

**Plutus Estates (WGC) Limited and Metropolitan
Housing Trust
Former Shredded Wheat Factory, Welwyn Garden City**

Environmental Statement: Volume 1, Main Text



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CONTENTS

PAGE

1	Introduction	1
2	The Site and Surroundings	6
3	Environmental Impact Assessment Methodology	8
4	Alternatives and Design Evolution	12
5	The Proposed Development	14
6	Development Programme and Construction	20
7	Transport and Access	35
8	Air Quality	61
9	Wind Analysis and Pedestrian Comfort	103
10	Noise and Vibration	113
11	Townscape and Visual Amenity	152
12	Ecology and Nature Conservation	234
13	Water Quality, Hydrology and Flood Risk	269
14	Soils, Geology and Contaminated Land	293
15	Cultural Heritage	347
16	Socio-Economics	369
17	Conclusions	389



1 INTRODUCTION

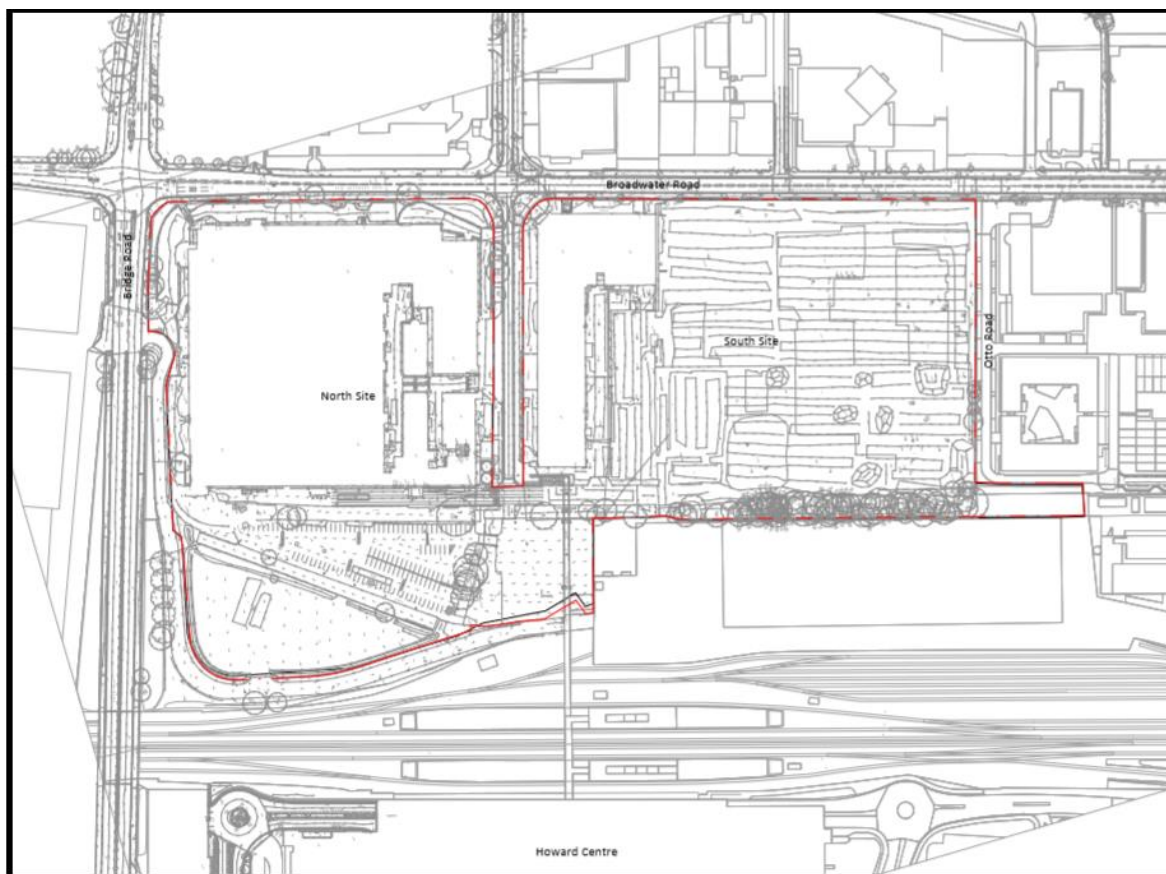
1.1 Plutus Estates (WGC) Limited and Metropolitan Housing Trust (hereafter referred to as 'the Applicant') is seeking to obtain full planning permission for a Proposed Development at the site of the Former Shredded Wheat Factory, Welwyn Garden City, (the 'Site').

1.2 The Proposed Development comprises the following:

'Creation of a mixed-use quarter comprising the erection of up to 1,340 residential dwellings including 414 (31%) affordable dwellings (Use Class C3); 114 extra care homes (Use Class C2); the erection of a civic building comprising 494 m² of health (Use Class D1), 494 m² of community use (Use Class D1), 1,232 m² of office (Use Class B1) and 646 m² of retail (Class A1/A2/A3/A4/A5); alterations, additions and change of use of Grade II Listed Building and retained Silos to provide 5,096 m² of flexible business floorspace (Use Class B1), 265 m² Combined Heat and Power (Sui Generis), 2,494 m² International Art Centre (Use Class D1), 1,226 m² Gymnasium (Use Class D2), 1,576 m² of restaurant / coffee shop / bar (Use Class A1/A3/A4/A5), Creche / Day Nursery of 644 m² as well as a Network Rail TOC Building of 364 m²; plus associated car parking, access, landscaping, public art and other supporting infrastructure.'

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

Figure 1.1: Site Location



LEGISLATIVE FRAMEWORK FOR THE EIA

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

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

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



STRUCTURE OF THE ENVIRONMENTAL STATEMENT

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

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

1.9 The ES provides:

- A description of the Site and its surroundings (Chapter 2);
- An overview of the approach and methodology of the EIA (Chapter 3);
- A description of alternatives and design evolution (Chapter 4);
- A description of the Proposed Development (Chapter 5);
- Identification of the development programme and construction (Chapter 6);
- The results of the analysis of the potentially significant environmental effects of the Proposed Development for the following disciplines: Transport and Access; Air Quality; Wind Analysis and Pedestrian Comfort; Noise and Vibration; Townscape and Visual Amenity; Ecology and Nature Conservation; Water Quality, Hydrology and Flood Risk; Soils, Geology and Contaminated Land; Cultural Heritage and Socio-Economics (Chapters 7-16). Cumulative impacts are assessed within each of the Chapters where relevant; and
- A conclusion based on the findings of the EIA (Chapter 17).

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

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

- A description of the development comprising information on the Site, design and size of the development;
- A description of measures envisaged in order to avoid, reduce and, if possible, remedy significant adverse effects;



-
- The data required to identify and assess the main effects which the development is likely to have on the environment;
 - An outline of the main alternatives studied by the applicant; and
 - A non-technical summary of the above information (**Volume 3**).

NATURE OF THE PLANNING APPLICATION

1.12 The Proposed Development, which has been assessed by the EIA process, is the subject of the full- planning application being made to WHBC.



REFERENCES

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



2 THE SITE AND SURROUNDINGS

2.1 The Site is located to the East of Welwyn Garden City town centre in Hertfordshire and occupies an area of approximately 8.7 ha. The Site, which is centred approximately on National Grid Reference (NGR) TL241 128, is bound by Bridge Road (B195) to the North, Broadwater Road (A1000) to the East, the East Coast Mainline railway to the West, and Salvisberg Court (a new residential development) to the South. Hyde Way bisects the Site in an East-West direction and extends to a footbridge over the railway tracks.

2.2 The planning application boundary is shown in Figure 1.1.

2.3 The Site is redundant and the vast majority has been vacant since 2008. The Site is currently accessed from Bridge Road and Broadwater Road (A1000). The Site currently comprises:

- buildings associated with the former Shredded Wheat cereal production factory (to the North of Hyde Way);
- buildings associated with former Polycell factory and associated industrial uses (to the South of Hyde Way);
- cleared areas (where former buildings have been demolished); and
- the roadway of Hyde Way and its associated pedestrian route.

2.4 The Site is not located within a Conservation Area, however, it is within close proximity to the Welwyn Garden City Conservation Area, separated by the East Coast Mainline railway. The Welwyn Garden City Conservation Area is located approximately 40m West of the Site (at its nearest point).

2.5 The Site is not located within an Area of Archaeological Significance. However, the Site does include the Grade II Listed Nabisco Shredded Wheat Factory and a number of associated factory buildings within its curtilage. The Grade II Listed Office Block of the Roche Products Factory is located immediately adjacent to the Southern boundary of the Site. The Grade I listed Hatfield House and Garden, a Registered Park and Garden is located approximately 4km to the South of the Site.

2.6 The Site is not covered by any statutory or non-statutory designated ecological sites. The Sherradspark Wood Local Nature Reserve is located approximately 875m North-West of the Site (at its nearest point).



2.7 The Site lies within an area defined by the Environment Agency as Flood Zone 1 (<0.1% risk of flooding in any one year).

2.8 The Site is not located within a designated Air Quality Management Area.

2.9 The Site has good access to public transport. Facilities within the vicinity of the Site include the following:

- East Coast Mainline rail services from Welwyn Garden City Station, located to the West, and accessed from the Site via the pedestrian footbridge. Destinations include Stevenage (10 minutes), London Kings Cross (23 minutes), Moorgate (47 minutes), Peterborough (1 hour 4 minutes) and Cambridge (57 minutes); and
- numerous bus services, the nearest bus stop is located on Broadwater Road.

2.10 Surrounding land uses in the immediate vicinity of the Site include industrial and office uses to the East and North. Residential development is located immediately adjacent to the Southern boundary of the Site with a Biopark office and laboratory located to the South-West of the Site.

2.11 The East Coast Mainline railway and railway sidings Pall Mall warehouse and distribution centre are located immediately adjacent to the Western Site boundary, with the Howard Centre mall and Welwyn Garden City town centre beyond.

Topography

2.12 The Site is generally flat with levels across the Site in the range of approximately 85m above ordnance datum (AOD).

Demolition of Existing Buildings

2.13 The demolition of the existing buildings on-site is currently taking place. The application does not include the demolition of existing buildings, however depending on whether the baseline environmental surveys took place prior to or following demolition, the impact of the demolition of the buildings is included in some of the technical chapters of this ES.



3 ENVIRONMENTAL IMPACT ASSESSMENT METHODOLOGY

3.1 The main objectives of the ES comprise:

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

CONSULTATION

3.2 Consultation is an essential part of the EIA process and has been used to:

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

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

3.4 As part of the planning promotion process, Quinn Estates Ltd has also undertaken public consultation with the local communities. Before and during the Outline Application for the development, detailed consultation was undertaken with local residents, key stakeholders Welwyn Hatfield Borough Council (WHBC) and Hertfordshire County Council (HCC). The



Applicant has sought to engage with key stakeholders throughout the pre-application and consultation phase.

3.5 Pre-application consultation with the local community has included a number of public consultation events and public exhibition events.

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

SCOPE OF THE EIA

3.7 The key issues to be addressed have been identified as those upon which the development may have potentially significant effects. These cover the following subjects:

- Transport and Access;
- Air Quality;
- Wind Analysis and Pedestrian Comfort;
- Noise and Vibration;
- Townscape and Visual Amenity;
- Ecology and Nature Conservation;
- Water Quality, Hydrology & Flood Risk;
- Soils, Geology, Contaminated Land;
- Cultural Heritage; and
- Socio-Economics.

ASSESSMENT CRITERIA

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

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

- international, national and local standards;
- relationship with planning policy;



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

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

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

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

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

3.13 A summary impact table that describes the potential impacts, mitigation measures and any residual effects for each of the environmental issues considered is provided at the end of each Chapter, where relevant.

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



CUMULATIVE EFFECTS

3.15 Cumulative impacts from proposed or committed developments in the vicinity of the Proposed Development have been considered within each of the following technical Chapters. The proposed or committed schemes considered are identified in Table 3.1.

Table 3.1: Proposed or Committed Developments

Site Name	Distance from the Site (km)	Location	Description
Rank Xerox Ltd, Bessemer Road, Welwyn Garden City, AL7 1HE	375m north of Site	524335, 231475	Various applications of office to residential use. Details available on Welwyn Hatfield Borough Council online planning portal.
Pall Mall Distribution Site	Adjacent to Site (west)		Part of the Broadwater Road West allocation site. Mixed use provision.
Mercury House, 1 Broadwater Road, Welwyn Garden City, AL7 3BQ	Adjacent to Site (east)	524330, 212980	Change of use from B1 office to C3 residential, construction of roof and side extensions, creation of 43 residential apartments and cycle storage compound. Permission Granted. Details available on Welwyn Hatfield Borough Council online planning portal 6/2016/2624/FULL
Former Argos Direct Distribution Depot, 1 Bessemer Road, Welwyn Garden City, AL7 1HF	Adjacent to Site (north)	524260, 213120	Erection of 2 industrial / distribution buildings comprising of commercial uses. Permission Granted. Details available on Welwyn Hatfield Borough Council online planning portal 6/2015/1957/MAJ
Land East of Bessemer Road	Adjacent to Site (northeast)	524450, 213050 (approx.)	Regeneration of the Site to provide a new retail Aldi foodstore with associated parking, servicing and landscaping. Permission Granted. Details available on Welwyn Hatfield Borough Council online planning portal 6/2016/1058/FULL.



4 ALTERNATIVES AND DESIGN EVOLUTION

INTRODUCTION

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

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

4.2 The following sections describe the main alternatives considered by the Applicant in addition to the Proposed Development. Consideration has also been given to and commentary is provided on any alternatives or options considered by the Applicant as follows::

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

‘NO DEVELOPMENT’ ALTERNATIVE

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

4.4 As the Proposed Development can contribute up to 1340 dwellings to future housing supply and the Site is under the Applicant’s control, the ‘No Development’ scenario has been dismissed.

ALTERNATIVE SITES

4.5 The Applicant has control of the Site and it is available for development. The Proposed Development is specific to the Site and as the Applicant has control of the land, other sites in the immediate vicinity have not been considered.



ALTERNATIVE DESIGNS AND LAYOUTS

4.6 The current Proposed Development has evolved over a number of design iterations, responding to local authority planning and development aspirations, public engagement and taking account of the Applicant's development objectives, design aspirations and prevailing environmental constraints. The evolution of the Development has therefore responded to a variety of design and environmental issues and the resultant proposals are considered to offer the most advantageous design solution.

4.7 The Site currently has a consent for the development of an alternative scheme, however the consented scheme is not considered to be developable in the current market and it delivers an insufficient amount of affordable development.

4.8 Further details of the design evolution are contained in the Design and Access Statement which supports this Application.

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

5 THE PROPOSED DEVELOPMENT

5.1 The Proposed Development comprises a site with an area of approximately 8.7 hectares (ha) and comprises two parcels of land to the north and south of Hydeway.

5.2 The planning application is made in full.

5.3 The Proposed Development comprises the following:

‘Creation of a mixed-use quarter comprising the erection of up to 1,340 residential dwellings including 414 (31%) affordable dwellings (Use Class C3); 114 extra care homes (Use Class C2); the erection of a civic building comprising 494 m² of health (Use Class D1), 494 m² of community use (Use Class D1), 1,232 m² of office (Use Class B1) and 646 m² of retail (Class A1/A2/A3/A4/A5); alterations, additions and change of use of Grade II Listed Building and retained Silos to provide 5,096 m² of flexible business floorspace (Use Class B1), 265 m² Combined Heat and Power (Sui Generis), 2,494 m² International Art Centre (Use Class D1), 1,226 m² Gymnasium (Use Class D2), 1,576 m² of restaurant / coffee shop / bar (Use Class A1/A3/A4/A5), Creche / Day Nursery of 644 m² as well as a Network Rail TOC Building of 364 m²; plus associated car parking, access, landscaping, public art and other supporting infrastructure.

