mitigation Measures (HIA). 	Not Significant - mitigation would prevent or limit accidents and the severe consequences of loss of life and damage to site.	No mitigation required.	Not significant

Table 18.5 - MA&D Significance Record – Operation Phase

Risk Event	Hazard Description	Hazard Source and / or Pathways	Reasonable Worst Consequence	Embedded Mitigation	Risk Significance	Additional Mitigation	Residual Risk Significance
Flooding	Flooding of elements of the Proposed Development resulting in damage and / or disruption to property and infrastructure.	Precipitation and nearby surface water course (unidentified stream). Areas of the site are within Flood Zone 3 and Flood Zone 2.	Loss of life or permanent injury, local area evacuation, significant damage to property.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); Design Codes, Building Codes and Building Regulations (18.44); Milton Keynes Emergency Response Planning and/or Aylesbury Vale District Council emergency plan Emergency Response plans are responsible for coordinating local authority level responses and plans to major events. The operational site and activities will fall under the jurisdiction of these responses; Mitigation Measures (Drainage Strategy and FRA); Mitigation measures (Chapter 17: Climate Change); and Mitigation Measures (Chapter 8: Drainage). 	Not Significant - mitigation would prevent severe consequences including loss to life, injury and evacuation. Event likely to be short term, reversible and subject to a local authority level response.	No mitigation required.	Not significant
Severe Weather (extreme temperatures and drought)	Damage and / or injuries / death to the Proposed Development / users.	The UK climate	Loss of life or permanent injury, damage to property, stress on utilities.	<ul style="list-style-type: none"> Milton Keynes Emergency Response Planning and/or Aylesbury Vale District Council emergency plan Emergency Response plans are responsible for coordinating local authority level responses and plans to major events. The operational site and activities will fall under the jurisdiction of these responses; Design Codes, Building Codes and Building Regulations (18.44); and Mitigation measures (Chapter 17: Climate Change). 	Not Significant – mitigation would prevent severe consequences including injury. Event likely to be short term and reversible.	No mitigation required.	Not significant
Poor Air Quality	Adverse health impacts to users and residents of the Proposed Development as a result of exposure to concentrated areas of poor air quality.	Road and rail vehicles.	Death as a result of pre-existing health conditions and place pressure on local healthcare facilities.	<ul style="list-style-type: none"> Air Quality Design Considerations (HIA). 	Not Significant – Events are likely to be short term, reversible and of a negligible magnitude.	No mitigation required.	Not Significant
Human Diseases	Contraction of a disease (most likely pandemic flu) by users of the Proposed Development.	Respiratory, vector-borne, blood-borne and food-borne transmission by users of the Proposed Development.	Could result in health impact and / or death to human receptors and the facilitate the spread of a pandemic flu strain.	<ul style="list-style-type: none"> Milton Keynes Emergency Response Planning and/or Aylesbury Vale District Council emergency plan Emergency Response plans are responsible for coordinating local authority level responses and plans to major events. The operational site and activities will fall under the jurisdiction of these responses; Design Codes, Building Codes and Building Regulations (18.44); Mitigation Measures (HRA); and Healthcare Provision (Chapter 13: Socioeconomics). 	Not Significant – Secured mitigation measures would prevent the contraction and spreading of diseases and be managed by a local authority level response.	No mitigation required.	Not Significant
Urban Fires	Disruption, damage and injury / death to users of the Proposed Development and Milton Keynes resulting from fires.	Ignition sources, BPA UKOP pipeline and combustible materials.	Could cause loss of life or permanent injury, significant damage to equipment, damage to surrounding property and	<ul style="list-style-type: none"> Design mitigation (Chapter 14: Services and Utilities); Existing H&S Legislation (18.44); and Design Codes, Building Codes and Building Regulations (18.44). 	Not Significant – mitigation would prevent severe consequences of loss of life and damage to site. Event likely to be short term and reversable.	No mitigation required.	Not Significant

			infrastructure, disruption to essential services.				
Power Failure	Disruption to users of the Proposed Development.	Human error, severe weather, electricity overload, utilities installations.	Injury and disruption to users of the Proposed Development.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); and Design Codes, Building Codes and Building Regulations (18.44). 	Not Significant - mitigation would prevent accidents likely to cause severe consequences of loss of life and damage to site. Event likely to be short term and reversible.	No mitigation required.	Not Significant
System Failure	Disruption to users of the Proposed Development due to utilities and failures.	Human error, severe weather, mechanical or electronic failure, utilities installations failures.	Injury and disruption of users of the Proposed Development.	<ul style="list-style-type: none"> Design Mitigation (Chapter 14: Services and Utilities); Existing H&S Legislation (18.44); and Design Codes, Building Codes and Building Regulations (18.44). 	Not Significant - mitigation would prevent accidents likely to cause severe consequences of loss of life and damage to site. Event likely to be short term and reversible.	No mitigation required.	Not Significant
Major Traffic Accidents	Collisions of vehicles with other road vehicles or rail vehicles and / or users of the Proposed Development.	Vehicles using the Proposed Development and / or adjacent to the Proposed Development	Loss of life and or permanent injury, damage to surrounding property, agriculture, and infrastructure.	<ul style="list-style-type: none"> Mitigation Measures (Chapter 10: Traffic and Transport); Network Rail buffer fencing; East West Rail Design Codes and H&S; and Design mitigation (Transport Assessment). 	Not Significant - mitigation would prevent severe consequences of loss of life and damage to site.	No mitigation required.	Not significant
Industrial and Urban Accidents	Accidents associated with the operation of the BPA UKOP pipeline causing adverse human health effects and disruption to the Proposed Development.	BPA UKOP pipeline, gas mains pipeline, users of the Proposed Development, nearby surface water bodies and agricultural land.	Loss of life or permanent injury, Damage and fire / explosion risk to the BPA UKOP pipeline / gas mains pipeline, evacuation of staff, damage to surrounding property agriculture and infrastructure and environmental contamination.	<ul style="list-style-type: none"> Design Mitigation (Chapter 14: Services and Utilities) Existing H&S Legislation (18.44); Design Codes, Building Codes and Building Regulations (18.44); Mitigation Measures (Chapter 8: Drainage); Mitigation Measures (FRA and Drainage Strategy); Operational facilities emergency response plans; and Mitigation Measures (Chapter 16: Ground Conditions). 	Not Significant - mitigation would prevent or limit accidents and the severe consequences of loss of life and damage to site.	No mitigation required.	Not Significant
Pollution Accidents	Accidents associated with the operation of the BPA UKOP pipeline causing adverse human health effects and disruption to the Proposed Development.	BPA UKOP pipeline, users of the Proposed Development, nearby surface water bodies and agricultural land.	Adverse impacts to human health and environmental contamination.	<ul style="list-style-type: none"> Existing H&S Legislation (18.44); Design Codes, Building Codes and Building Regulations (18.44); Mitigation Measures (Chapter 8: Drainage); Mitigation Measures (Chapter 14: Services and Utilities); Mitigation Measures (Drainage Strategy and FRA); Operational facilities emergency response plans; and Mitigation Measures (Chapter 16: Ground Conditions). 	Not Significant - mitigation would prevent or limit accidents and the severe consequences of loss of life and damage to site.	No mitigation required.	Not Significant

Summary

- 18.58 Given the controls, mitigation and processes that are in place it is considered that the risks of any MA&D event occurring will be managed to be as low as reasonably practicable. As a result, all risks of MA&D events occurring on the Proposed Development or as a result of the Proposed Development are **Not Significant** in both the construction and operation phases.
- 18.59 The main external influencing factors in relation to MA&D for the Proposed Development are the BPA UKOP oil pipeline, the existing gas mains pipeline and the proposed East West Rail route. Consequently, the key embedded mitigation measures for both the construction and operation phases are those that mitigate the risks associated with these external factors, pollution accidents and industrial / urban accidents. The mitigation measures are those outlined in the CEMP, existing H&S legislation, design codes, building codes and building regulation and mitigation measures outlined in Chapters 8, 14 and 16.
- 18.60 For the purposes of this assessment, no additional mitigation measures are required.

References

- Ref 18.1. Cabinet Office (2017) National Risk Register of Civil Emergencies – 2017 Edition [Accessed on 19/03/2020, available at: <https://www.gov.uk/government/publications/national-risk-register-of-civil-emergencies-2017-edition>]
- Ref 18.22. The European Union (2014). Directive 2012/18/EU: On the control of major-accident hazards involving dangerous substances [Accessed on 19/03/2020, available at: <https://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex%3A32012L0018>]
- Ref 18.3. Department for Environment, Food and Rural Affairs (2011) Guidelines for Environmental Risk Assessment and Management [Accessed on 19/03/2020], available at: <https://www.gov.uk/government/publications/guidelines-for-environmental-risk-assessment-and-management-green-leaves-iii>]
- Ref 18.4. Milton Keynes Council (2020) Emergency Planning Portal [Accessed on 17/04/2020, available at: <https://www.milton-keynes.gov.uk/environmental-health-and-trading-standards/emergency-planning>]
- Ref 18.5. Aylesbury Vale District Council (2018) Aylesbury Vale District Council Emergency Plan 2018 Version [Accessed on 17/04/2020, available at: https://www.aylesburyvaledc.gov.uk/sites/default/files/page_downloads/Emergency%20Plan%20V4%20Dec%2018%20Public%20Version.pdf]

19. SIGNIFICANT, CUMULATIVE AND INTERACTIVE EFFECTS

Introduction

19.1 The likely significant interactive and cumulative effects of the Proposed Development following implementation of the proposed mitigation measures have been assessed in Chapters 5 to 18. This Chapter provides a summary of the main effects, including those effects which are significant.

Statement of Significance

19.2 Table 19.1 summarises the likely significant effects of the Proposed Development.

Table 19.1: Likely Significant Effects

Topic	Stage of Development	Receptor	Duration of Effect	Mitigation Measure	Significance of Effect
Archaeology	Construction & Operation	Area 3 late prehistoric/Roman settlement	Permanent	Area retained within open space. Watching brief undertaken during construction phase to record any peripheral archaeological features.	Negligible Not significant
		Area 4 late prehistoric/Roman settlement	Permanent	Area retained within open space. Watching brief undertaken during construction phase to record any peripheral archaeological features.	Negligible Not significant
		Hedgerows and parliamentary enclosure field system	Permanent	All hedgerows to be retained.	Negligible Not significant
		Weasel Lane	Permanent	Weasel Lane to be retained except where internal roads cross the lane.	Minor Not Significant
		Newton Longville Conservation Area	Permanent	Addressed in design and layout, and by providing strategic landscaping.	None Not significant
		Listed Buildings at Westbrook End, Newton Longville	Permanent	Addressed in design and layout, and by providing strategic landscaping.	None Not significant