5.4 The proposed site layout is presented in Figure 5.1.

Figure 5.1: Proposed Site Layout

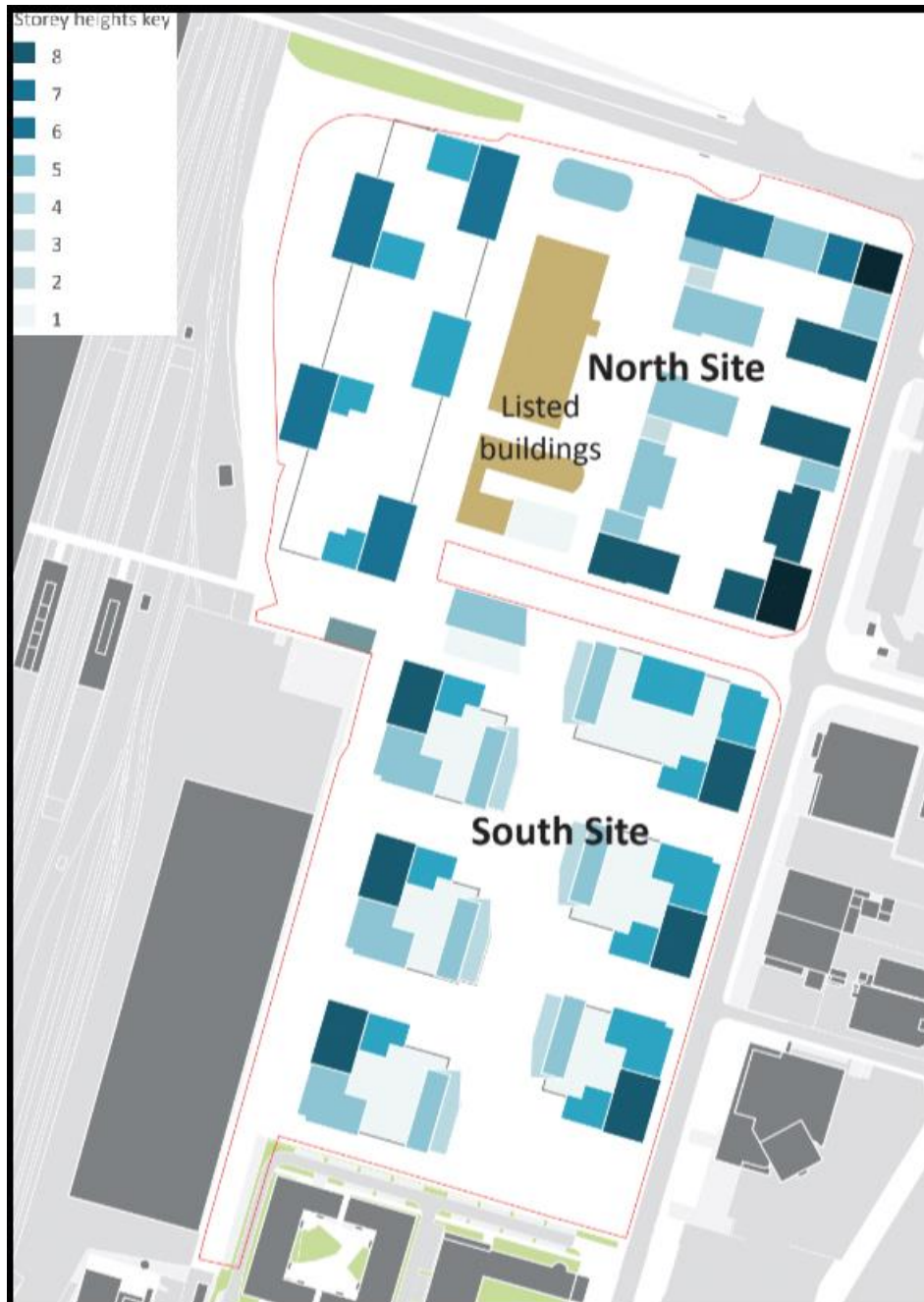


Scale and Massing

5.5 The height of buildings across the Site will range from one to eight storeys, the taller buildings will be located around the boundary of the Site, with the lower buildings located internally

5.6 Figures 5.2 illustrates the proposed building heights within the Site.

Figure 5.2: Building Heights





Density

5.7 The residential element of the Proposed Development will have an overall density of 154 dwellings per hectare, based upon a development area of 8.7 ha.

Quantum of Development

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

Table 5.1: Land Budget Summary

	Land Budget Summary
Site Area	8.7 hectares
CHP plant (Sui Generis Use Class)	265 m ²
Residential Element	
Density	154 dwellings per hectare
Total no of dwellings (Use Class C3)	1340 (including 414 affordable homes)
Total no of dwellings (Use Class C2)	114 (extra care homes)
Commercial Element	
Retail (Use Class A1 to A5)	2222 m ²
Employment (Use Class B1)	6692 m ²
Public Services (Use Class D1)	4126 m ²
Entertainment and Leisure (Use Class D2)	1226 m ²

Commercial Area

5.9 The Proposed Development will provide up to 6692 m² of B1 (Business) floorspace.

Residential Uses

5.10 The residential component of the masterplan forms a significant part of the development proposals and will provide up to 1340 new homes comprising apartments of different sizes and tenures and 114 extra care homes.

Access and Parking

5.11 Access to the Site for road vehicles will be via multiple access points off Broadwater Road and Bridge Road as illustrated in Figure 5.3. Car movements have been limited to the periphery of the Site to ensure that as much as possible of the areas used by pedestrians are

free from car traffic. A designated taxi pick up and drop off point and queuing facility for 5 taxis has been located on Hydeway.

Figure 5.3: Vehicular Access



5.12 Car parking will be largely located within undercroft or basement areas supplemented by a small amount of on-street car parking spaces.

5.13 The scheme provides a network of streets and publicly accessible spaces designed to allow easy access. New connections have been created and the accessibility of existing routes



have been improved. Pedestrian crossing points along new roads and streets will either provide level access or dropped kerbs.

5.14 On-street cycle parking will be provided in the main public spaces around Goodman Square and the railway footbridge. Safe and secure private cycle storage will be provided within each residential block.



6 DEVELOPMENT PROGRAMME AND CONSTRUCTION

INTRODUCTION

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

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

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

PROGRAMME OF WORKS

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

DESCRIPTION OF THE WORKS

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

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



Enabling Works

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

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

Site Preparation

6.7 All existing non-critical infrastructure will be removed. The enabling works would entail the decommissioning and removal of any associated structures and communication infrastructure in all areas within the Site boundary. The works will include the use of heavy plant, with the potential for on-site material selection, dependant on site establishment and space to facilitate necessary plant. All works will be strictly managed to ensure that vehicle movement and dust are controlled and kept to a minimum. Further details on the management of dust are included in Chapter 8: Air Quality.

6.8 Site preparation works will also involve the breaking out of any hardstanding material, crushing and screening to produce stock piles of aggregate hardcore materials for use within the sub-base and foundation structures of the new buildings and roadways.

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

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



Construction of the Proposed Development

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

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

6.13 The operation of construction vehicles and general construction activities may give rise to the potential for surface runoff to become contaminated with hydrocarbons, silt or other construction materials. This may in turn lead to a contamination event should site drainage be allowed to enter watercourses. Excavations may require dewatering (of accumulated rainfall or runoff) during construction. In such circumstances, it will be important to ensure that the quality of this water is sufficiently high to allow discharge to an appropriate point. Further details on drainage are provided in Chapter 13: Water Quality, Hydrology and Flood Risk.

Removal of Remaining Construction Elements

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

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

HOURS OF WORK

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

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

6.16 These proposed hours would be agreed with the Local Authority Planning department prior to commencement of the works. Special working outside these hours, such as heavy plant



activities and crane and equipment assembly, would be kept to a minimum and would be subject to prior agreement with reasonable notice by the Local Authority's Environmental Health Officer (EHO).

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

PLANT AND EQUIPMENT

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

Table 6.1: Indicative Plant used during Construction

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

Plant and Equipment	Enabling works and Site Preparation	Construction	Services installation	Fit out	Landscaping
Tipper lorries		X			X
Wheel washers	X	X	X		X
Skips & Skip trucks	X	X		X	X

ENVIRONMENTAL MANAGEMENT AND MITIGATION

Environmental Management Plan

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

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

6.21 The CEMP would include:

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

6.22 The CEMP would place stringent contractual and procedural performance obligations upon trade contractors. These would be maintained and reinforced by commitments detailed below and, where relevant, within Chapters 7-16 inclusive. Such obligations would be enforced



through subsequent detailed agreements with and consents provided by the Local Authority. A clear management structure and description of the responsibilities and authority of a specific Project Environmental Manager (PEM) would be included.

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

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

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



- Provisions for auditing by the PEM, WHBC and other regulatory authorities, where appropriate;
- Details of plant to be used;
- Details of all construction works involving interference with a public highway, including temporary carriageway/footpath closures, realignments and diversions; and
- Housekeeping procedures and environmental management controls.

Contract Conditions

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

Management of Construction Works

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

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

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

Emergencies and Accidents

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



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

Materials Storage and Handling

6.31 Environmental issues would be considered in the procurement of raw materials and manufactured building components and all such materials would be appropriately stored on the Site to minimise damage by vehicles, vandals, weather or theft. Deliveries of hazardous materials would be supervised and a just-in-time deliveries system would be implemented to minimise storage times and reduce the risk of spillage on-site. Tanks and drums of liquid chemicals and fuels would be stored in bunded compounds. Packaging materials would be returned, where possible.

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

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

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

Waste Management and Minimisation

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

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



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

6.37 A Site Waste Management Plan (SWMP) would be developed and implemented detailing how waste created during the construction phase would be managed. This would be prepared by the Contractor in accordance with the Site Waste Management Plan Regulations 2008 and non-statutory guidance on preparation of SWMPs. All relevant Contractors would be required to investigate opportunities to minimise waste arisings at source and, where such waste generation is unavoidable, to maximise the recycling and reuse potential of construction materials. Recycling of materials would take place off-site, where noise and dust are less likely to result in effects to the occupants of surrounding properties. Appropriate waste management and recycling centres close to the Site would be identified prior to the construction works and contracts would be established with registered waste carriers and authorised waste disposers for construction waste.

6.38 All waste would be stored on the Site in accordance with the relevant legislation, in particular the Waste (England and Wales) Regulations 2011 (Ref 6.1) and no burning of construction waste would be undertaken at the Site.

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

Traffic and Access Management

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

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



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

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

6.44 The Traffic Management Plan would detail the management of the above measures as well as the management of car parking on the Site and the Site labour force travel to the Site. No parking on public roads would be allowed and the Contractor/Construction Manager would be responsible for enforcing this requirement. Provision would be made within the Site for essential on-site parking. Any local traffic management measures for Site access would be agreed with the relevant authorities.

Air Quality and Dust

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

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



- Ensuring that a road sweeper is available to clean mud and other debris from hardstanding, roads and footpaths.

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

Hazardous Materials and Contaminated Land

6.47 Prior to construction, the Contractor would be required to prepare a Method Statement and Risk Assessment demonstrating how the safety of construction workers and the public would be addressed in terms of potentially harmful substances. Protective measures would include:

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

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

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

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



Site Drainage and Effects on Water Resources

6.50 The assessment of the potential effects of the Development proposals on water resources is presented in Chapter 13: Water Quality, Hydrology and Flood Risk. In summary, a precautionary approach would be adopted to appropriately manage construction-derived surface water run-off. As such, particular care would be taken to prevent any release or mobilisation of pollutants, which could pose a potential risk to receptors such as surface water and groundwater.

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

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



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

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

Protection of Ecological Resources

6.54 An assessment of the potential effects of the Development on ecological resources is presented in Chapter 12: Ecology and Nature Conservation.

6.55 Chapter 12 details the measures that will be taken to mitigate effects from the Proposed Development can be broadly summarised as follows:

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

CUMULATIVE EFFECTS

6.56 Any cumulative effects during the construction phase are identified within Chapters 7-16 where relevant.

SUMMARY AND CONCLUSIONS

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



ecological and archaeological effects, ensuring a high level of control throughout the construction works.

6.58 The procedures within the CEMP would ensure the delivery of a high level of environmental control throughout the construction phase, thereby minimising the potential for adverse effects. Further detail regarding specific mitigation during construction works for the Proposed Development is presented within Chapters 7 to 16 of this ES.



REFERENCES

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

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

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

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

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

7 TRANSPORT AND ACCESS

INTRODUCTION

7.1 This Chapter assesses the potential effects of the Proposed Development in relation to transport and access. It summarises the findings of the Transport Assessment (TA), Framework Travel Plan (FTP) and Delivery & Servicing Plan (DSP) prepared by Entran Ltd, which are included as Appendix 7.1.

7.2 The existing transport network in the vicinity of the Site has been described in the context of national, regional and local transport policy. The effects of the Proposed Development on the network has been assessed taking into consideration future changes resulting from committed developments in the area and the net changes in travel demand resulting from the Proposed Development.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Assessment Methodology

7.3 The Transport Assessment (TA) has been prepared in accordance with good practice guidance published by both the Department for Transport (DfT) and the (then) Department for Communities and Local Government (DGLG). The above guidance indicates that the assessment should set out the baseline conditions against which effects should be fully assessed. It also states that the TA should include details of the extant and lawful uses of the Site. For the purposes of the EIA, the existing observed baseline conditions are used as the basis of assessment.

7.4 It should be noted that planning permission was granted in August 2017 for a significant mixed-use regeneration scheme on this Site comprising 850 dwellings and a range of commercial and community facilities. That planning application by Spen Hill Developments Ltd was supported by a Transport Assessment, prepared by Transport Planning Associates (TPA). The scope of that approved TA has informed the TA for the current Proposed Development.

7.5 It is important to note that the planning application for the approved development was also supported by an EIA, carried out by the Waterman Group. Transportation was scoped out of that EIA. The Waterman scoping report said:

“It is not considered that the operation of the local highway network is an environmental matter for consideration as part of the EIA. The effects of the Development upon traffic flows and capacities of the local highway network are therefore scoped out of the EIA. This is supported by HCC. The TA can remain a planning application document while sitting outside of the ES.”

7.6 The previous approach taken by Waterman has not been carried forward into this EIA. For a robust form of assessment Transport and Access is included as a consideration of this EIA.

Significance Criteria

7.7 The potential effects and residual effects of the Proposed Development upon all transport modes have been assessed using the significance criteria in Table 7.1. These criteria have been based on professional judgement and outline the approach to categorising the significance of effects identified within the Transport Assessment.



Table 7.1 – Significance Criteria for Transport

Significance criteria	Description			
	Traffic	Public Transport	Walking & cycling	Construction traffic
Major adverse effect	>50% increase in either daily or peak hour traffic flows on any road.	>50% increase in either daily or peak hour passenger demand for public transport.	On and off-Site facilities for pedestrians and cyclists significantly degraded.	>50% increase in either daily or peak hour traffic flows on any road.
Moderate adverse effect	20%-50% increase in either daily or peak hour traffic flows on any road.	20%-50% increase in either daily or peak hour passenger demand for public transport.	On and off-Site facilities for pedestrians and cyclists degraded.	20%-50% increase in either daily or peak hour traffic flows on any road.
Minor adverse effect	5%-20% increase in either daily or peak hour traffic flows on any road.	5%-20% increase in either daily or peak hour passenger demand for public transport.	On Site facilities for pedestrians and cyclists degraded.	5%-20% increase in either daily or peak hour traffic flows on any road.
Neutral	<5% change in daily and peak hour traffic flows on all roads.	<5% change in daily and peak hour passenger demand for public transport.	Facilities for pedestrians and cyclists neither enhanced nor degraded.	<5% change in daily and peak hour traffic flows on all roads.
Minor beneficial effect	No increase in traffic on any road with 5%-20% reduction in daily and peak hour traffic flows on one or more roads.	5%-20% reduction in daily and peak hour passenger demand for public transport.	On Site facilities for pedestrians and cyclists enhanced.	5%-20% reduction in either daily or peak hour traffic flows on any road.
Moderate beneficial effect	No increase in traffic on any road with 20%-50% reduction in daily and peak hour traffic flows on one or more roads.	20%-50% reduction in daily and peak hour passenger demand for public transport.	On and off Site facilities for pedestrians and cyclists enhanced.	20%-50% reduction in either daily or peak hour traffic flows on any road.
Major beneficial effect	No increase in traffic on any road with >50% reduction in daily and peak hour traffic flows on one or more roads.	>50% reduction in daily and peak hour passenger demand for public transport.	On and off Site facilities for pedestrians and cyclists significantly enhanced.	>50% reduction in either daily or peak hour traffic flows on any road.

7.8 In addition to the magnitude of effect as set out in Table 7.1 above, the duration and geographical extent of the effect are also considered. These are categorised as short term, medium term and long term; local, regional and national.

LEGISLATION, PLANNING POLICY AND GUIDANCE

National Planning Policy

7.9 Key national planning policy in relation to the transport effects of the Proposed Development comprises:

Department for Transport, Eddington Transport Study (2006)

7.10 In 2006 the Chancellor of the Exchequer and the secretary of state for Transport commissioned the Eddington Transport report (Ref 7.1) to examine the long-term links between transport and the UK's economic productivity, growth and stability, within the context of the Government's broader commitment to sustainable development. The Eddington study highlighted transport's pivotal role in supporting the UK's future economic success. It recommended a number of reforms to the planning, funding and delivery of transport interventions to maximise sustainable returns from investment, as well as recognising the need to improve the environmental performance of transport.

Department for Transport, Delivering a Sustainable Transport System (2008)

7.11 In October 2007 The Department for Transport (DfT) published 'Towards a Sustainable Transport System' (TaSTS) (Ref 7.2) and in December 2008 DfT published 'Delivering a Sustainable Transport System' (DaSTS) (Ref 7.3) both in response to the Eddington study. These reports set five clear goals for the UK's transport system.

- To support national economic competitiveness and growth, by delivering reliable and efficient transport networks;
- To reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change;
- To contribute to better safety, security and health and longer life expectancy by reducing the risk of death, injury or illness arising from transport, and by promoting travel modes that are beneficial to health;
- To promote greater equality of opportunity for all citizens, with the desired outcome of achieving a fairer society; and

- To improve quality of life for transport users and non-transport users, and to promote a healthy natural environment.

7.12 All integrated planning and transport policy must therefore be considered under the aegis of these goals.

Department for Transport, Creating Growth, Cutting Carbon – Making Sustainable Transport Happen (2011)

7.13 In January 2011 the Government published this White Paper (Ref 7.4). This paper outlined the coalition Government's vision for a transport system that is an engine for economic growth, but one that is also greener and safer and improves quality of life in our communities. It stated that investment on its own is not enough, we also need to help people to make transport choices that are good for society as a whole; however, it also stated that the Government recognises that it is not possible for public transport, walking or cycling to represent viable alternatives to the private car for all journeys, particularly in rural areas and for some longer multi-leg journeys and so the Government is committed to making car travel greener by supporting greener automotive technology.

Department for Communities and Local Government, National Planning Policy Framework (2012)

7.14 The NPPF (Ref. 7.5) replaces the majority of national Planning Policy Guidance notes and Statements. Section 4, Promoting Sustainable Transport supersedes PPG13 Transport 2011 but carries the same message. Where PPG13 promoted policies to reduce the need to travel, especially by car, NPPF says that smarter use of technologies can reduce the need to travel and that the transport system needs to be balanced in favour of sustainable travel, giving people real choice about how they travel. However, in common with the 2011 White Paper NPPF states that different policies and measures will be required in different communities and opportunities to maximise sustainable transport solutions will vary from urban to rural areas.

7.15 The NPPF states that all developments that generate significant amounts of movement should be supported by a Transport Statement or Transport Assessment and a Travel Plan.

Department for Transport Guidance on Transport Assessments (2007)

7.16 DfT guidance on transport assessments (Ref.7.6) states that when preparing such reports due consideration should be given to factors such as environmental sustainability, managing existing networks and mitigating the residual effects of traffic. The guidance is intended to assist stakeholders in determining whether an assessment may be required and, if so, what the level and scope of that assessment should be. It also provides guidance on the content and preparation of transport assessments and transport statements.

7.17 A key difference between a Transport Assessment (TA) and the former Traffic Impact Assessment (TIA) is the requirement to seek to influence travel behaviour rather than merely predicting the transport effects of a development and providing for it. The DfT guidance is clear that this should be an iterative process whereby the impacts are determined and if they are not deemed acceptable the form of development should be reconsidered to maximise travel by sustainable modes of transport. Furthermore, unlike a TIA and an EIA, where a Site is unused or partially vacant the baseline conditions for a TA should take account of the extant uses of the Site.

Department for Communities and Local Government planning practice guidance (2014)

7.18 In 2014 DCLG published a suite of Planning Practice Guidance (PPG) including advice entitled “Travel plans, transport assessments and statements in decision taking” (Ref 7.7). The 2007 guidance has now been formally replaced by the PPG as current government guidance on the transport related effects of development; however, many highway authorities and practitioners still refer to the 2007 guide on certain matters detail.

Regional Policy and Guidance

Hertfordshire County Council Local Transport Plan 2011-2031 (2011)

7.19 The third Hertfordshire Local Transport Plan (LTP3) (Ref 7.8) sets out the highway authority’s vision and strategy for the long term development of transport in the county. It provides the framework for transport’s support of the economic and social development of Hertfordshire over the plan period. The Hertfordshire vision is to provide a safe, efficient, resilient transport system that serves the needs of business and residents across Hertfordshire and minimises its impact on the environment. The LTP consists of:

- The Strategy – vision, goals and challenges
- Policy document – setting out the council’s transport policies
- Implementation Plan – setting out intended short term and longer term interventions (actions)
- Daughter documents – detailed strategies to support individual policy areas.

7.20 In October 2017 HCC opened a consultation on LTP4 (Ref 7.9); that consultation closed on 23 January 2018. The draft LTP4 states that it will guide transport and land use decisions to 2031 and beyond. The plan says:

“This new LTP for Hertfordshire is a break from the plans that have preceded it, and seeks to set the county on a different path in the development of its transport system. It is a transition in how we plan for a future transport system in the county in two aspects.”

“A move away from a focus on car based investment and capacity enhancement. These are now seen as a last resort”, and

“A growing appreciation that transport is on the verge of great change. Technology and other drivers for change look likely to challenge the trend for increased economic growth to be accompanied with increased levels of car ownership and use.”

BASELINE CONDITIONS

7.21 The Site consists of approximately 8.7 hectares (Ha) of brownfield land and is located on the eastern edge of Welwyn Garden City’s town centre on Broadwater Road. The Site is bounded by Bridge Road to the north, Broadwater Road to the east, residential developments to the south and the East Coast Mainline to the west.

7.22 The northern portion of the Site was previously occupied by the Nabisco Shredded Wheat Factory and includes some distinctive silos, which are listed buildings. The production building is also a grade 2 listed building and has been closed since 2008.

7.23 In addition to the East Coast Mainline a warehouse building of approximately 10,000m² (known as Pall Mall) also abuts the western side of the Site.

7.24 The Site currently takes vehicular access from Hydeway which has a junction with Broadwater Road. There are also a further five dropped-crossing (haulingway) style accesses



from Broadwater Road. The Site also shares access with the adjacent warehouse via a priority junction onto Bridge Road.

7.25 A short spur road links to a footbridge that connects the Site to the Railway Station and Howard Shopping Centre on Howardsgate.

7.26 Broadwater Road forms part of the A1000 which links the A1(M), to the north of Welwyn Garden City, to the A414 and Hatfield to the south, before continuing on to North London.

7.27 Broadwater Road has a width of approximately 8.0m and is subjected to a 30mph speed limit, which is enforced by speed cameras. There are a number of roads joining Broadwater Road which provides access to residential areas; there are also a number of employment sites with direct access on to Broadwater Road.

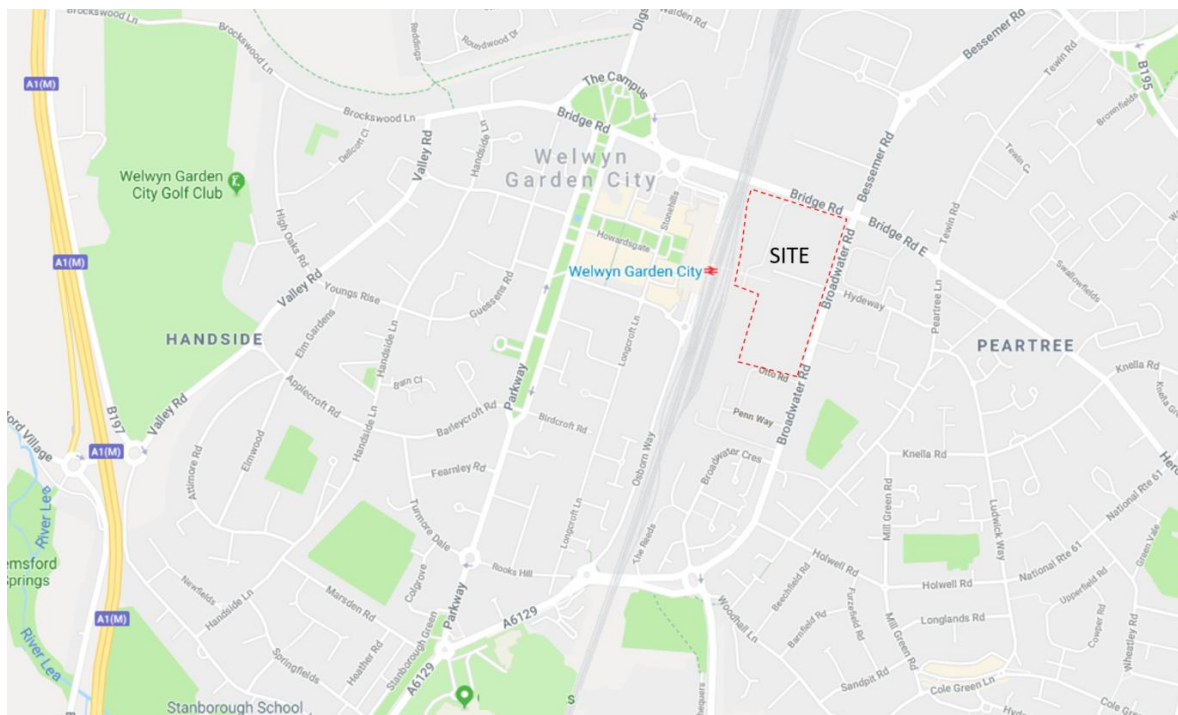
7.28 Hydeway has a width of approximately 6.75m and provides access from Broadwater Road to the footbridge over the railway line. The Proposed Development site lies on both sides of Hydeway and as such there are currently no properties served directly by Hydeway.

7.29 Bridge Road is a dual carriageway that runs from the east to west, with access to the town centre via Hunters Bridge which crosses the railway and is subjected to a 30mph speed limit. The width of the carriageway varies from 14m to 15.5m as the number of lanes changes from single to two lanes in either direction. There is a central reserve for the majority of its length.

7.30 The junction between Bridge Road and Broadwater Road is a four-arm signal-controlled junction with two approach lanes on Bridge Road east and three approach lanes on the other three arms. The signals include uncontrolled pedestrian crossings with central refuges on each arm.

7.31 Figure 7.1 below illustrates the local highway network around the Site.

Figure 7.1: Local Highway Network



Pedestrian Access

7.32 Acceptable journey distance on foot vary depending on the purpose of the journey, the environment in which the journey is taking place and of course the individual walking. Prior to being superseded by the National Planning Policy Framework (NPPF) PPG13 suggested that walking offers the greatest potential to replace short car trips for journeys less than 2km. The IHT guide 'Providing for Journeys on Foot' suggests that for journeys to work a desirable walking distance would be 500m, an acceptable walking distance would be 1km and the preferred maximum walking distance would be 2km, in line with the PPG13 advice.

7.33 The Site is accessible to the town centre and surrounding areas and facilities through and extensive footway network, which includes the footbridge linking Hydeway to the railway station. The town centre and railway station are both within approximately 200m form the Site, which is within the desirable walking distance for commuting and shopping.

7.34 There are footways along both sides of Broadwater Road, one with a grass verge between the carriageway and the footway, with the width varying from approximately 3.2m to 4m.



7.35 Bridge Road has footways along both sides of the carriageway, with the width varying from approximately 2.6m to 2.9m. The footways continue along Bridge Road East, although the width varies from approximately 2.3m on the north side and 3.9m on the south side.

7.36 There are currently two signal-controlled pedestrian crossings within 100m walk of the site providing access across Broadwater Road (south of Hydeway and north of Otto Way) as well as uncontrolled crossings at the junction between Broadwater Road, Bessemer Road and Bridge Road. All formal crossing points, whether controlled or uncontrolled, have flush dropped kerbs and tactile paving.

7.37 Overall, the footways in the area around the Site are generally in a reasonable state of repair and street lighting is provided.

Cycle

7.38 It is widely recognised that cycling has the potential to substitute for short car trips, particularly those that are less than 5km. The Site lies within 5km of every point in Welwyn Garden City and as such all local facilities, such as schools, leisure and employment sites are all within an acceptable cycling distance. The TA includes a full appraisal of existing cycle facilities.

Public Transport

7.39 The nearest bus stops are located on Broadwater Road, Bridge Road and Osborn Road. The entire Site is within 200m of six bus stops; these are served by 14 bus routes in total. Bus stop on Broadwater Road is served by the bus 601 with majority of the services severed by the bus stop of Bridge Road. The bus services, duration and frequency can be seen on Table 7.2. Full, current bus timetables can be found at arrivabus.co.uk, centrebus.info, greenline.co.uk, tfl.gov.uk and unobus.info.

Table 7.2 – Bus route summary

No	Details	Duration	Frequency
201	Welwyn Garden City – Welham Green	0923 – 1004	1 trip per day (Tuesday and Friday)
203	Welwyn Garden City – Watton at Stone	1245 - 1323	1 trip per day (Thursday only)
206	Welwyn Garden City – Panshanger Circular	0845 - 1505	2 trips per day (Tuesday, Thursday & Friday)
242	Welwyn Garden City – Waltham Cross	0814 - 1840	2 hours
300	Hemel Hempstead - Stevenage	0540 - 1953	20 – 30 mins
301	Hemel Hempstead - Stevenage	0547 - 2348	20 – 30 mins
314	Welwyn Garden City – Hitchin	0740 - 0825	8 trips per day
315	Kimpton - Welwyn Garden City	0700 - 1825	4 trips per day
330	St. Albans – Welwyn Garden City	0800 – 1500	30 mins
366	Luton – Welwyn Garden City - Hatfield	0606 - 1907	1 per hour
388	Herford - Welwyn Garden City - Stevenage	0637 - 0825	1 trip (Schooldays only)
401	Welwyn Garden City – Panshanger Circular	0610 - 1950	20 – 30 mins
403	Woodhall and Haldens Circular	0721 - 1904	30 – 40 mins
404	Welwyn Garden City – South Hatfield	0900 - 1755	2 hours
405	Welwyn Garden City – South Hatfield	1000 – 1655	2 hours
601	Borehamwood – St Albans - Welwyn Garden City	0616 - 2026	20 – 30 mins
653	Welwyn Garden City – New Greens	0548 - 2247	20 mins
724	Heathrow Airport - Harlow	0315 - 2209	20 -30 mins

7.40 It is clear that the site is well served by frequent bus service which are located in close proximity to the Site. The services in Table 7.2 connect with the bus station allowing passengers to connect to the wider local bus network. The bus station is less than 500m walk from the Site.

Rail

7.41 The nearest rail station is Welwyn Garden City, located to the west of the Site and accessed via the footbridge which connects the Site to the town centre. The station is served by the Great Northern Route (southern end of East Coast Main Line). Welwyn Garden City train station benefits from a bus terminus, taxi rank and secure, covered cycle parking. Trains from Welwyn Garden City provide a direct link to London King's Cross station to the south and Peterborough to the north.

7.42 Baseline traffic figures for the surrounding highway network were derived from manual counts carried out in connection with a detailed assessment of a previous planning application for a mixed-use development on this Site. Full details appended to the TA. Further baseline data was derived from permanent Department for Transport (DfT) count sites installed on roads in vicinity of the Site. A growth rate from the National Road Traffic Forecasts (NRTF) was applied to the traffic count data to establish predicted future year figures.

7.43 The resultant annual average daily traffic flows (AADT) on the highway network surrounding the Site are summarised in Table 7.3 below.

Table 7.3 - Baseline AADT two-way traffic flows

Link	2013 ATC Data	2016 growth	2017 growth	2025 growth
Bridge Road (w)	14130	14610	14723	15533
Bridge Road	14130	14610	14723	15533
Bessemer Road	11172	11552	11641	12281
Bridge Road (E)	11593	11987	12080	12744
Broadwater Road (N of Hydeway)	12186	12600	12698	13396
Broadwater Road (S of Hydeway)	12186	12600	12698	13396
Broadwater Road (S of Site)	12486	12911	13010	13726

Existing uses

7.44 The Site consists of approximately 8.7 hectares of brownfield land and is located on the eastern edge of Welwyn Garden City's town centre on Broadwater Road. The northern part of the Site, to the north of Hydeway, is mostly occupied by the Nabisco Shredded Wheat cereal production factory. The north west of the Site contains a triangular area of hardstanding and an area of grassland and vegetation, scrub and shrubs, as well as a number of semi mature trees.