		Lower Salden Farmhouse	Permanent	No mitigation required.	None Not significant
Agriculture	Construction	Loss of approximately 16 Ha of best and most versatile agricultural land	Permanent	It is not possible to mitigate the loss of agricultural land.	Moderate Adverse Significant
		Unit A (substantial mixed arable and livestock enterprise)	Permanent	Loss of farmed area, but remaining farm enterprise unaffected and would be viable and sustainable. No mitigation required.	Minor Adverse Not significant
		Unit B (smallholding operated on a part-time basis)	Permanent	Loss of farmed area of a part time business. No mitigation required.	Negligible Not significant
		Unit C (full-time arable farm business)	Permanent	Small loss of farmed area, but remaining farm business unaffected and would be viable and sustainable. No mitigation required.	Minor Adverse Not significant
	Operation	Trespass onto neighbouring agricultural land	Permanent	Strong physical boundaries and open space provided to prevent trespass.	Negligible Not significant
		Loss of approximately 16 Ha of best and most versatile agricultural land	Permanent	It is not possible to mitigate the loss of agricultural land.	Moderate Adverse Not significant
Ecology	Construction & Operation	SSSIs	Permanent	No mitigation required.	None Not significant
		Blue Lagoon LNR	Permanent	No mitigation required.	None Not significant
		Railway sidings east of Salden Wood LWS	Permanent	No mitigation required.	None Not significant
		Other LWSs	Permanent	No mitigation required.	None Not significant
		Milton Keynes Wildlife Corridors	Permanent	No mitigation required.	None Not significant

		Hedgerows with Mature trees	Permanent	Retained hedgerow habitat protected. New hedgerow planted. Hedgerow management and enhancement implemented.	Moderate Adverse at construction phase without mitigation. Not Significant at end of operational phase with mitigation. Not significant
		Woodland	Permanent	Retained woodland habitat protected. Woodland management and enhancement implemented. New woodland planted.	Moderate Adverse at construction phase without mitigation. Not Significant at end of operational phase with mitigation. Not significant
		Bats	Permanent	Trees subject to felling or significant work surveyed prior to construction. New habitat created. Bat hop-overs provided. Integrated bat boxes provided. Sensitive lighting scheme implemented.	Moderate Adverse at construction phase without mitigation and provided no legal infringement. Not significant at operational phase with mitigation and provided no legal infringement. Not significant
		Badger	Permanent	Existing badger setts retained. Badger survey undertaken prior to construction. Precautionary working methods implemented. Sensitive lighting scheme implemented.	Not Significant at construction phase without mitigation and provided no legal infringement. Not Significant at operational phase with mitigation and provided no legal infringement. Not significant
		Birds	Permanent	Nesting bird avoidance measures implemented. New habitat created. Integrated bird boxes provided.	Moderate Adverse at construction phase without mitigation and provided no legal infringement. Not significant at operational phase with mitigation and provided no legal infringement. Not significant
		Reptiles	Permanent	Precautionary clearance methods implemented. New habitat created.	Not Significant at construction phase without mitigation and provided no legal infringement. Not Significant at operational phase with mitigation

					and provided no legal infringement. Not significant
		Amphibians	Permanent	Existing ponds retained. New habitats created including wildlife ponds and micro-pools within sustainable drainage system.	Not Significant at construction phase without mitigation and provided no legal infringement. Not Significant at operational phase with mitigation. Not significant
Drainage	Construction	Flood Risk	Temporary	CEMP implemented. Sustainable drainage features completed prior to each phase of development.	Negligible Not significant
		Surface Water Drainage	Temporary	Temporary surface water drainage facilities provided to control discharge of surface water run-off.	Negligible Not significant
		Geomorphology	Temporary	Temporary surface water drainage facilities provided to prevent effects on river channel geomorphology, Measures to restrict movement of materials included in CEMP.	Negligible Not significant
		Water Quality	Temporary	CIRIA and EA guidance on water pollution included in CEMP to protect water quality.	Minor Not significant
		Water Resource	Temporary	Materials with a low water demand used. Low water use fittings provided in construction compounds.	Negligible Not significant
		Groundwater	Temporary	Rapid surface water runoff collection measures and treatment of groundwater prior to discharge included in CEMP to limit interaction	Negligible Not significant

				between surface and groundwater.	
	Operation	Flood Risk	Permanent	Future exceedance flows managed through outline design and layout framework.	Negligible Not significant
		Surface Water Drainage	Permanent	Surface water run-off measures incorporated with swales and attenuation ponds to provide storage and the use of flow control devices to manage discharge rates.	Negligible Not significant
		Geomorphology	Permanent	Impacts on river channel geomorphology avoided by design and layout. No mitigation required	Negligible Not significant
		Water Quality	Permanent	Surface water strategy implemented with swales and attenuation ponds and the use of permeable paving.	Minor Not significant
		Water Resource	Permanent	Surface water drainage strategy implemented. Water recycled and reused. e.g. rainwater harvesting. Measures to reduce consumption and discharge of water implemented including use of low water and water efficient units and fixtures.	Negligible Not significant
		Groundwater	Permanent	Measures to limit the interaction between the surface and groundwater included in design.	Negligible Not significant
Landscape	Construction & Operation	Hedgerows	Permanent	Retained hedgerows protected and managed. New hedgerow planted.	Moderate/Slight Adverse during construction. Slight Beneficial at end of operational phase. Not significant

		Trees	Permanent	Retained trees protected and managed. New trees planted.	Slight Adverse during construction. Slight Beneficial at end of operational phase. Not significant
		Arable Farmland	Permanent	New areas of public open space created including new meadow grassland and amenity grassland.	Substantial/ Moderate Adverse during construction. Moderate adverse at end of operational phase. Significant at construction and operational phases.
		Public Rights of Way ('PROW')	Temporary during construction phase. Permanent during operational phase.	PROW temporarily diverted during construction. Existing PROW incorporated into layout, and additional recreational footpaths created.	Substantial/ Moderate Adverse during construction. Slight Adverse at end of operational phase. Not significant
		Landform	Permanent	Overall landform retained. No built development located in most elevated parts of site.	Slight Adverse during construction. Negligible at end of operational phase. Not significant
		Watercourses	Permanent	Existing watercourses retained or realigned. Watercourses integrated with drainage system and incorporated into layout and new areas of open space.	Moderate Adverse during construction. Slight Adverse at end of operational phase. Significant at construction phase. Not significant at operational phase.
		The Site and immediately surrounding area	Permanent	New areas of public open space created including new meadow grassland and amenity grassland. Green infrastructure provided to supplement existing landscape features.	Substantial Adverse during construction. Moderate Adverse at end of operational phase. Significant at construction and operational phases.
		LCA 4.9 Newton Longville – Stoke Hammond Claylands	Permanent	Existing key landscape features retained. New landscaping provided.	Moderate/Slight Adverse during construction. Slight Adverse at end of operational phase.