7.45 The southern part of the Site, immediately south of Hydeway, contains buildings associated with industrial uses, beyond this is a cleared area where former buildings have been demolished.

7.46 Network Rail have an access road which currently runs through the northern section of the Site and is accessed from Bridge Road.

7.47 IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Vehicle access and traffic flow

7.48 Vehicular access to the Proposed Development is gained from Bridge Road and Broadwater Road via a number of existing and new cul-de-sac roads. The junction arrangements were agreed through a series of collaborative workshops with HCC and WHBC as part of the previous application. The agreed junction arrangements have therefore been retained as part of the current proposals. These predominantly shared space cul-de-sacs provide direct access to the parking areas but maintain the integrity of the pedestrian and cycle areas in the heart of the development.

7.49 Table 7.4 shows the named accesses to the Site and Figure 7.2 shows the access reference names and numbers.

Table 7.4 – Site accesses

Junction	Access
1	Bridge Road
2	Lind Grove
3	Hydeway
4	Middle
5	Broad Court
6	Southern

Figure 7.2 – Site access reference names and numbers



7.50 This closely matches the access descriptions from the consented scheme; however, Junction 5 was referred to in the TPA assessment as the 'Fourth access' from Broadwater Road. This was likely to cause confusion so as it is located opposite Broad Court it has been re-named within the TA for the Proposed Development. It is important to note that all the access roads will remain private but will be subject to a statutory road naming process. The names given to



these accesses in this report are therefore merely for ease of reference, and not intended as future road names. The accesses are described in greater detail below.

7.51 The existing Bridge Road access will be retained. This will continue to serve the adjacent warehouse and will provide access to the northern part of the Site for delivery and service vehicles as well a car park access. The junction will continue to operate as a priority junction allowing all movements.

7.52 The Lind Grove access, which is the most northerly from Broadwater Road, will be a priority junction with Broadwater Road. The Site access arm will be raised to provide a shared surface within the site. The junction will provide access to a limited amount of surface level car parking.

7.53 The Site currently takes access from Hydeway. The junction will remain a priority crossroads but will become a raised table junction. Within the Site Hydeway will be completely remodelled to include a turning area with drop-off facilities for the station, 'echelon' parking along both sides, central parking/waiting suitable for taxis, a tree lined footway along the northern side and a tree lined cycleway along the southern side.

7.54 It has been agreed with the highway authority that existing public highway rights will be extinguished from Hydeway so that it becomes a private road, but that the footway/cycleway along the southern side is retained as a public right of way between Broadwater Road and the railway footbridge.

7.55 Hydeway will provide access into the underground parking beneath blocks 6 and 7 as well as the undercroft parking beneath block 8.

7.56 The middle access from Broadwater Road, will be a priority junction with Broadwater Road. The Site access arm will be raised to provide a shared surface within the Site. The junction will provide access to a limited amount of surface level car parking and the undercroft parking beneath block 9.

7.57 The Site access immediately opposite Broad Court will be a priority junction with Broadwater Road. The Site access arm will be raised to provide a shared surface within the Site. The junction will provide access to a limited amount of surface level car parking and the undercroft parking beneath block 10.



7.58 The Southern Access into the Proposed Development from Broadwater Road will be a raised table priority junction, with Broadwater Road forming the main arms. The access road into the Site will continue as a shared surface although a separate footway/cycleway will be provided adjacent to it, providing direct access into the south site's central pedestrianised landscape area. The junction will provide access to a limited amount of surface level car parking as well as the undercroft parking beneath blocks 11, 12 and 13.

Demolition and Construction phase

7.59 A Construction Logistic Plan (CLP) would be implemented before construction works commence to provide management control and minimise congestion to public highways. Further details are contained in the TA.

7.60 The development of the Site had been divided on to 3 phases. Each construction phase will utilise different means of access from the public highway. Phase 1 will use the existing vehicle accesses from Bridge Road and Hydeway as well as the existing vehicle cross-over from Broadwater Road at the southern end of the Site. Phase 2 will also use the existing access from Bridge Road but will use a newly constructed access onto Broadwater Road. This access will form one of the final accesses for the operational phase. Phase 3 of the construction will use two newly constructed accesses onto Broadwater Road. Again, these area accesses that will form vehicular access for the operational phase. Figure 7.3 below shows the three phases as illustrated.

7.61 At construction phase, it is anticipated that the number of vehicular movements to and from the Site as a result of each phase of the construction will not be more than the number of trips generated by the completed development.

7.62 A detailed assessment of construction vehicle numbers was carried out and agreed with the highway authority as part of the approved development on this Site. A review of that information indicates that the construction of the Proposed Development will generate very similar vehicle numbers and patterns. It is estimated that during the peak period of demolition and construction, approximately 310 daily traffic movements would occur to and from the Site. This includes HGV traffic associated with demolition and construction activities as well as traffic generation by construction workers travelling to and from the Site.

7.63 The existing daily traffic movements on Broadwater Road is 13,645. Traffic generated by the Proposed Development during peak demolition and construction period would be

therefore equate to 2.3% of the existing traffic movements. The predicted peak demolition and construction traffic represents a negligible proportion of additional traffic movement of Broadwater Road.

7.64 In addition, a percentage increase in traffic movements of less than 5% is considered to have insignificant effect on the operation of the local network. As such, is considered that any effect to driver delays, pedestrians and cyclists as a result of traffic during demolition and construction would be minimal and therefore the effect on the local highway network without an appropriate CLP would be short term local minor adverse.

Figure 7.3 – Development construction phases



7.65 The HGV trips will be spread throughout the day, as they will be made up of materials deliveries, off-site disposal and other trips related to the management of the construction process.



7.66 The daily traffic flow associated with the Proposed Development construction traffic is considered to be relatively low and the change in magnitude for severance is considered to be negligible adverse for all links assessed.

7.67 In general, the construction vehicles would use existing or newly constructed vehicle accesses from Bridge Road and Broadwater Road. Both these are main arterial routes with standard footways available either on one or both sides of the carriageway. On this basis, the change in magnitude for fear and intimidation is considered to be short term minor adverse for all links assessed.

Completed Development

7.68 The Site accesses have been designed around the swept path of a 11.3m long Refuse vehicle (4 axle), being the largest vehicle likely to visit the Proposed Development. The access has been designed such that all vehicles can enter and leave in a forward gear with ample stacking capacity within the Site so that no queuing will occur within the public highway.

7.69 In accordance with the methodology approved by HCC in connection with the consented scheme the residential vehicle trip generation has been calculated by establishing the predicted working population, then quantifying journeys to work by modes, and finally establishing the non-work journeys to derive a total residential trip generation. The vehicle trips were then distributed onto the highway network in proportion to the quantum of car parking served by each site access. The wider trip distribution onto the highway network is based on a detailed origin and destination analysis. This is described in detail in the TA.

7.70 The trip generation associated with the approved non-residential uses was derived by interrogating the TRICS database. The same methodology has been used for the Proposed Development. As for the residential uses the vehicle trips have been apportioned to each site access in accordance with the amount of commercial car parking served by that access.

7.71 Table 7.5 below, shows the increase in traffic on the local highway network.

Table 7.5 - Baseline AADT traffic increase

Link	2013 ATC Data	2016 growth	2017 growth	2025 growth	2025 + Dev	% incr
Bridge Road (w)	14130	14610	14723	15533	16024	3%
Bridge Road	14130	14610	14723	15533	17967	14%
Bessemer Road	11172	11552	11641	12281	15118	19%
Bridge Road (E)	11593	11987	12080	12744	13776	7%
Broadwater Road (N of Hydeway)	12186	12600	12698	13396	17737	24%
Broadwater Road (S of Hydeway)	12186	12600	12698	13396	17668	24%
Broadwater Road (S of Site)	12486	12911	13010	13726	17972	24%

7.72 In the absence of mitigation the significance of the change in traffic on the local highway network would be local long term moderate adverse on the Broadwater Road and Bridge Road corridors. The level of impact would affect driver delay, severance for pedestrian and cyclists and would also have an effect on the potential for fear and intimidation for pedestrian and cyclists on those corridors.

7.73 The effect on pedestrian/cyclist delay is considered as minor adverse on the Bridge Road and Broadwater Road corridors. The effect on pedestrian delay at the Bridge Road/Broadwater Road junction would be moderate adverse.

7.74 The increase in pedestrian/cycle trips on Bridge Road, Broadwater Road and the footbridge over the railway would result in moderate adverse long-term effect on pedestrian/cyclists on the links and junctions considered.



ASSESSMENT OF CUMULATIVE EFFECTS

7.75 The Proposed Development is the largest development to have any effect on the study area within the approved study period. Other committed and allocated developments will have the potential to add traffic onto the local highway network within the study area. For this reason, all future year assessments have included for a level of growth in background traffic that takes account of the cumulative effects of committed developments.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

7.76 The development will deliver significant highway improvement works to Bridge Road and Broadwater Road as well as off-site highway improvements to increase operational capacity at a number of roundabouts remote from the Site.

7.77 All highway works will be delivered by means of a Section 278 Agreement with the local highway authority. The S278 technical approval will include a requirement for a traffic management plan to ensure safe working practices within the highway as well as minimal disruption to pedestrian and cycle movements.

7.78 The Proposed Development will enhance the existing permeability of the local walking and cycling network through implementation of a number of measures including provision of walking and cycling facilities through the Site, the refurbishment of the rail footbridge and the re-modelling of Bridge Road and Broadwater Road to reduce vehicle speeds and enhance pedestrian and cycle routes and crossings.

7.79 The development will also be supported by a four-part Transport Implementation Strategy comprising a Framework Travel Plan, Delivery and Servicing Plan, Car Park Management Plan and Construction Logistics Plan. These will be live management documents that will inform and influence the movement of people and goods to and from the Site.

7.80 The refurbished footbridge will improve links to the rail station and upgraded bus station for those travelling to and from the development as well as the wider local community.

7.81 As a result of the enhancements, it is anticipated that residents, employees and visitors will consider modes other than private car.

Demolition and Construction Phase

7.82 A Construction Logistics Plan (CLP) would be implemented before construction works commence to provide management control and minimise congestion to public highways. Prior to commencement on site a Construction Logistics Plan (CLP) will be drawn up in partnership with HCC and WHBC and submitted for approval. The CLP will comply with the guidance document '*Building a better future for freight: Construction Logistics Plans*'.

7.83 During the demolition and construction phase, details of the routing strategy, hours of operation, along with logistics and mitigation measures would be included in the CLP and CEMP which should be secured through a suitable planning condition. As a result, the likelihood is that construction vehicle movements will predominantly occur outside of peak hours such that operatives can avoid busy periods on the external network and avoid late nights/early hours to reduce the disturbance of nearby residents.

7.84 The development will be supported by a Construction Logistics Plan (CLP) which will include a route management strategy as well as dictate any limitations on construction vehicle delivery hours. It is anticipated that there would be minimal flows associated with construction during the peak hours and the change in magnitude of the Site access junctions for driver, pedestrian delay and pedestrian amenity are considered to be neutral.

7.85 The daily traffic flow associated with the construction traffic is likely to be minimal when compared to the operational phase and as with all major construction sites it is anticipated that in addition to the CLP, a CEMP will be secured through a suitable planning condition. It is considered that the residual potential for accidents and safety is neutral all links assessed.

7.86 On this basis, appropriate management is considered to result in a neutral effect on fear and intimidation for all links assessed. During the construction of the highway improvement works the effect on driver delay is considered to be local short term minor adverse, while pedestrian/cyclist delay and pedestrian/cyclist amenity are considered to have a magnitude of short term minor adverse.

Completed Development

7.87 The previously approved development on the former Shredded Wheat factory site included a comprehensive range of transport improvement measures. Some of these were



integral components of the development, some were dictated by the SPD and some were proposed as mitigation measures to address the transport effects of development.

7.88 The Proposed Development will deliver all the off-site transport improvements agreed as part of the consented scheme. It will also fund some additional off-site improvements. These are set out below:

7.89 *Road hierarchy*; The access from Bridge Road will remain as a private road with a minimum width of 6m. A 2m footway will be provided along the western side of the carriageway. The southern access from Broadwater Road will be a major access road with a width of 6.0m where cars are parked at 90 degrees and a minimum of 4.8m otherwise. The carriageway has localised widening on bends where necessary. In addition, there will be a segregated footway provided through the central landscape area and to each of the residential blocks. The three Mews / Streets, which form part of the internal road network, will all be shared surfaces with a width of approximately 6m. All accesses from Broadwater Road will have raised entrance tables to assist pedestrian/cycle movement along Broadwater Road.

7.90 *Broadwater Road improvements*; The redevelopment proposals would reallocate the existing highway land along Broadwater Road so that there is greater provision for pedestrians and cyclists. The existing carriageway would be narrowed to 6.75m while a 4m foot/cycleway would be provided along both sides of the carriageway across the site frontage, where possible. The narrowing of Broadwater Road would continue along its entire length, providing the opportunity to widen pedestrian and cycle facilities along the length of Broadwater Road as the area is redeveloped in the future, subject to land ownership. The existing pedestrian crossing facilities along Broadwater Road will be retained, although the signalised crossing south of Hydeway will be relocated further north.

7.91 *Bridge Road/ Hunters Bridge improvements*; Overall traffic calming measures proposed along Broadwater Road will be extended to include Bridge Road and Hunters Bridge so that the characteristics of these roads are changed from being vehicle dominant to an area which is more attractive to pedestrians and cyclists. The proposals will narrow the highway land allocated to vehicles so that there is a single 3m lane in either direction. This in turn allows the foot/cycleways to be widened to 4m along both sides of the carriageway and a central pedestrian area of approximately 5.7m will also be provided.

7.92 *Rail Bridge*; The existing rail bridge between the site and the railway station will be refurbished as part of the development. This will include demolishing the existing steps on the



site side of the rail lines and replacing them with a new set of much wider steps directly onto the newly created public square. The stops will include provision to wheel bicycles up onto the bridge. A range of bespoke cycle parking facilities will be provided beneath the steps. A lift will also be provided to allow access for the mobility impaired or for those with pushchairs for example. The bridge itself will be refurbished in agreement with Network Rail. Full details of the bridge refurbishment are submitted in support of the planning application.

7.93 *Broadwater Road/ Bridge Road junction;* The existing signalised crossroads of Broadwater Road / Bridge Road and Bessemer Road will be altered to a shared space 'octabout'. The proposed octabout will operate along the same principals as a roundabout albeit on a less formal basis, as the intention is to introduce controlled uncertainty to drivers which will result in slower vehicle speeds and a more agreeable environment for pedestrians and cyclist.

7.94 *Broadwater Road/ Osborne Way / Stanborough Road junction;* The Stanborough Road arm of the Broadwater Road / Osborn Way / Stanborough Road roundabout will be widened to 8.5m to increase the approach capacity.

7.95 *Broadwater Road / A1000 Chequers roundabout;* The Broadwater Road and A1000 Chequers arms of the Broadwater Road / Broadwater crescent / A1000 Chequers roundabout will be improved to increase the flare lengths on both arms to increase the entry capacity.

7.96 *Hydeway West;* The kerb radii on the entry to Hydeway west will be increased to improve entry / egress for HGVs. The radii on the western arm of Hydeway will also be altered and the whole junction will become a raised table. Highway rights will be extinguished (stopped-up) from Hydeway west so that the road will become private in line with the other access roads into the Wheat Quarter. A 3m wide shared cycleway/footway will be provided along the southern side which will remain a public right of way between Broadwater Road and the new steps to the rail bridge.

7.97 Hydeway will be remodelled to allow for 'kiss and ride' facilities for those using the rail station as well as an informal taxi rank. This will encourage the use of public transport for longer journeys and will be a benefit to the wider local community.

7.98 *Peartree Lane / Ranvenfield cycle route;* The existing pedestrian crossing over Peartree Lane at the eastern end of Hydeway will be upgraded to allow cyclists to cross and then to use the carriageway of the cul-de-sac section of Peartree Lane rather than the footway.



7.99 The FTP has been developed to seek to influence modes of travel to the development site rather than merely predicting travel patterns and providing mitigation. The FTP promotes travel by sustainable modes of transport and provides a structure for the management of residents' and staff travel to the Proposed Development. It sets out objectives, obligations, targets and measures as well as means of securing and enforcing the FTP.

7.100 The DSP highlights the implications of the Proposed Development with regard to existing and also proposed servicing constraints and has been prepared in accordance with the Freight Transport Association document '*Designing for Deliveries*' and the guidance document '*Managing freight effectively: Delivery and Servicing plans*.'

7.101 The DSP provides a strategy for managing deliveries including measures to reduce the number of vehicle trips, hours of delivery, route management, promotion of rail and membership of the Freight Operator Recognition Scheme (FORS).

7.102 The Proposed Development would result in an increase in traffic on the local highway network but the proposed junction improvements would ensure that the effects on capacity and driver delay are Neutral. The implementation of a FTP and DSP would improve the management of travel and deliveries to and from the Site.

7.103 The effects to the pedestrian/cyclist around the local highway network after the implementation of the extensive improvement works will have a long term moderate beneficial effect.

SUMMARY

7.104 A summary of potential effects, mitigation and resulting residual effects in relation to transport are summarised below in Table 7.6.

Table 7.6: Transport and Access Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Construction Phase				
Traffic Generation	Temporary	Minor	CLP	Neutral
Disruption to pedestrians and cyclist	Temporary	Minor		Minor Adverse
Construction disruption to the local highway network	Temporary	Minor	CLP	Minor adverse
Completed Development				
Traffic Generation	Permanent	Neutral	Road development	Neutral
Cyclists	Permanent	Neutral	STP	Beneficial
Pedestrians	Permanent	Neutral	STP	Beneficial

REFERENCES

Ref 7.1: Chancellor of the Exchequer and Secretary of State for Transport (2006); 'Eddington Transport Study', HMSO, Norwich

Ref 7.2: DfT (2007); 'Towards a Sustainable Transport System', DfT Publications, London

Ref 7.3: DfT (2008); 'Delivering a Sustainable Transport System', DfT Publications, London

Ref 7.4: DETR (2011); 'Creating Growth, Cutting Carbon – Making Sustainable Transport Happen', DfT Publications, London

Ref 7.5: DCLG (2012); 'National Planning Policy Framework', HMSO

Ref 7.6: DfT (2007); 'Guidance on Transport Assessment', HMSO, Norwich.

Ref 7.7: DCLG (2014); 'Travel Plans, Transport Assessments and Statements in decision taking'.

Ref 7.8: Hertfordshire County Council; (2011); 'Hertfordshire Local Transport Plan' (LTP3).

Ref 7.9: Hertfordshire County Council; (2018); 'Draft Hertfordshire Local Transport Plan' (LTP4).



8 AIR QUALITY

INTRODUCTION

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

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

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

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

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

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Scope of Assessment

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

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

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

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

8.7 There are residential properties situated to the east and south of the Site within 350 m of the boundary. An assessment of construction phase impacts of dust and particulate matter in relation to human health and nuisance has therefore been included in this assessment. There are no sensitive ecological habitats within 50m of the Site boundary or within 50m of the route used by construction vehicles up to 500m from the site entrance, therefore an assessment of construction phase impacts on sensitive ecological habitats has been scoped out of this assessment.



8.8 During the operation of the Proposed Development there is the potential for impacts on local air quality to occur as a result of emissions from road vehicle trips generated by the operation of the Development. Guidance provided by Environmental Protection UK (EPUK) and the IAQM (Ref. 8.2) provides threshold criteria for establishing when significant impacts on local air quality may occur and when a detailed assessment of potential impacts is required. At locations outside an AQMA, a change in light duty vehicles (LDV) of more than 500 per day and / or a change in heavy duty vehicles (HDV) of more than 100 per day is considered to result in potentially significant impacts on air quality. At locations within or adjacent to an AQMA, a change in LDVs of more than 100 per day and / or a change in HDVs of more than 25 per day is considered potentially significant.

8.9 The Site does not fall within an AQMA and there are no AQMA declared within Welwyn Garden City. However, data provided by the transport consultants indicates that the Proposed Development will result in an increase in LDVs in excess of the threshold values for locations outside an AQMA. An assessment of impacts arising from vehicle emissions using the local roads has therefore been included in the assessment.

8.10 The EPUK & IAQM guidance also states that a detailed assessment should be completed if the proposals include one or more substantial combustion processes and there is a risk of impacts at relevant receptors. An assessment of the impacts arising from the exhaust emissions associated with the operation of the proposed on-site energy generating plant has therefore also been included.

8.11 Consideration has also been given to the suitability of the Site for residential development in terms of exposure.

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

Construction Phase Methodology

8.13 To assess the potential impacts associated with dust and PM₁₀ releases during the construction phase and to determine any necessary mitigation measures, an assessment based on the latest guidance from the IAQM (Ref 8.1) has been undertaken.

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

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

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

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

Dust Emission Magnitude

8.17 The magnitude of the dust impacts for each source is classified as Small, Medium or Large depending on the scale of the proposed works. Table 8.1 summarises the IAQM criteria

that may be used to determine the magnitude of the dust emission. These criteria are used in combination with site specific information and professional judgement.

Table 8.1: Dust Emission Magnitude Criteria

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



Receptor Sensitivity

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

Table 8.2: Factors Defining the Sensitivity of a Receptor

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

8.19 The sensitivity of a receptor will also depend on a number of additional factors including any history of dust generating activities in the area, likely cumulative dust impacts from nearby construction sites, any pre-existing screening such as trees or buildings and the likely duration of the impacts. In addition, the influence of the prevailing wind direction and local topography may be of relevance when determining the sensitivity of a receptor.

Area Sensitivity

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

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

Receptor Sensitivity	Number of Receptors	Distance from the source (a)			
		<20m	<50m	<100m	<350m
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low
(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.					

Table 8.4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM ₁₀ (µg/m ³)	Number of Receptors	Distance from the source (a)				
			<20m	<50m	<100m	<200m	<350m
High	> 32	> 100	High	High	High	Medium	Low
		10 - 100	High	High	Medium	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	28 - 32	> 100	High	High	Medium	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	High	Medium	Low	Low	Low
	24 - 28	> 100	High	Medium	Low	Low	Low
		10 - 100	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	< 24	> 100	Medium	Low	Low	Low	Low
		10 - 100	Low	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
Medium	>32	> 10	High	Medium	Low	Low	Low
		1 - 10	Medium	Low	Low	Low	Low
	28-32	> 10	Medium	Low	Low	Low	Low
		1 - 10	Low	Low	Low	Low	Low
	<28	-	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low
(a) For trackout, the distance is measured from the side of roads used by construction traffic. Beyond 50m, the impact is negligible.							



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

Risk of Dust Impacts

8.22 The risk of dust impacts prior to mitigation for each emission source is presented in Tables 8.5, 8.6 and 8.7.

Table 8.5: Risk of Dust Impacts – Demolition

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

Table 8.6: Risk of Dust Impacts – Earthworks and Construction

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

Table 8.7: Risk of Dust Impacts - Trackout

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

Construction Traffic

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



of access for construction traffic which would be via Bridge Road. Details of the likely construction traffic flows were not available at the time of writing, but it is anticipated that the additional traffic is unlikely to be significant in comparison to the existing traffic flows along the construction routes. A detailed assessment of the impact of emissions from construction traffic has therefore been scoped out of this assessment.

Operational Phase Methodology

Air Quality Assessment

8.24 Air quality at and in the vicinity of the Site has been predicted using the ADMS Roads dispersion model (Version 4.1, February 2017) and ADMS Extra. Both are commercially available dispersion model and has been widely validated for this type of assessment and used extensively in the Air Quality Review and Assessment process.

Traffic Emissions Modelling

8.25 The ADMS Roads model uses detailed information regarding traffic flows on the local road network and local meteorological conditions to predict pollution concentrations at specific locations selected by the user. Meteorological data from Luton Airport Meteorological Station has been used for the assessment.

8.26 The model has been used to predict road specific concentrations of oxides of nitrogen (NO_x) and Particulate Matter (PM_{10} and $\text{PM}_{2.5}$) at selected receptors in the vicinity of the surrounding road network and within the Development itself. The predicted concentrations of NO_x have been converted to NO_2 using the NO_x to NO_2 calculator available on the Defra air quality website (Ref. 8.3).

8.27 Traffic data for road links adjacent to the Development Site has been provided by the Transport Consultants.

8.28 A summary of the traffic data used in the assessment can be found in **Appendix 8.2**. The data includes details of annual average daily traffic flows (AADT), vehicle speeds and percentage Heavy Duty Vehicles (HDV) for the assessment years considered. Low traffic

speeds have been assigned to appropriate road links to account for congestion and queuing vehicles.

8.29 The following scenarios have been included in the assessment:

- 2016 – base scenario (for verification purposes);
- 2025 – future base scenario plus committed developments
- 2025 – future base scenario plus committed developments plus Proposed Development (hereafter referred to as ‘with development’ scenario)

8.30 The emission factors released by Defra in November 2017, provided in the emissions factor toolkit EFT2017 v8.0 have been used to predict traffic related emissions in 2016 and 2025 (the proposed opening year of the Development).

8.31 To predict local air quality, traffic emissions predicted by the model must be added to local background concentrations. Background concentrations of NO_x, NO₂, PM₁₀ and PM_{2.5} have been taken from the 2015 Defra background maps (issued November 2017). The maps

provide an estimate of background concentrations between 2015 and 2030. The data used for the modelling assessment are set out in Table 8.11.

8.32 Background concentrations for 2016 have been used to predict concentrations in 2025 assuming no change in future years. This is considered to represent a conservative approach to the prediction of future concentrations to take account of uncertainty in future background concentrations.

8.33 To determine the performance of the model at a local level, a comparison of modelled results with the results of monitoring carried out within the study area was undertaken. This process aims to minimise modelling uncertainty and systematic error by correcting the modelled results by an adjustment factor to gain greater confidence in the final results. This process was undertaken using the methodology outlined in Chapter 7, Section 4 of LAQM.TG(16). Full details of the model verification process are presented in **Appendix 8.3**.

8.34 An overall verification factor of 2.94 was determined which indicates that the model is underpredicting compared to the monitored concentrations in this area. The modelled NO_x concentrations were adjusted using this factor prior to conversion to NO₂ using the NO_x to NO₂ calculation tool available on Defra's website.

8.35 Local roadside monitoring data were not available for concentrations of PM₁₀ and PM_{2.5}. Modelled PM₁₀ and PM_{2.5} concentrations have therefore been adjusted by the verification factor obtained for NO_x, which is consistent with the guidance provided in LAQM.TG(16).

8.36 LAQM.TG(16) does not provide a method for the conversion of annual mean NO₂ concentrations to 1-hour mean NO₂ concentrations. However, research (Ref. 8.4) has concluded that exceedances of the 1-hour mean objective are generally unlikely to occur where annual mean concentrations do not exceed 60 µg/m³. Care has been taken to ensure that locations where the 1-hour mean objective is relevant are included in the assessment.

Modelling emissions from energy generating plant

8.37 The impact of emissions of NO_x and CO arising from the proposed energy generating plant has been assessed using the ADMS Extra dispersion model. The dispersion modelling has been carried out using three years (2014 to 2016) of hourly sequential meteorological data from Luton Airport Meteorological Station in order to take into account the inter-annual variability and reduce the effect of any atypical conditions. The input data is provided in **Appendix 8.4**.

8.38 A quantitative assessment of air quality at and around the Proposed Development site has been completed against the relevant Air Quality Strategy objectives set out in **Appendix 8.5**.

Significance Criteria

Construction Phase

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

Operational Phase

8.40 The significance of the predicted impacts has been determined following the advice provided in the EPUK & IAQM planning guidance, in combination with professional judgement. The guidance recommends that the impact at individual receptors is described by expressing the magnitude of incremental change in pollution concentrations as a proportion of the relevant assessment level and examining this change in the context of the new total concentration and its relationship with the assessment criterion as summarised in Table 8.8.

Table 8.8: Impact Descriptors for Individual Receptors

Long Term Average Concentration at Receptor in Assessment Year	% Change in concentration relative to AQAL (a)			
	1	2-5	5-10	>10
75% or less of AQAL	Negligible	Negligible	Slight adverse	Moderate adverse
76-94% of AQAL	Negligible	Slight adverse	Moderate adverse	Moderate adverse
95-102% of AQAL	Slight adverse	Moderate adverse	Moderate adverse	Substantial adverse

103-109% of AQAL	Moderate adverse	Moderate adverse	Substantial adverse	Substantial adverse
110% or more of AQAL	Moderate adverse	Substantial adverse	Substantial adverse	Substantial adverse
(a) a change in concentration of less than 0.5% of the AQAL is considered insignificant, however changes between 0.5% and 1% are rounded up to 1%.				

8.41 The EPUK & IAQM guidance notes that the criteria in Table 8.8 should be used to describe impacts at individual receptors and should be considered as a starting point to make a judgement on significance of effects, as other influences may need to be accounted for. The EPUK & IAQM guidance states that the assessment of overall significance should be based on professional judgement, taking into account several factors, including:

- The existing and future air quality in the absence of the development;
- The extent of current and future population exposure to the impacts; and
- The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

8.42 In accordance with the EPUK & IAQM guidance, short-term impacts of less than 10% of the AQAL are described as 'negligible', regardless of the existing air quality. Where the short-term process contributions are between 11 and 20% of the AQAL the severity of the impact is described as 'slight'. Impacts of between 21 and 50% and over 51% are described as 'moderate' and 'substantial' respectively.

Sensitive Receptors

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

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

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

8.45 To assess the impact of emissions arising from the traffic generated by the Proposed Development and the proposed energy generating plant pollutant concentrations have been predicted at 11 existing sensitive receptors within the vicinity of the Site including nearby residential properties and locations selected for short term exposure such as a bus stop, public house and library. Due to the height of the proposed stack, receptors have been selected at different heights representing different floors within the surrounding buildings. Details of these sensitive receptors are presented in Table 8.9 and the locations are illustrated in Figure 8.1.

8.46 The modelling assessment also predicted concentrations at a number of locations representing locations within the Proposed Development itself to assess the suitability of the Site for the proposed end use.

Table 8.9: Location of Sensitive Receptors

ID	Receptor	Type	Easting	Northing
R1	Flats on Broadwater Rd (nth of Penn Way)	Residential	524147.1	212527.1
R2	Flats on Broadwater Rd (sth of Penn Way)	Residential	524129.7	212466.8
R3	Flats on Broadwater Crescent	Residential	524119.3	212416.1
R4	Flats on Moatwood Green	Residential	524119.3	212327.8
R5	Flats on Athelsta Walk South	Residential	524024.8	212189.9
R6	Flat above The Bakehouse pub	Residential	524344.9	213051.5
ST1	The Bakehouse pub (Ground Floor)	Short-Term	524341.6	213041.2
ST2	Bus Stop on Bridge St	Short-Term	524212.8	213049.5
ST3	Wickes store	Short-Term	524277.8	213061.1
ST4	Library	Short-Term	524366.7	213237.8
ST5	Halfords	Short-Term	524418.4	213017.7
D1	Block 6A	Proposed Receptor	524267.1	213012.5
D2	Block 6C	Proposed Receptor	524232.7	213022.7



ID	Receptor	Type	Easting	Northing
D3	Block 6B	Proposed Receptor	524278.2	212967
D4	Block 6D	Proposed Receptor	524221.8	212970.7
D5	Block 6E	Proposed Receptor	524158.3	213045.8
D6	Block 6E	Proposed Receptor	524160.9	213027.7
D7	Block 4	Proposed Receptor	524158.9	213010.5
D8	Block 7A	Proposed Receptor	524264.1	212915.6
D9	Block 7F	Proposed Receptor	524163.1	212885.8
D10	Block 7E	Proposed Receptor	524175.1	212904.4
D11	Block 7D	Proposed Receptor	524188.2	212949.8
D12	Block 5	Proposed Receptor	524145.1	212887.8
D13	Block 5	Proposed Receptor	524113.8	212917.9
D14	Block 5	Proposed Receptor	524144.4	212927.9
D15	Block 5	Proposed Receptor	524154.3	212907
D16	Block 2A	Proposed Receptor	524089.2	212888.6
D17	Block 1	Proposed Receptor	524122	212865.1
D18	Block 2C	Proposed Receptor	524107.1	212950
D19	Block 8C west facade	Proposed Receptor	524160	212836.6
D20	Block 8C north facade	Proposed Receptor	524169.9	212850.6
D21	Block 4	Proposed Receptor	524135.3	212940.2
D22	Skate Park	Proposed Receptor	524068.3	212854.1

Figure 8.1: Location of Receptors Considered within ADMS Model



LEGISLATION, PLANNING POLICY AND GUIDANCE

8.47 The European Directive on Ambient Air and Cleaner Air for Europe

8.48 European Directive 2008/50/EC (Ref. 8.6) of the European Parliament and of the Council of 21st May 2008, sets legally-binding Europe-wide limit values for the protection of public health and sensitive habitats. The Directive streamlines the European Union's air quality legislation by replacing four of the five existing Air Quality Directives within a single, integrated instrument.