					Not significant
		LCA 4.7 Whaddon Chase	Permanent	Woodland blocks planted on northern and western boundaries.	Slight Adverse during construction. Negligible Adverse at end of operational phase. Not significant
		LCA 4.8 Horwood Claylands	Permanent	Woodland blocks planted on western boundaries.	Slight Adverse during construction. Slight Adverse/Negligible at end of operational phase. Not significant
		LCA 4.11 Mursley – Soulbury Claylands	Permanent	Limited intervisibility with Site. No mitigation required.	Slight Adverse during construction. Negligible Adverse/Neutral at end of operational phase. Not significant
		Users of A421 and B4034 (Photographs 07 and 11)	Permanent	Dense vegetation on northern boundary retained. New trees planted on northern boundary and built development set back from site boundary.	Moderate Adverse during construction. Moderate/Slight Adverse at end of operational phase. Significant at construction phase. Not significant at operational phase.
		Users of Whaddon Road, west of Site (Photographs 08, 09 and 15)	Permanent	Extensive woodland belts and linear parks provided on western boundary, and built development set back from site boundary.	Moderate Adverse during construction. Slight Adverse at end of operational phase. Significant at construction phase. Not significant at operational phase.
		Users of Bletchley Road, north of Newton Longville (Photograph 21)	Permanent	New planting on southern and western boundaries.	Moderate/Slight Adverse during construction. Slight Adverse at end of operational phase. Not significant
		Users of Midshire & Swan's Way, west of Site (Photographs 35 - 37)	Permanent	Woodland and tree planting provided on western boundary.	Slight Adverse during construction. Slight/Negligible Adverse at end of operational phase. Not significant

		Users of footpath NLO/16/1, west of Newton Longville (Photograph 23)	Permanent	Woodland and tree planting provided on southern boundary and within Site.	Moderate/Slight Adverse during construction. Slight Adverse at end of operational phase. Not significant
		Users of footpath NLO/18/1, south east of the Site (Photograph 18)		Tree planting provided in open space areas and within Site	Moderate Adverse during construction. Slight Adverse at end of operational phase. Significant at construction phase. Not significant at operational phase.
		Users of footpaths near Salden House Farm (Photograph 31 and 32)	Permanent	Woodland and tree planting provided on western boundary and within site.	Slight/Negligible Adverse during construction. Negligible at end of operational phase. Not significant
		Users of bridleway WHA/15/1, near Chase Farm (Photograph 34)	Permanent	Most of vegetation Woodland blocks and tree planting within linear parks provided on western boundary.	Slight/Negligible Adverse during construction. Negligible at end of operational phase. Not significant
		Users of bridleway MUR/16/1 and MUR/16/2 from Newton Longville to Cowpasture Farm (Photographs 24, 25 and 33)	Permanent	Majority of existing vegetation on southern and western boundaries retained. Woodland and tree planting provided on boundaries and within site.	Moderate/Slight Adverse during construction. Slight Adverse at end of operational phase. Not significant
		Users of Hammond Park Recreational Ground, Newton Longville (Photograph 17)	Permanent	Majority of existing vegetation on southern boundary retained. Woodland and tree planting provided in open space and within site.	Moderate/Slight Adverse during construction. Slight Adverse at end of operational phase. Not significant
		Users of Milton Keynes Boundary Walk within the southern part of the Site (Photographs 06 and 16)	Permanent	The route of the footpath retained. Existing hedgerows and vegetation retained. Green infrastructure corridors provided.	Substantial Adverse during construction. Moderate Adverse at end of operational phase.

					Significant at construction and operational phase.
		Users of Milton Keynes Boundary Walk and footpaths in Tattenhoe Park (Photograph 12)	Permanent	Majority of existing vegetation on northern boundary retained. Additional planting provided within site.	Slight Adverse during construction. Slight Adverse at end of operational phase. Not significant
		Users of Weasel Lane, crossing the Site, forming part of the Milton Keynes Boundary Walk (Photographs 03 - 06 and 41)	Permanent	Right of way temporarily diverted during construction phase. Existing hedgerows mostly retained. Right of way incorporated into area of open space. Additional hedgerow, woodland and tree planting provided.	Substantial Adverse during construction. Moderate Adverse at end of operational phase. Significant at construction and operational phase.
		Users of Weasel Lane, west of Site (Photograph 14)	Permanent	Existing vegetation retained on southern boundary. Woodland, trees, hedgerows and open space provided within site.	Moderate Adverse during construction. Moderate/Slight Adverse at end of operational phase. Significant at construction phase. Not significant at operational phase.
		Users of Whaddon Road within Newton Longville Conservation Area (Photograph 22)	Permanent	Existing vegetation retained on southern boundary. Woodland, trees and hedgerows provided in open space and within site.	Moderate/Slight Adverse during construction. Slight Adverse at end of operational phase. Not significant
		Users to Bletchley Road, North End (Photograph 28)	Permanent	Views of site unlikely because of distance, landform and existing vegetation. No mitigation required.	Negligible during construction. Negligible/Neutral at end of operational phase. Not significant
		Users of Lower Way, Great Brickhill, in Great Brickhill South Conservation Area (Photograph 26)	Permanent	Views of site unlikely because of distance, landform and existing vegetation. No mitigation required.	Negligible during construction. Negligible/Neutral at end of operational phase. Not significant