8.49 The pollutants included are sulphur dioxide (SO₂), NO₂, PM₁₀, PM_{2.5}, lead (Pb), carbon monoxide (CO), benzene (C₆H₆), ozone (O₃), polycyclic aromatic hydrocarbons (PAHs), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg).

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

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

8.51 The AQS sets standards and objectives for ten main air pollutants to protect health, vegetation and ecosystems. These are C₆H₆, 1,3-butadiene (C₄H₆), CO, Pb, NO₂, PM₁₀, PM_{2.5}, SO₂, O₃ and PAHs.

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

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

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

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

8.56 The AQS objective levels relevant to this assessment are set presented in **Appendix 8.2**.

Air Quality (England) Regulations

8.57 Many of the objectives in the AQS were made statutory in England through the *Air Quality (England) Regulations 2000* (Ref 8.8) and the *Air Quality (England) (Amendment) Regulations 2002* (the Regulations) (Ref 8.9) for the purpose of Local Air Quality Management (LAQM).

8.58 The Air Quality Standards Regulations 2010 (Ref 8.10) came into force on the 10th June 2010 and have adopted into UK law the limit values required by EU Directive 2008/50/EC. These regulations prescribe the 'relevant period' (referred to in Part I2V of the Environment Act 1995) that local authorities must consider in their review of the future quality of air within their area. The regulations also set out the air quality objectives to be achieved by the end of the 'relevant period'.

8.59 Ozone is not included in the Regulations as, due to its transboundary nature, mitigation measures must be implemented at a national level rather than at a local authority level.

Local Air Quality Management (LAQM)

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

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

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

8.63 The Department of Environment, Food and Rural Affairs (Defra) has published technical guidance for use by local authorities in their Review and Assessment work (Ref. 8.11). This guidance, referred to in this chapter as LAQM.TG(16), has been used where appropriate in the assessment.



National Planning Policy Framework

8.64 The National Planning Policy Framework (NPPF) (Ref. 8.12) sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of sustainable development. It requires Local Plans to be consistent with the principles and policies set out in the Framework with the objective of contributing to the achievement of sustainable development.

8.65 Current planning law requires that applications for planning permission must be determined in accordance with the relevant development plan. The NPPF should be taken into account in the preparation of development plans and therefore the policies set out within the Framework are a material consideration in planning decisions.

8.66 The NPPF identifies 12 core planning principles that should underpin both plan-making and decision-taking, including a requirement for planning to *'contribute to conserving and enhancing the natural environment and reducing pollution'*.

8.67 Under Policy 11: Conserving and Enhancing the Natural Environment, the Framework requires the planning system to *'prevent both new and existing developments from contributing to or being put at unacceptable risk or being adversely affected by unacceptable levels of air pollution'*.

8.68 In dealing specifically with air quality the Framework states that *'planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan'*.

Welwyn Hatfield District Plan (Saved Policies) (Ref. 8.13)

8.69 Policy R18 – Air Quality states:

'The Council will have regard to the potential effects of a development on local air quality when determining planning applications. Consideration will be given to both the operational characteristics of the development and to the traffic generated by it. Any development within

areas designated as Air Quality Management Areas must have regard to guidelines for ensuring air quality is maintained at acceptable levels as set out in the Air Quality Strategy.’

Welwyn Hatfield Borough Council Emerging Local Plan (Ref. 8.14)

8.70 A revised Local Plan was submitted for examination on 15th May 2017. The emerging plan contains the following policies relevant to air quality:

8.71 Policy SADM18 – Environmental Pollution states:

‘Prevailing air quality and potential impacts upon air quality arising from airborne emissions, dust and odour associated with the construction and operation of a proposal (including vehicular traffic) will be considered when determining 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 that are:

- i. Likely, due to the nature of the proposal, to give rise to significant air pollution;*
- ii. Within an Air Quality Management Area;*
- iii. Within 50 metres of a major road or heavily trafficked route;*
- iv. Within proximity to a source of air pollution which could present a significant risk to human health; and/or*
- v. Particularly sensitive to air pollution due to their nature, such as schools, health care establishments or housing for older people.’*

Control of Dust and Particulates associated with Construction

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

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

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

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

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

EPUK & IAQM Land Use Planning and Development Control

8.76 Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) published the Land Use Planning and Development Control Air Quality guidance in January 2017 (Ref. 8.2) to provide guidance on the assessment of air quality in relation to planning proposals and ensure that air quality is adequately considered within the planning control process.

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

8.78 This guidance has been used within this assessment.

Assessment of Dust from Demolition and Construction

8.79 The IAQM published guidance in 2014 on the assessment of emissions from demolition and construction activities (Ref. 8.1). The guidance sets out an approach to identifying the risk of impacts occurring at nearby sensitive receptors from dust generated during the construction process and sets out recommended mitigation measures based on the identified risk. This guidance has been used within this assessment.

BASELINE CONDITIONS

Welwyn Hatfield Borough Council Review and Assessment of Air Quality

8.80 Welwyn Hatfield Borough Council (WHBC) has carried out reviews of the air quality in the area, the air quality within the borough is generally good and as a result WHBC has not declared any AQMAs. Monitoring has indicated one area where the monitored levels are at the objective level, WHBC continue to monitor this location.

8.81 WHBC currently monitor air quality within the borough using a network of diffusion tubes and one roadside PM_{2.5} monitor.

Automatic Local Monitoring Data

8.82 WHBC operate one automatic monitoring site, this is a BAM PM_{2.5} monitor, which is currently positioned at a roadside location approximately 3.7km to the south of the Site. Monitoring commenced at this Site in spring 2016, a full year calendar year of ratified data is therefore not currently available. The monitoring data obtained for the year 2016 had a data capture rate of 60.3%, the annualised value measured for this site for 2016 was 9µg/m³ which is well below the relevant AQS objective level.

8.83 Based on the data recorded at this site, PM_{2.5} concentrations are expected to meet the annual mean and 24-hour objectives at the Development Site.

Non-Automatic Monitoring

8.84 NO₂ diffusion tube monitoring is carried out at a number of locations within the area. Data from the closest monitoring sites to the Site are presented in Table 8.10. Monitoring is also undertaken at a number of urban background sites within the regulatory area, however none are in a location that would be representative of the area of the Site, for completeness these are included in Table 8.10 below.

Table 8.10: Annual Mean NO₂ Concentrations Measured by Diffusion Tube (µg/m³)

Site Name	Site Type	OS Grid Reference	Annual mean concentrations (µg/m ³)				
			2012	2013	2014	2015	2016
WH18 – Broadwater Rd	Roadside	524285, 212988	-	-	42	35	40
WH2 - Parkway	Roadside	523656, 213133	30	27	25	24	24
WH2*, Bus Station, WGC	Near Road	523918, 213069	-	-	-	-	43
WH28 – Taxi Rank, WGC	Roadside	523815, 212960	-	-	-	-	33
WH9 – Mount Pleasant Close	Urban Background	523519, 209890	-	23	22	21	22
WH10 – The Ryde	Urban Background	523377, 209858	-	25	21	20	22
WH11 – Thistle Grove	Urban Background	526249, 211617	-	21	18	15	16
WH12 – The Commons	Urban Background	525852, 211187	-	21	19	15	18
WH13 - Alconbury	Urban Background	527150, 212966	-	18	17	14	16

8.85 The monitoring data shows NO₂ concentrations in exceedance of the relevant AQS objective level at roadside locations near to the Site.

8.86 Diffusion tubes are unable to record short-term concentrations of NO₂. However, as detailed previously, where annual mean concentrations are less than 60 µg/m³ it is unlikely there will be an exceedances of the 1-hour objective. Based on the annual mean concentrations recorded during 2016 it is expected that the 1-hour mean objective is being met in the vicinity of the Site.

Defra Background Maps

8.87 Additional information on background concentrations in the vicinity of the Site has been obtained from the Defra background pollutant maps. The 2015 Defra background maps provide estimated concentrations for the years 2015 to 2030. For the purposes of this assessment 2016 background concentrations have been obtained.

8.88 A review of the monitored concentrations at urban background locations within the borough and the background concentrations obtained from the Defra background maps indicated that the Defra background maps are underpredicting compared to the measured values in this area. At the monitoring sites on the outskirts of the urban areas, the Defra background maps are underpredicting by up to 40% and at the sites in a more urban setting by 14%.

8.89 The average pollutant concentrations from the grid squares representing the assessment area have been extracted from the maps which include the Site and road links included in the modelling assessment. To account for the disparity between the concentrations obtained from the Defra background maps and the likely real-world values, the concentrations from the Defra background maps have been adjusted. As the Site is within the centre of an urban area, the concentrations from the Defra maps have been increased by 14%.

8.90 The background concentration for each pollutant used in the assessment is presented in Table 8.11 below.

Table 8.11: Estimated Annual Mean Background Concentrations from Defra Maps ($\mu\text{g}/\text{m}^3$)

Year	NO _x	NO ₂	PM ₁₀	PM _{2.5}
2016	27.3	19.4	16.1	11.0

IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Construction Phase Effects

Area Sensitivity

8.91 The Proposed Development Site is currently the site of the former Shredded Wheat Factory. The demolition of the existing buildings on-site is currently taking place. The application does not include the demolition of the existing buildings, however the ES also considers the impact of the demolition of the buildings, therefore the dust effects associated with demolition have been included.

8.92 The assessment of dust impacts is dependent on the proximity of the most sensitive receptors to the site boundary. A summary of the receptor and area sensitivity to health and dust soiling impacts is presented in Table 8.12.

Table 8.12: Sensitivity of Receptors and the Local Area to Dust Impacts

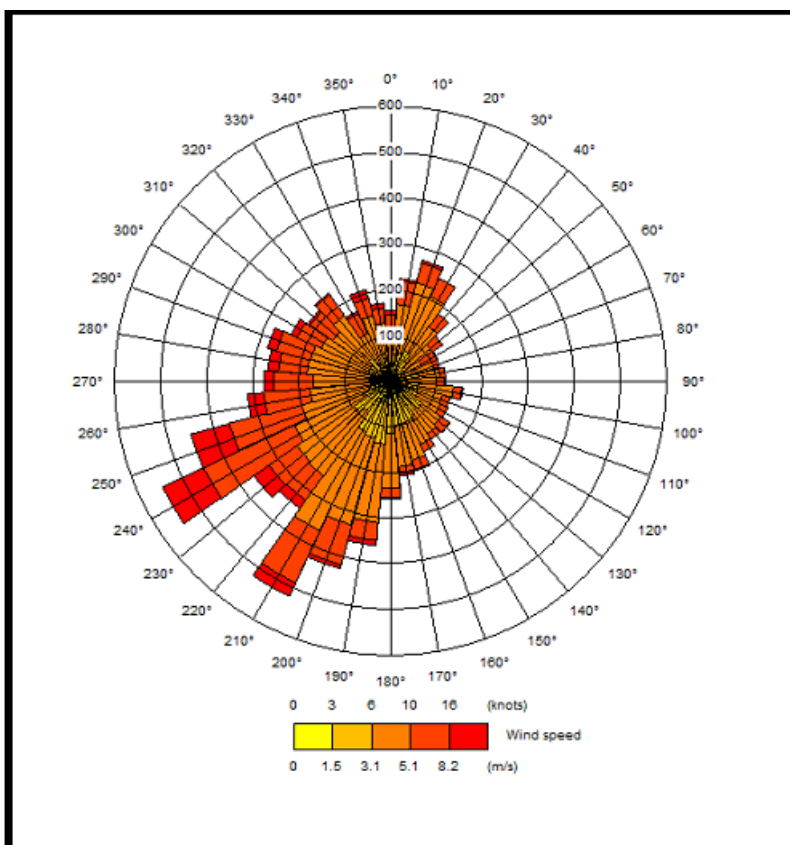
Receptor	Distance from Site Boundary (m)	Approx. Number of Receptors	Sensitivity to Health Impacts (a)		Sensitivity to Dust Soiling Impacts	
			Receptor	Area	Receptor	Area
Residential Properties	<20 m	20	High	Low	High	High
	20 - 50 m	20 to 40	High	Low	High	Medium
Historical (listed) Buildings	< 20 m	2	-	-	High	Medium
	50 – 100m	2	-	-	High	Low
Overall Sensitivity of the Area			Low		High	
(a) Estimated background PM ₁₀ concentration is 16.1 µg/m ³ .						

8.93 It is understood that construction traffic will travel along Bridge Road and / or Broadwater Road to gain access to the Site. Within the IAQM guidance it is indicated that impacts from trackout as a result of construction vehicles moving on the road network can result in impacts up to 500 m from the site access points and within 50 m of the roadside. There are sensitive receptors located within 50 m of Broadwater Road within 500 m of the Site access. The sensitivity of the surrounding area to dust soiling as a result of trackout is therefore considered to be medium although given background PM₁₀ concentrations the sensitivity in relation to human health would be low.

8.94 The precise behaviour of the dust, its residence time in the atmosphere, and the distance it may travel before being deposited will depend upon a number of factors. These include wind direction and strength, local topography and the presence of intervening structures (buildings, etc.) that may intercept dust before it reaches sensitive locations. Furthermore, dust would be naturally suppressed by rainfall.

8.95 A wind rose from Luton Airport is provided in Figure 8.2, which shows that the prevailing wind is from the southwest, therefore receptors to the northeast of the Development Site are the most likely to experience dust impacts from the development. The area to the northeast of the Site is predominantly commercial. The highest risk of impacts is expected to occur in this location.

Figure 8.2: Wind Rose for Luton Airport Meteorological Station (2016)



Dust Emission Magnitude

8.96 The existing buildings on Site are understood to comprise primarily of brick and concrete which are potentially dusty material. The demolition activities are likely to be at a height of less than 10m above ground. The demolition is currently underway which means that it is being undertaken within the wetter months of the year. The volume of the buildings to be demolished is not known, but it is considered that it may exceed 50,000m³. Therefore, to ensure a worst-case assessment, the dust emission magnitude is considered to be 'large'.

8.97 Earthworks will primarily involve excavating material, haulage, tipping and stockpiling. This may also involve levelling of the site and landscaping. The area of the Site is 8.7ha and therefore classed as '*large*' in terms of emissions magnitude based on the IAQM guidance.

8.98 Dust emissions during construction will depend on the scale of the works, method of construction, construction materials and duration of build. The main construction material would involve the use of concrete, known to be a dusty material. The volume of the proposed buildings

is not known but due to the size of the Site and to ensure a worst-case assessment, the dust emission magnitude is considered to be '*large*'.

8.99 Factors influencing the degree of trackout and associated magnitude of effect include vehicle size, vehicle speed, vehicle numbers, geology and duration. The number of HGV movements (leaving the site) is likely to be between 10 and 50 per day, therefore dust emission magnitude due to trackout is considered to be '*medium*'.

Dust Risk Effects

8.100 A summary of the potential risk of dust impacts, based on the low overall sensitivity of the area to human health and ecological effects and high overall sensitivity to dust soiling impacts, is presented in Table 8.13.

Table 8.13: Risk of Dust Impacts Prior to Mitigation

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

Operational Phase Effects

Predicted NO₂ Concentrations

8.101 Annual mean NO₂ concentrations, predicted at the identified receptor locations are presented in Table 8.14 below.

Table 8.14: Predicted Annual Mean NO₂ Concentrations (µg/m³)

Receptor	2025 Base + Committed	2025 Base + Committed + Development	Concentration Change due to Development (% of Objective)	Magnitude of Impact
R1 Ground Floor	23.3	24.4	2.9	Negligible
R1 3 rd Floor	20.5	20.9	0.9	Negligible
R2 Ground Floor	23.4	24.6	3.0	Negligible
R2 2 nd Floor	21.2	21.7	1.3	Negligible
R3 Ground Floor	24.8	26.5	4.1	Negligible
R3 2 nd Floor	21.2	21.8	1.4	Negligible
R4 Ground Floor	24.1	25.5	3.5	Negligible
R4 2 nd Floor	21.3	21.8	1.4	Negligible
R5 Ground Floor	25.7	27.5	4.6	Negligible
R5 2 nd Floor	21.1	21.6	1.2	Negligible
R6 Ground Floor	24.8	25.9	2.6	Negligible
ST1	27.3	28.6	3.4	
ST2	27.9	28.5	1.5	
ST3	26.8	28.1	3.2	
ST4	22.2	22.9	1.6	
ST5	22.7	23.2	1.2	

8.102 The results of the modelling indicate that in the opening year of 2025, the AQS objective level for annual mean NO₂ concentrations will be met at all of the receptor locations included within the assessment.

8.103 The highest increase as a result of emissions from the traffic generated by the Proposed Development and emissions from the proposed energy generating plant is 1.9µg/m³ (predicted at receptor 5 Ground Floor flat) which equates to a 4.6% of the air quality objective of 40 µg/m³. According to criteria set out in Table 8.8, the impact at all of the existing sensitive receptors is considered to be negligible.

8.104 Within the Site itself, the annual mean NO₂ concentrations are predicted to be well below (less than 75%) of the AQAL and therefore the impact with regards to new exposure is considered to be negligible.

8.105 Concentrations of annual mean NO₂ concentrations predicted within the study area are all well below 60µg/m³ therefore it is considered likely that the AQS objective level for hourly mean NO₂ concentrations will also be met. Therefore, the impact of the Proposed Development on the surrounding existing receptors and with regards to new exposure for hourly mean NO₂ concentrations is also considered to be negligible.

8.106 In accordance with the advice provided within the EPUK & IAQM guidance the impact of short-term concentrations arising from an elevated point source can be considered to be negligible if the process contribution is less than 10% of the relevant AQAL. The maximum process contribution arising from the proposed energy plant is 1.3µg/m³ which is predicted at the proposed receptor at Block 7D on the 4th Floor which is the block located to the north-east of the proposed stack. This represents 0.7% of the relevant AQAL and can therefore be considered to be negligible.

Predicted PM₁₀ Concentrations

8.107 Predicted annual mean PM₁₀ concentrations at the selected receptor locations are presented below in Table 8.15.

Table 8.15: Predicted Annual Mean PM₁₀ Concentrations (µg/m³)

Receptor	2025 Base + Committed	2025 Base + Committed + Development	Concentration Change due to Development (% of Objective)	Magnitude of Impact
R1 Ground Floor	17.3	17.6	0.9	Negligible
R1 3 rd Floor	16.4	16.5	0.3	Negligible
R2 Ground Floor	17.3	17.7	0.9	Negligible
R2 2 nd Floor	16.6	16.8	0.4	Negligible
R3 Ground Floor	17.8	18.3	1.3	Negligible
R3 2 nd Floor	16.7	16.8	0.4	Negligible
R4 Ground Floor	17.5	18.0	1.1	Negligible
R4 2 nd Floor	16.7	16.8	0.4	Negligible
R5 Ground Floor	18.1	18.7	1.5	Negligible
R5 2 nd Floor	16.6	16.8	0.4	Negligible
R6 Ground Floor	17.4	17.6	0.6	Negligible
ST1	18.0	18.3	0.8	-

Receptor	2025 Base + Committed	2025 Base + Committed + Development	Concentration Change due to Development (% of Objective)	Magnitude of Impact
ST2	18.3	18.4	0.3	-
ST3	17.8	18.1	0.7	-
ST4	16.9	17.1	0.5	-
ST5	17.1	17.3	0.3	-

8.108 The results of the modelling indicate that in the opening year of 2025, the predicted annual mean PM₁₀ concentrations will be well below (less than 75%) the objective level of 40 µg/m³ at all the selected receptors both with and without the Proposed Development operational.

8.109 Traffic associated with the Proposed Development is predicted to result in a maximum increase in the annual mean PM₁₀ concentration of 0.6 µg/m³ which equates to 1.5% of the 40 µg/m³ objective. At all of the receptors included in the assessment the impact is classed as negligible based on criteria set out in Table 8.8

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

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

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

8.112 Based on the above approach, the maximum number of days where PM₁₀ concentrations are predicted to exceed 50µg/m³ is between 0 and 2 days at the selected receptors with a change of less than one day as a result of the operation of the Development. The impact on 24-hour PM₁₀ concentrations is therefore also considered to be negligible.

8.113 Within the Site itself, annual mean and 24-hour mean PM₁₀ concentrations are predicted to be well below (less than 75%) of the relevant AQAL. The impact of the development with regards new exposure is therefore considered to be negligible.

Predicted PM_{2.5} Concentrations

8.114 Predicted annual mean PM_{2.5} concentrations at the identified receptor locations are presented in Tables 8.16 below.

Table 8.16: Predicted Annual Mean PM_{2.5} Concentrations (µg/m³)

Receptor	2025 Base + Committed	2025 Base + Committed + Development	Concentration Change due to Development (% of Objective)	Magnitude of Impact
R1 Ground Floor	11.6	11.8	0.8	Negligible
R1 3 rd Floor	11.2	11.2	0.2	Negligible
R2 Ground Floor	11.7	11.9	0.8	Negligible
R2 2 nd Floor	11.3	11.4	0.4	Negligible
R3 Ground Floor	11.9	12.2	1.1	Negligible
R3 2 nd Floor	11.3	11.4	0.4	Negligible
R4 Ground Floor	11.8	12.0	1.0	Negligible
R4 2 nd Floor	11.3	11.4	0.4	Negligible
R5 Ground Floor	12.1	12.4	1.3	Negligible
R5 2 nd Floor	11.3	11.4	0.3	Negligible
R6 Ground Floor	11.7	11.9	0.5	Negligible
ST1	12.0	12.2	0.7	Negligible
ST2	12.2	12.3	0.3	Negligible
ST3	12.0	12.1	0.6	Negligible
ST4	11.5	11.6	0.4	Negligible
ST5	11.6	11.6	0.3	Negligible

8.115 The results of the modelling assessment indicate that in the opening year of 2025, predicted annual mean PM_{2.5} concentrations will be well below (less than 75%) the 25 µg/m³ objective limit at the selected receptor locations both with and without the Proposed Development in operation.

8.116 The Proposed Development is predicted to increase PM_{2.5} concentrations by up to 0.3µg/m³ which equates to 1.3% of the objective. At all of the receptor locations the impact is classed as negligible.



8.117 Within the Site itself, annual mean PM_{2.5} concentrations are predicted to fall well below the relevant AQAL. The impact with regards to new exposure is therefore also considered to be negligible.

Predicted CO Concentrations

8.118 The maximum concentration of CO arising from the proposed energy generating plant at a receptor included within the assessment is 5.5µg/m³ which is predicted at Block 7D on the 1st floor which is the proposed block to the north east of the proposed stack. This represents less than 0.06% of the relevant AQAL, the impact is therefore considered to be negligible.

Uncertainty

8.119 There are many components that contribute to the uncertainty in predicted concentrations. The model used in this assessment is dependent upon the traffic data that have been input which will have inherent uncertainties associated with them. There is then additional uncertainty as the model is required to simplify real-world conditions into a series of algorithms.

8.120 Defra issued revised emission factors in November 2017 which better reflect the anticipated change in future year emissions. This assessment has used these emissions factors in conjunction with background concentrations obtained from background maps based on 2015 monitored concentrations to reduce the uncertainty in the prediction of future concentrations.

ASSESSMENT OF CUMULATIVE EFFECTS

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

8.122 Details of the committed developments considered cumulatively within this assessment are outlined in Chapter 3.

Construction Phase Effects

8.123 Guidance provided by the IAQM suggests that effects of dust and particulate matter generated from a construction site may be experienced up to 350m from the site. There are a number of committed developments located within 350m of the Site, however there are no sensitive receptors that fall within 350m of both the Site and any of the committed developments. All construction sites would be the subject of stringent mitigation measures similar to those that would be implemented during construction of the Proposed Development. The cumulative impact of the Proposed Development and all the committed developments is therefore considered to remain negligible following the implementation of the relevant site specific Dust Management Plans.

Operational Phase Effects

8.124 The traffic flows used for the assessment were calculated to account for the additional traffic from the committed developments in the area. The assessment of the significance of the Proposed Development effects has therefore taken into account the cumulative effect of the Site and the committed development on predicted future pollutant concentrations.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Mitigation

Construction Phase

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

8.126 A high risk of dust soiling impacts and a medium risk of human health (PM₁₀) effects is predicted at adjacent receptors during construction of the Proposed Development. Appropriate mitigation measures for the Site have been identified following the IAQM guidance and based on the risk effects presented in Table 8.13. It is recommended that the 'highly recommended' measures set out below are incorporated into a Dust Management Plan (DMP) and approved by WHBC prior to commencement of any work on site:

8.127 'Highly Recommended' Measures

- develop and implement a stakeholder communications plan that includes community engagement before work commences on site;
- display the name and contact details of the person accountable for air quality and dust issues on the site boundary (i.e. the environment manager/engineer or site manager);
- display the head or regional office contact information on the site boundary;
- record all dust and air quality complaints, identify cause, take appropriate measures to reduce emissions in a timely manner and record the measures taken;
- make the complaints log available to the local authority when asked;
- record any exceptional incidents that cause dust and/or air emissions, either on- or off- site and the action taken to resolve the situation in the log book;
- carry out regular site inspections to monitor compliance with the DMP, record inspection results and make inspection log available to WHBC when asked;
- hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes;
- undertake daily on-site and off site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of the site boundary, with cleaning to be provided if necessary.
- carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked;
- increase frequency of site inspection by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged periods of dry or windy conditions;
- agree dust deposition, dust flux or real-time PM₁₀ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site.
- plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible;



-
- erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles;
 - fully enclose site or specific operations where there is a high potential for dust production and the activities are being undertaken for an extensive period;
 - avoid site runoff of water or mud;
 - keep site fencing, barriers and scaffolding clean using wet methods;
 - remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If being re-used on site, cover as detailed below;
 - cover, seed or fence stockpiles to prevent wind whipping;
 - ensure all vehicles switch off engines when stationary - no idling vehicles;
 - avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable;
 - produce a construction logistic plan to manage the sustainable delivery of goods and materials;
 - only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction e.g. suitable local exhaust ventilation systems;
 - impose and signpost a maximum-speed limit of 15mph on surfaced and 10mph on un-surfaced haul roads and work areas;
 - produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials;
 - implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking and car-sharing);
 - only use cutting, grinding or sawing equipment fitted on in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems;
 - ensure an adequate water supply on site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
 - use enclosed chutes and conveyors and covered skips;
 - minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
 - ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods;
 - avoid bonfires and burning of waste materials;
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- soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust);
 - ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground;
 - avoid explosive blasting, using appropriate manual or mechanical alternatives;
 - bag and remove any biological debris or damp down such material before demolition;
 - re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable;
 - use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable;
 - only remove the cover in small areas during work and not all at once;
 - avoid scabbling (roughening of concrete surface) if possible;
 - ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place;
 - ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery;
 - use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site;
 - avoid dry sweeping of large areas;
 - ensure vehicles entering and leaving the site are covered to prevent the escape of materials during transport;
 - inspect on-site haul routes for integrity and instigate necessary repairs to the surfaces as soon as reasonably practicable;
 - record all inspections of haul routes and any subsequent action in a site log book;
 - install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned;
 - implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable);
 - ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit; and
 - access gates to be located at least 10 m from receptors where possible.
-



8.128 In addition to the 'recommended' measures, the IAQM guidance also sets out one 'desirable' measure which should also be considered for inclusion within the DMP. This is:

- for smaller supplied of fine powder materials ensure bags are sealed after use and stored appropriately to prevent dust;

Operational Phase

8.129 The Proposed Development is predicted to result in a negligible impact on local air quality therefore on-site mitigation measures are not considered necessary.

Residual Effects

Construction Phase

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

Operational Phase

8.131 The Proposed Development is predicted to have a negligible impact on local air quality.



SUMMARY

8.132 An air quality impact assessment has been undertaken to assess both construction and operational effects associated with the Proposed Development.

8.133 An assessment of the potential effects during the construction phase identified that releases of dust and particulate matter are likely to occur during site activities. Through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases may be effectively mitigated and the resultant effects are considered to be negligible.

8.134 Dispersion modelling has been carried out to assess the impact of the operational development on local air quality. The assessment has shown that NO₂ and PM₁₀ concentrations are predicted to be below the relevant objective limits throughout the study area and within the Site itself. The results indicated that the impact of the emissions arising from the traffic generated by the Proposed Development and emissions from the proposed energy generating plant is negligible. The impact with regards new exposure is also considered to be negligible, therefore the Site is considered to be suitable for the proposed use with regards to air quality.

Table 8.17: Air Quality Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Dust and particulate matter generated during the construction phase	Temporary	-	The adoption of <i>best practice and measures outlined in the IAQM guidance</i>	Negligible
Effects on Local Air Quality from emissions from construction traffic	Temporary	Negligible	None	Negligible
Effects on Local Air Quality from emissions from road traffic generated by the operation of the Proposed Development and emissions from the proposed energy generating plant	Permanent	Negligible	None	Negligible

REFERENCES

- Ref 8.1:** Institute of Air Quality Management (2014); 'Guidance on the assessment of dust from demolition and construction version 1.1'.
- Ref 8.2:** Environmental Planning UK & Institute of Air Quality Management. Land-use Planning and Development Control: Planning for Air Quality, January 2017
- Ref 8.3:** <http://uk-air.defra.gov.uk>
- Ref 8.4:** D. Laxen and B Marner (2003) Analysis of the relationship between 1-hour and annual mean nitrogen dioxide at UK roadside and kerbside monitoring sites.
- Ref 8.6:** Air Quality Directive 2008/50/EC
- Ref 8.7:** The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007)
- Ref 8.8:** The Air Quality (England) Regulations 2000 - Statutory Instrument 2000 No.928
- Ref 8.9:** The Air Quality (England) (Amendment) Regulations 2002 - Statutory Instrument 2002 No.3043
- Ref 8.10:** The Air Quality Standards Regulations 2010 – Statutory Instrument 2010 No. 1001
- Ref 8.11:** Department for Environment, Food and Rural Affairs (Defra), (2016): Part IV The Environment Act 1995 Local Air Quality Management Review and Assessment Technical Guidance LAQM.TG(16).
- Ref 8.12:** Communities and Local Government: *National Planning Policy Framework* (March 2012)
- Ref 8.13:** Welwyn Hatfield District Plan (Saved Policies) (2005)
- Ref 8.14:** Welwyn Hatfield Borough Council Emerging Local Plan

9 WIND ANALYSIS AND PEDESTRIAN COMFORT

INTRODUCTION

9.1 This Chapter addresses the microclimate effects of the Proposed Development. The Site is divided into North and South site, each having clusters of buildings arranged around a number of communal spaces for the pedestrians. Site analysis shows that immediate surrounding building comprise low rise factories and warehouses. Other developments are predominantly 2-3 storey high residential developments. The assessment will summarise the results of the wind environment assessment for pedestrian comfort and safety. The assessment methodology, legislative and policy context, assessment of potential effects in the foreseen scenario and recommendations for mitigation in case of any adverse impacts will also be included in this report.

LEGISLATION, PLANNING, POLICY AND GUIDANCE

National Planning Policy

9.2 There is no national planning policy related to wind microclimate around buildings.

9.3 The Guidance on Tall Buildings (EH, 2007) sets out how English Heritage (EH) evaluate proposals for tall buildings, which is still the most relevant. Paragraph 4.1.9 under the criteria for evaluation states that applicants seeking planning permission should ensure that the following criteria are addressed: *“The effect on the local environment, including microclimate, overshadowing, night-time appearance, vehicle movements and the environment and amenity of those in the vicinity of the building.”*

Guidance

9.4 The BRE Digest DG 520 Wind Microclimate around Buildings explains general principles of wind flow patterns around buildings to assist designers, planners and developers in developing massing and layout techniques to mitigate unacceptable wind speeds. The BRE Digest also gives advice on methods and criteria for assessing pedestrian wind comfort.

9.5 In the UK, most wind comfort assessments use the Lawson criteria which have become the widely accepted environmental criteria for the assessment of pedestrian comfort and safety. These criteria have been developed by T.V. Lawson (Ref. 9.1).

9.6 The Best Practice Guidelines for Computational Fluid Dynamics Simulation of Flows in Urban Environment COST Action 732 (Ref. 9.2) provides best practice guidelines for undertaking CFD simulations and their application to the prediction of flow and transport processes in urban environments.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

9.7 The methodology for the assessment uses Computational Fluid Dynamics (CFD) to analyse the effect on wind behaviour of the proposed buildings and compare resultant wind speeds with Lawson's criteria for pedestrian comfort and safety.