		Users of bridleway 15, Little Brickhill (Photograph 27)	Permanent	Woodland, trees and hedgerows provided within site.	Slight/Negligible Adverse during construction. Negligible/Neutral at end of operational phase. Not significant
		Residential properties at Chase Farm, west of Site (Photograph 34, Photograph 29 taken from access road to farm)	Permanent	Woodland, trees and hedgerows provided on western boundary.	Slight/Negligible Adverse during construction. Negligible/Neutral at end of operational phase. Not significant
		Residential properties on northern edge of Newton Longville (Photographs 19 and 20 and reverse view Photograph 05)	Permanent	Existing vegetation on southern boundary retained. Woodland belt, tree and hedgerow planting provided as part of a new landscape framework at site.	Substantial/ Moderate Adverse during construction. Moderate Adverse at end of operational phase. Significant at construction and operational phase.
		Residential properties on edge of Bletchley, including 'New Leys Farmhouse', indented into northern Site boundary	Permanent	Existing hedgerows on eastern boundary retained. New hedgerow provided adjacent to residential area.	Substantial/ Moderate Adverse during construction. Moderate Adverse at end of operational phase. Significant at construction and operational phase.
		Residential properties within Tattenhoe Park (Photograph 13 and reverse view Photograph 04)	Permanent	Woodland, trees and hedgerows provided within site.	Slight Adverse during construction. Slight/Negligible Adverse at end of operational phase. Not significant
		Residential properties at Bletchley Leys Farm adjacent to western Site boundary and 'The Leys Farmhouse', indented into western Site boundary (Photographs 02, 08 and 09)	Permanent	Existing vegetation at western boundary retained. Open space provided adjacent to residential properties. Built development set back from site boundary.	Substantial/ Moderate Adverse during construction. Moderate Adverse at end of operational phase. Significant at construction and operational phase.
		Residential properties adjacent to the eastern Site boundary within Bletchley (Photograph 30 and 38, reciprocal views	Permanent	Existing vegetation at eastern boundary retained. Open space with tree planting provided adjacent	Substantial Adverse during construction. Moderate Adverse at end of operational phase.

		shown in Photographs 06, 39 and 40)		to residential properties. Built development set back from site boundary.	Significant at construction and operational phase.
Traffic & Transport	Construction	Impact of construction traffic on Buckingham Road, Whaddon Road and A421	Temporary	Construction Traffic Management Plan implemented.	Negligible Not significant
	Operation	Traffic levels on Whaddon Road (between Bottle Dump Roundabout and Site access)	Permanent	Travel Demand Management Strategy implemented. Framework Travel Plan implemented for all uses. Local highway improvements implemented including new access junction and shared footway/cycleway on Whaddon Road at Site access.	Not significant
		Traffic levels on A421 (between Whaddon Crossroads and Bottle Dump Roundabouts)	Permanent	Travel Demand Management Strategy implemented. Framework Travel Plan implemented for all uses. Local highway improvements implemented at Bottle Dump Roundabout and Whaddon Crossroads.	Not significant
		Traffic levels on Whaddon Road	Permanent	Travel Demand Management Strategy implemented. Framework Travel Plan implemented for all uses. Local highway improvements implemented including new access junction and shared footway/cycleway at Whaddon Road.	Not significant
		Traffic levels on A421 Standing Way (between Bottle Dump and Tattenhoe Roundabouts)	Permanent	Travel Demand Management Strategy implemented. Framework Travel Plan implemented for all uses. Local	Not significant

				highway improvements implemented including new access junction off A421 Standing Way and capacity improvements at Tattenhoe Roundabout.	
		Traffic levels on Buckingham Road	Permanent	Travel Demand Management Strategy implemented. Framework Travel Plan implemented for all uses. Local highway improvements implemented including new access roundabout on Buckingham Road with associated footway/cycleway and crossing link.	Not significant
		Users of Whaddon Road through Newton Longville	Permanent	Traffic calming measures implemented in Newton Longville.	Not significant
		Users of the following: B4034 Buckingham Road /Sherwood Drive/ Water Eaton Road; A421 Tattenhoe Roundabout; A421 Emerson Roundabout; A421 Bleak Hall Roundabout; A421 Elfield Park Roundabout; and, A421 Windmill Hill Roundabout.	Permanent	Junction capacity improvements implemented by BC and MKC on behalf of Applicant and secured in S106 Agreement	Not significant
Air Quality	Construction	Impacts from dust and particulates on existing and future residents during construction	Temporary	Construction Environmental Management Plan and Dust Management Plan implemented.	Insignificant Not significant
	Operation	Impacts from traffic emissions on existing and future residents	Permanent	Pollutant concentrations for all receptors will remain below objectives for NO ₂ , PM ₁₀ and PM _{2.5} . No mitigation required.	Negligible Not significant
Noise & Vibration	Construction	Construction noise	Temporary	Construction Environmental Management Plan implemented.	Negligible/ Moderate Negative

				Good working practices, maintenance of equipment and public relations implemented.	Not significant
		Construction vibration	Temporary	Construction Environmental Management Plan implemented.	Negligible Not significant
	Operation	Internal noise	Permanent	Addressed at detailed design stage with dwellings separated from noise sources, and boundary screening, internal layouts and sound insulation measures implemented.	Negligible Not significant
		External noise		Addressed at detailed design stage with boundary acoustic treatment provided, and gardens and external amenity areas screened from noise sources by buildings.	Negligible Not significant
		Development related traffic noise	Permanent	Low-noise road surfacing used for new roads.	Negligible/ Minor Negative Not significant
		Commercial and industrial noise	Permanent	Addressed at detailed design stage, with buildings designed to include appropriate noise mitigation measures and external activities controlled to minimise operational noise.	Negligible Not significant
Socio-Economic	Construction	Construction employment	Temporary	Construction jobs provided for approximately 10 years.	Moderate Beneficial
		Existing economic activity on site	Permanent	Loss of farmed area affecting existing farm	Minor Adverse Not significant

				businesses. No mitigation required.	
	Operation	Operational employment	Permanent	Land for employment uses provided, which would be attractive to small businesses. Jobs provided at neighbourhood centre and schools.	Minor Beneficial
		Social infrastructure – education, healthcare and community facilities	Permanent	Primary school, secondary school and neighbourhood centre provided. Planning obligations for social infrastructure provided in S106 Agreement.	Minor beneficial
		Open space and green infrastructure	Permanent	Formal and informal open space, play areas, and sport and recreation facilities provided. Planning obligations for open space and recreation facilities provided in S106 Agreement.	Minor Beneficial
Services & Utilities	Construction	Loss of supply during works to connect to the supply network	Temporary	Supply shut down localised and planned for quiet periods. Affected users notified. Essential supplies maintained. Good construction practice implemented.	Minor Not significant
	Operation	Capacity of infrastructure network	Temporary	Supply maintained by utility companies.	Negligible Not significant
Waste	Construction	Site clearance and earthworks	Temporary	Site Waste Management Plan prepared to minimise the amount of waste generated and disposed of during site clearance.	Negligible Not significant
		Construction	Temporary	Site Waste Management Plan prepared to	Not significant

				minimise the amount of waste generated. Construction waste reused on-site or reused and recycled off-site.	
	Operation	Household waste	Permanent	Internal and external waste and recycling storage facilities provided. Councils weekly kerbside food waste collection service provided at site. Home composting and community composting facilities provided at site.	Not significant
		Commercial and industrial waste	Permanent	Waste and recycling storage facilities provided.	Negligible Not significant
Ground Conditions	Construction & Operation	Geology and soils	Permanent	No designated geological sites identified, and no mitigation required. It is not possible to mitigate the loss of soil from agricultural land.	None for geology. Major Adverse for soils. Significant
		Human health	Temporary	Materials Management Plan to be implemented at construction phase to ensure materials do not risk human health. Further ground investigation to be undertaken at detailed design stage, and remediation strategy implemented if required.	Negligible Not significant
		Controlled waters	Temporary	Material stockpiles covered/sealed during construction phase to prevent contamination of drainage network. Temporary and permanent surface water drainage strategy	None

				implemented to prevent contamination from surface water run-off.	
Climate Change	Construction	Embodied carbon	Permanent	Manufacturers, suppliers and materials selected to reduce carbon emissions, including the use of local suppliers and the use of reusable and recyclable materials.	Minor Adverse Not significant
	Operation	Building emissions	Permanent	Detailed design based on energy hierarchy including energy efficient buildings and use of renewable energy.	Minor Adverse Not significant
		Transport emissions	Permanent	Sustainable modes of transport encouraged through design and layout, including the delivery of walking, cycling and public transport facilities. Framework Travel Plans implemented for all uses.	Minor Adverse Not significant
		Surface water flooding to public realm and ground floor properties	Permanent	Surface water drainage strategy implemented including swales and attenuation ponds.	Neutral with mitigation measures Not significant
		Building damage due to droughts and ground movement	Permanent	Surface water drainage strategy implemented. Water recycled and reused. Measures to reduce consumption and discharge of water implemented.	Neutral with mitigation measures Not significant
		Damage to buildings or impacts on pedestrian comfort associated with increased extreme weather	Permanent	Green infrastructure included in design and layout, and landscape strategy implemented.	Neutral with mitigation measures Not significant

		Overheating in homes/urban heat island effect in public areas and associated health implications	Permanent	Addressed at detailed design stage, with passive design measures including energy efficient lighting, external shading, and landscape planting.	Neutral with mitigation measures Not significant
		Increased energy needs for cooling for commercial and residential units	Permanent	Addressed at detailed design stage, with active design measures including use of mechanical ventilation and low energy cooling systems.	Neutral with mitigation measures Not significant
		Soft landscaping failure and associated loss of services	Permanent	Addressed at detailed design stage, with appropriate plants and vegetation selected and maintenance strategy implemented to deal with extreme weather.	Neutral with mitigation measures Not significant
		Water shortages for public use and for landscaping	Permanent	Water recycled and reused. Measures to reduce consumption and discharge of water implemented. Surface water drainage strategy implemented.	Neutral with mitigation measures Not significant
Major Accidents & Disasters	Construction	Flooding event on receptors	Temporary	Health and safety legislation implemented. Emergency response planning implemented. CEMP implemented. Drainage mitigation implemented.	Not significant
		Severe weather (extreme temperatures and drought) event on receptors	Temporary	Health and safety legislation implemented. Emergency response planning implemented.	Not significant
		Poor air quality event on receptors	Temporary	Health and safety legislation implemented.	Not significant

				Emergency response planning implemented. CEMP implemented. Air quality mitigation implemented.	
		Wildfires event on receptors	Temporary	Health and safety legislation implemented. CEMP implemented.	Not significant
		Human diseases event on receptors	Temporary	Health and safety legislation implemented. CEMP implemented. Ground conditions mitigation implemented.	Not significant
		Power failure event on receptors	Temporary	Health and safety legislation implemented. Services and utilities mitigation implemented.	Not significant
		System failure event on receptors	Temporary	Health and safety legislation implemented. Services and utilities mitigation implemented.	Not significant
		Major traffic accidents event on receptors	Temporary	Health and safety legislation implemented. Construction Traffic Management Plan implemented.	Not significant
		Industrial and urban accidents event on receptors	Temporary	Health and safety legislation implemented. CEMP implemented. Drainage, ground conditions, and services and utilities mitigation implemented.	Not significant
		Pollution accidents event on receptors	Temporary	Health and safety legislation implemented. CEMP implemented. Drainage and ground conditions mitigation implemented.	Not significant

	Operation	Flooding event on receptors	Temporary	Health and safety legislation implemented. Emergency response planning implemented. Drainage and climate change mitigation implemented.	Not significant
		Severe weather (extreme temperatures and drought) event on receptors	Temporary	Emergency response planning implemented. Climate change mitigation implemented. Addressed at detailed design stage.	Not significant
		Poor air quality event on receptors	Temporary	Air quality mitigation implemented.	Not significant
		Urban fires event on receptors	Temporary	Health and safety legislation implemented. Addressed at detailed design stage.	Not significant
		Human diseases event on receptors	Temporary	Emergency response planning implemented. GP surgery provided.	Not significant
		Power failure event on receptors	Temporary	Health and safety legislation implemented. Addressed at detailed design stage. Services and utilities mitigation implemented.	Not significant
		System failure event on receptors	Temporary	Health and safety legislation implemented. Addressed at detailed design stage. Services and utilities mitigation implemented.	Not significant
		Major traffic accidents event on receptors	Temporary	Health and safety legislation implemented. Transport mitigation implemented.	Not significant

		Industrial and urban accidents event on receptors	Temporary	Health and safety legislation implemented. Emergency response planning implemented. Drainage, services and utilities, and ground conditions mitigation implemented.	Not significant
		Pollution accidents event on receptors	Temporary	Health and safety legislation implemented. Emergency response planning implemented. Drainage, services and utilities, and ground conditions mitigation implemented.	Not significant

19.3 There are three environmental topics where significant effects as a result of the Proposed Development are identified: agriculture, landscape and ground conditions. There are significant effects identified on the following sensitive receptors:

Agriculture

- Loss of approximately 16 Ha of best and most versatile agricultural land

Landscape

- Arable farmland (during construction and operational phases)
- Watercourses (during construction phase)
- The Site and immediately surrounding area (during construction and operational phases)
- Users of A421 and B4034 (during construction phase)
- Users of Whaddon Road, west of Site (during construction phase)
- Users of footpath NLO/18/1, south east of the Site (during construction phase)
- Users of Milton Keynes Boundary Walk within the southern part of the Site (during construction and operational phases)
- Users of Weasel Lane, crossing the Site, forming part of the Milton Keynes Boundary Walk (during construction and operational phases)
- Users of Weasel Lane, west of Site (during construction phase)
- Residential properties on northern edge of Newton Longville (during construction and operational phases)
- Residential properties on edge of Bletchley, including 'New Leys Farmhouse', indented into northern Site boundary (during construction and operational phases)
- Residential properties at Bletchley Leys Farm adjacent to western Site boundary and 'The Leys Farmhouse', indented into western Site boundary (during construction and operational phases)
- Residential properties adjacent to the eastern Site boundary within Bletchley (during construction and operational phases)

Ground Conditions

- Soils

- 19.4 The significant effects on agricultural land and soil cannot be addressed through mitigation measures. A number of the significant effects on landscape would only occur during the construction phase and as such would be temporary, although significant effects on landscape would occur during the construction and operation phases for the nearest residential properties but the significant effects would be reduced once landscape mitigation measures have been implemented.

Cumulative Effects

- 19.5 Cumulative effects are impacts that result from incremental changes caused by other past, present or reasonably foreseeable actions together with the Proposed Development. Table 19.2 identifies the cumulative developments considered, the potential sensitive receptors from cumulative effects and the significance of those cumulative effects.
- 19.6 The traffic modelling has included all known committed developments within and on the edge of Milton Keynes, and as such the cumulative effect of traffic from these developments on air quality and noise matters has already been assessed and mitigation measures identified.
- 16.119
- 19.7 It is anticipated that all known committed developments would meet all regulation and policy requirements e.g. construction activities, drainage, waste and be subject to planning conditions to control these matters.
- 16.120

Table 19.2: Cumulative Effects

Topic	Cumulative Development	Receptors	Significance of Cumulative Effect	Proposed Mitigation Measures
Ecology	East West Rail	Badgers	Not significant provided mitigation measures implemented and no legal infringement. Not significant	Mitigation measures proposed for East West Rail including artificial badger sett created and new habitat created. At Application Site, existing badger setts retained, badger survey undertaken prior to construction, precautionary working methods implemented, and sensitive lighting scheme implemented.
Ecology	Remaining development at Tattenhoe Park	Amphibians and birds	Not significant with mitigation measures implemented. Not significant	Mitigation measures proposed for Tattenhoe Park including ponds and woodland areas. At Application Site, new habitat created and bird boxes provided.
Ecology	Proposed allocation at Shenley Park	Birds	Not significant with mitigation measures implemented. Not significant	It is expected that ecological mitigation measures will be required for development at Shenley Park. At Application Site, new habitat created and bird boxes provided.
Landscape	East West Rail	Users of Whaddon Road, users of Milton Keynes Boundary Walk, users of PROW, residential properties on northern edge of Newton Longville, and residential properties on western edge of Bletchley.	Moderate Adverse effects already identified on these sensitive receptors from Proposed Development.	Existing vegetation on southern boundary retained. Woodland belt, tree and hedgerow planting provided as part of a new landscape framework at site.

			No additional significant cumulative effects identified for these sensitive receptors. Not significant	
Landscape	Remaining development at Tattenhoe Park	Users of A421, users of Shenley Road, residential properties on northern edge of Newton Longville, and residential properties on western edge of Bletchley.	Moderate/Slight Adverse Not significant	Existing trees and hedgerows retained. Additional woodland and trees planted. Green infrastructure and open space provided. Additional landscaping provided along Weasel Lane corridor, and at southern and western boundary.
Landscape	Proposed allocation at Shenley Park	None identified. Proposed Development and Shenley Park allocation are located within separate landscape character areas. Landform and existing vegetation along A421 limit intervisibility between two sites. Proposed Development and Shenley Park allocation will include strategic landscaping at boundaries.	None Not significant	Dense vegetation on northern boundary retained. New trees planted on northern boundary and built development set back from site boundary.
Landscape	Remaining development at Newton Leys	Users of Weasel Lane.	None Not significant	Existing vegetation retained on southern boundary. Woodland, trees, hedgerows and open space provided within site.
Air Quality – Dust	Other committed developments at Tattenhoe Park, Kingsmead South and Shenley Park	Existing residents.	Insignificant Not significant	Construction Environmental Management Plan and Dust Management Plan implemented.
Air Quality – Increased Traffic Emissions	Other committed developments at Tattenhoe Park, Kingsmead South and Shenley Park	Existing residents.	Negligible Not significant	Pollutant concentrations for all receptors will remain below objectives for NO ₂ , PM ₁₀ and PM _{2.5} . No mitigation required.
Waste	Other committed developments within and on the edge of Milton Keynes	Increased waste from site clearance, construction, household waste, and industrial and commercial waste. It is anticipated that all other developments would meet waste regulations and standards and include a Construction Environmental Management Plan and Site Waste Management Plan.	Minor Adverse Not significant	Site Waste Management Plan prepared to minimise the amount of waste generated and disposed of during construction. Waste, recycling, food waste and composting facilities provided.

19.8 The assessment of cumulative effects has identified no additional significant effects on any environmental topic or sensitive receptor. The Proposed Development already includes mitigation measures to address significant effects on sensitive receptors, and those mitigation measures would also address any adverse cumulative effects.

Interactive Effects

- 19.9 Interactive effects arise where the effects of development on one environmental topic bring about changes in another topic. The original version of the ES identified interactive effects related to water. It is noted that all of the previously identified interactive effects related to water were assessed as negligible, and therefore not significant and no additional mitigation measures were required. Chapter 8: Drainage of this updated ES did not identify any interactive effects related to water, on the basis that during the construction phase a Construction Environmental Management Plan would be implemented to prevent water pollution, and during the construction and operational phases drainage facilities would be provided to control the discharge of surface water run-off to limit the interaction between the surface and groundwater. These proposed mitigation measures would prevent pollutants from entering watercourses or the drainage system.

20. CONCLUSIONS

- 20.1 An updated ES has been prepared to address a number of minor amendments that have been made to the Planning Application (AVDC Ref. 15/00314/AOP) and to reflect changes in regulation, policy and guidance that have occurred since the original application was submitted in 2015. This updated ES supersedes the ES prepared in January 2015 and its Addendum in August 2016.
- 20.2 Regulatory changes include the Town and Country Planning (Environmental Impact Assessment) Regulations which were revised in 2017. Schedule 4 of the EIA Regulations 2017 identifies the topics that should be addressed in an ES. There are three environmental topics that were not assessed in the original ES but are included in this updated ES, which are as follows: human health, climate change and disaster management. There have also been changes to relevant adopted and emerging development plan documents and policies since the Planning Application was submitted; Plan:MK was adopted in 2019 and the emerging Vale of Aylesbury Local Plan (VALP) was prepared and submitted for examination in 2017, with consultation on proposed modifications in late 2019. The Application Site is now identified as an allocation in the Submission Vale of Aylesbury Local Plan (SVALP2017) for a mixed use sustainable urban extension – Site Ref. NVL001: Land at South West Milton Keynes.
- 20.3 It should be noted that the Application Site and the Applicant are unchanged. The Proposed Development still provides for a mixed-use sustainable urban extension for up to 1,855 dwellings on 144.85 Ha of land to the south west of Milton Keynes. The description of development has changed to include extra care units within the total quantum of proposed new housing.
- 20.4 Draft conditions for the Proposed Development have been discussed with the former AVDC and are agreed subject to minor amendments. The final conditions will need to relate to the updated Planning Application documents.
- 20.5 The S106 Agreement for the Planning Application has been discussed with the former AVDC, MKC and former Buckinghamshire County Council. The Agreement document is at an advanced stage but has not yet been completed and signed.
- 20.6 This updated ES has reconsidered alternative sites and alternative site layouts as required by the EIA Regulations 2017.
- 20.7 Development Parameters have been established and assessed for the Proposed Development so that appropriate planning conditions can be defined which would provide limits and controls for future reserved matters applications.
- 20.8 All likely significant effects have been identified and the proposed mitigation measures have been assessed in Chapters 5 to 18 to inform conclusions as to the residual effects of the Proposed Development on the environment. Chapter 19 summarises the likely significant effects of the Proposed Development.
- 20.9 There are three environmental topics where significant effects as a result of the Proposed Development are identified, which are: agriculture, landscape and ground conditions. The significant effects on agricultural land and soil cannot be addressed through mitigation measures. A number of the significant effects on landscape would only occur during the construction phase and as such would be temporary, although significant effects on landscape would occur during the construction and operation phases for the nearest residential properties but the significant effects would be reduced once landscape mitigation measures have been implemented.

- 20.10 The assessment of cumulative effects has identified no additional significant effects on any environmental topic or sensitive receptor. The Proposed Development already includes mitigation measures to address significant effects on sensitive receptors, and those mitigation measures would also address any adverse cumulative effects.
- 20.11 No significant interactive effects have been identified in the assessment.
- 20.12 In conclusion, the likely significant environmental effects of the Proposed Development are identified and assessed in this ES, both during the construction phase and once completed. Mitigation measures are proposed to prevent, reduce and offset any significant adverse effects on the environment arising from the Proposed Development. This updated ES has been prepared in accordance with the EIA Regulations 2017, and it provides sufficient information to enable the decision makers to understand and take into account the likely significant environmental effects arising from the Proposed Development.