9.8 A 3-dimensional model of the Proposed Development is created using CAD software. The extent of the model comprises the Site and the surrounding context within a radius of 500m. It also includes proposed and committed developments detailed as per the information available on the Council's website. The model was constructed based on the Z map provided by the design team and the information available from the Council's website.

9.9 The virtual wind environment is simulated in Star CCM+ CFD software. The air surrounding the 3D model is divided into cells using a finite volume mesh. Fundamental physics equations are solved iteratively over time over all turbulent scales to yield statistically steady solution of flow variables. The Reynolds Averaged Navier Stokes (RANS) realizable $\kappa - \epsilon$ physics models were selected to model turbulence due to industry wide consensus of an adequate level of accuracy. Wind speed increases with height; it is important that this is captured in the model. Logarithmic equations are used to account for this, in order to accurately simulate the natural environment. This also allows the surface roughness to be accounted for. Through this process, the CFD software will predict wind speed at any point or a horizontal surface in the model.

9.10 The assessment methodology combines the use of the Computational Fluid Dynamics (CFD) to predict wind velocities around the Proposed Development, ten years hourly wind data from London City Airport meteorological station and the recommended Lawson's criteria for pedestrian comfort and safety.

Lawson's Criteria for Pedestrian Safety and Comfort

9.11 A methodology for assessing acceptable wind speeds has been developed by T.V Lawson at Bristol University (Ref. 9.1). This is widely accepted as an appropriate methodology for pedestrian comfort analysis in the UK.

9.12 The Lawson criteria is used in this study to assess the effects of local wind environment on pedestrian comfort and safety. The criteria outline different mean wind speeds acceptable for different types of pedestrian activity to maintain safety and comfort around the Site.

Significance Criteria

9.13 To maintain pedestrian comfort, the Lawson criteria indicate that the threshold hourly average wind speeds for each pedestrian activity should not be exceeded for more than a certain number of times (Table 9.2). This methodology of using frequencies and associating a different wind speed for each use is considered to be more practical as explained in T.V.Lawson "The Determination of the Wind Environment of a Building Complex before Construction". (Ref. 9.1).

9.14 The frequency of occurrence of the maximum acceptable wind speeds indicates the likely duration of it and the effect it may have on the pedestrians. The Bristol Method stipulates criteria of acceptability to maintain pedestrian comfort for different activities and safety. It relates frequency of occurrence to the hourly average wind speeds ranges of the Beaufort scale. (Table 9.1)

Table 9.1: The Beaufort Scale

Beaufort Force	Hourly Average Wind Speed (m/s)	Description of Wind
0	< 0.45	Calm
1	0.45-1.55	Light
2	1.55-3.35	Light
3	3.35-5.60	Light
4	5.60-8.25	Moderate
5	8.25-10.95	Fresh
6	10.95-14.10	Strong
7	14.10-17.20	Strong
8	17.20-20.80	Gale
9	20.80-24.35	Gale
10	24.35- 28.40	Strong Gale
11	28.40-32.40	Storm
12	>32.40	Hurricane

Table 9.2: Lawson's Comfort Assessment Criteria

Activity	Beaufort Range	Frequency of Occurrence (% of time)
Pedestrian Leisure Walking	B4 (5.60 - 8.25 m/s)	4%
Pedestrian Standing	B3 (3.35 - 5.60 m/s)	6%
Pedestrian Sitting	B3 (3.35 - 5.60 m/s)	1%

9.15 Lawson's safety criteria identifies areas where pedestrians could find walking difficult, stumble or fall. According to the criteria, the exceedance of the acceptable wind speed on Beaufort scale should not occur for more than 1 hour per year or 0.01% of the time, for pedestrian safety. (Table 9.3).

Table 9.3: Lawson's Safety Assessment Criteria

Activity	Beaufort Range	Frequency of Occurrence (% of time)
Pedestrian Safety	B6 (10.95-14.10 m/s)	0.01%



CFD Simulation and Frequency Analysis

9.16 As the Lawson Criteria are based on frequency of occurrence of wind speeds rather than absolute wind speeds alone, a procedure to combine all occurrences on the Site is required:

- Representative locations at which to evaluate pedestrian comfort are identified. These locations are defined as monitoring points at 1.5 metre height from ground level.
- A reference wind speed from the meteorological station, measured at 10 metre height, is used to generate a logarithmic wind velocity profile taking into account the roughness of the surroundings of the Site.
- Using the generated velocity profile, twelve different wind directions are simulated, spaced at 30° intervals to represent all wind directions. The results are generated in the form of CFD contour plots at 1.5 m above the ground level and the magnitude of the wind velocity at each measurement point is extracted for every wind direction.
- A wind speed factor is derived from the simulated wind directions at each measurement point.
- The wind speed factor is scaled by the hourly weather data measured at the meteorological station to derive the resulting wind speed experienced at each measurement point.
- A statistical frequency distribution is performed on all the hourly wind speeds at each measurement point based on the Lawson's Bristol method. The wind velocity occurring more frequently than recommended time is then obtained to identify if the criteria for various pedestrian activities and safety is met.

Limitations and Assumptions

9.17 The study takes into account the effect of geometry, height and massing of the Proposed Development on the local wind conditions. The buildings are modelled as blocks with smooth surfaces and sharp corners, which is considered as sufficient detail to represent buildings in wind modelling environmental flows.

9.18 The CFD model excludes both soft and hard landscaping (for example, trees and street furniture) therefore the conservative representation of the Site is modelled, as trees and planting will generally improve the local wind environment.



9.19 A logarithmic wind profile is used to model the variation of the wind speed with height and takes into account the roughness of the landscape beyond the modelled Site and surrounding buildings.

9.20 The methodology uses mean hourly wind values. CFD modelling cannot currently be used to predict gusts. High turbulence can result in 'Gust Equivalent Mean' values that are higher than the wind speed. This can presently only be done through the use of wind tunnel testing. The results of this analysis will therefore not include maximum gust speed or predict any impacts of this. Vector plots from CFD modelling have been used to provide qualitative assessment for key areas for the identification of wind acceleration.

9.21 The Lawson Criteria focus on the effect of the wind only and do not factor other environmental variables such as air temperature, rain, solar radiation, relative humidity, and other complex variables like the effect of clothing and age, which will ultimately effect overall pedestrian comfort at a given time. Despite the complexity of defining comfort, Lawson's simplified assessment method presents the best available methodology to anticipate wind effects on pedestrians.

BASELINE CONDITIONS

9.22 The Site is located on the east of the main train station of Welwyn Garden City. Currently, it is occupied by a decommissioned factory and a warehouse. The rest of the Site is vacant with hardstanding as some of the dilapidated buildings have been demolished. The Site is located in an urban context.

9.23 The baseline model was modelled to represent the existing scenario of the Site (Figure 9.1). On the west orientation, the Site is bound by the mainline railway track and a 2-3 storey warehouse, PW Gates building. To the immediate south, the Site overlooks a 5 storey student accommodation building, Salvisberg Court, and a 3 storey office buildings. On the east orientation, the Site is surrounded by warehouses and some offices. There are no major pedestrian areas except for a few car parking lots.

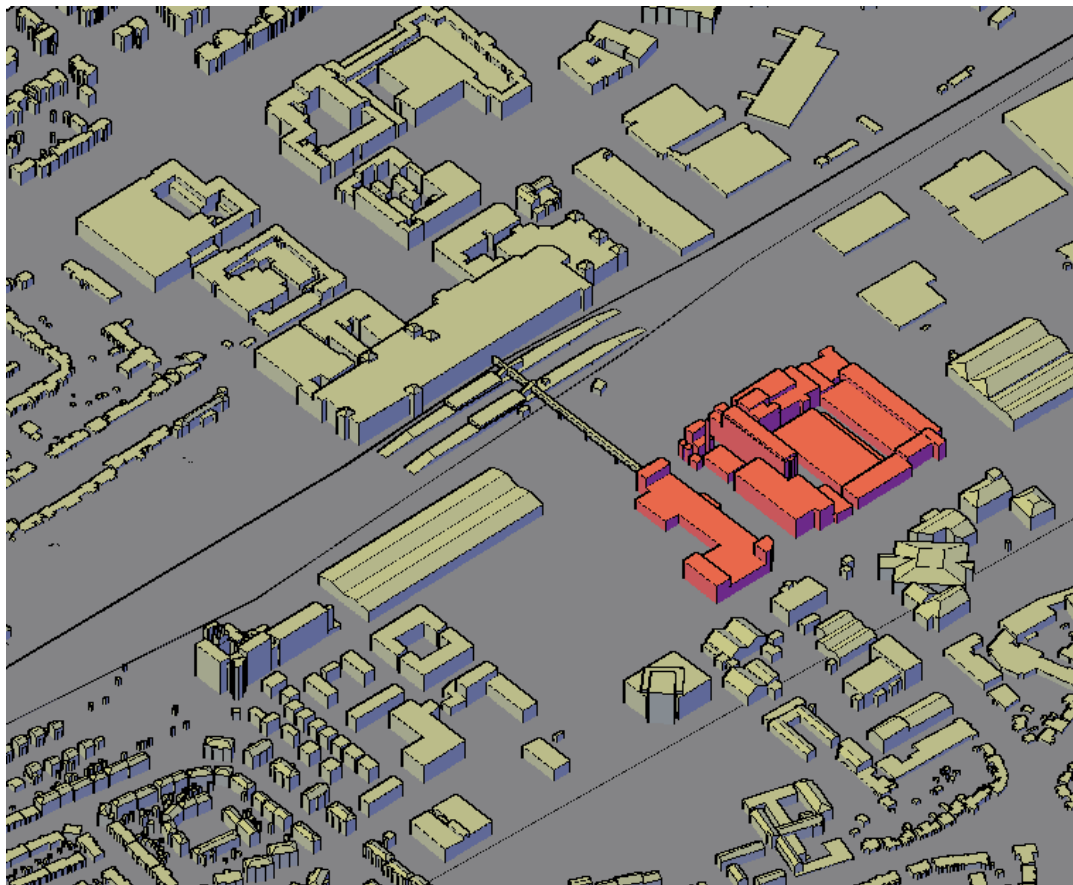


Figure 9.1 3D model of the Baseline Scenario (Site coloured in red)

9.24 The desktop study indicates that the wind is unlikely to experience any major effects as the context is urban and there are no tall buildings in the periphery. There could be some local wake effect around the corners of the surrounding buildings and the existing factory but these are unlikely to affect various pedestrian activities.

9.25 Wind is likely to accelerate in open areas such as the large open area to the south and west of the Site and along the railway line. This might affect the pedestrian activities of standing and walking in the adjacent car parking.

9.26 It should be noted that a full assessment is currently being undertaken which is likely to confirm our readings from the desktop study and provide full analysis. This will be made available in the meantime.

PROPOSED CONDITIONS

Construction Phase

9.27 The wind environment is largely dictated by the building masses which may gradually vary from the construction phase to operational phase. The assessment during the construction phase has not been quantitatively assessed as the resultant effects would be temporary in nature. Therefore, the assessment of wind environment has been limited to the operational phase of the Proposed Development.

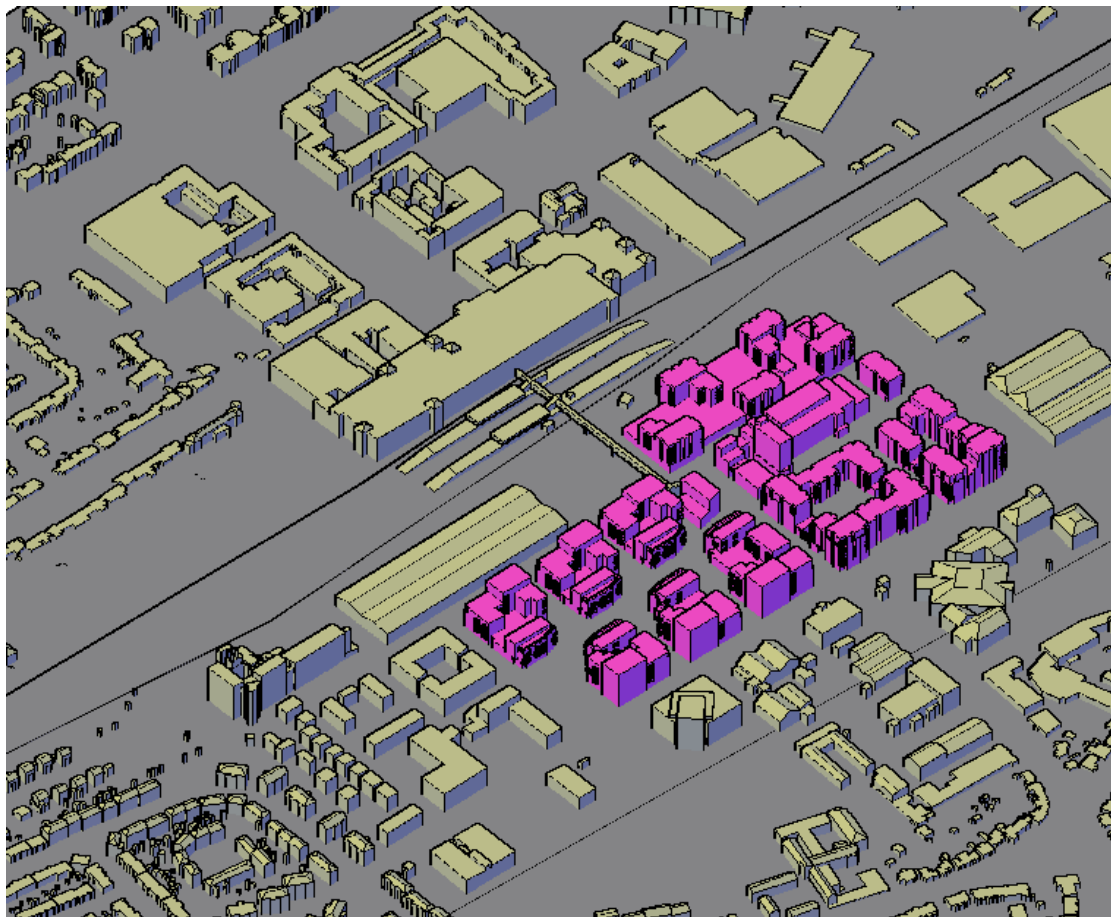


Figure 9.2 3D model of the Proposed Scenario (Proposed development in pink)



Operational Phase

9.28 The development comprises North and South Site. The North Site has a 5 storey listed building surrounded by other 5-6 storey buildings. Blocks 2, 6 and 7 have five to seven storeys high towers which are all connected at the podium level. These podium will provide large communal space for the residents. The South Site has six blocks arranged along the main vehicular road connecting it to the North Site. These blocks have up to 8 storeys high towers also connected at the podium level. The proposed scenario was modelled by inserting the Proposed Development on the Site (Figure 9.2).

9.29 The communal spaces at the podium level are likely to be affected by the downdraught of wind along the building facades. These spaces are sensitive receptors to various pedestrian activities like sitting, standing and walking. This effect may be more prominent in blocks 6 and 7 as the podium are flanked by up to seven storeys high towers on all sides. Other podiums are more open and are likely to have only limited wind effects.

9.30 There may be some funneling effect between the blocks as they create a streetscape. This may affect the pedestrians strolling around the buildings and the parking lots.

9.31 A detailed wind assessment for consecutive directions and cumulative frequency plots are being developed at the time of reporting which will indicate the areas of wind acceleration. This will be made available in the meantime.

CONCLUSIONS

9.32 The desktop study for wind effects on pedestrians has highlighted some areas for detailed assessment. In the Proposed Development there are large communal spaces at the podium level that are contained within the buildings. These building blocks are up to 7 storeys high and are likely have a downdraught effect on the prevailing winds. This may create some localised zones of wind acceleration. The effect this will have on various pedestrian activities is currently being assessed with detailed modelling at the time of reporting.

REFERENCES

Ref. 9.1: Lawson, T.V "The Determination of the Wind Environment of a Building Complex before Construction" Department of Aerospace Engineering, University of Bristol Report Number TVL 9025 (May 1990)

Ref. 9.2: Franke. J, Hellsten. A, Schlunzen. H, Carrisimo.B. (2007). Best Practice guidelines for the CFD Simulation of flows the Urban Environment- Cost Action 732.

10 NOISE AND VIBRATION

INTRODUCTION

10.1 This Chapter addresses the noise and vibration issues likely to arise from the construction and use of the development, and includes the consideration of noise and vibration from increased traffic on the local road network close to the Site. The development comprises of various elements as detailed within Chapter 5: The Proposed Development, and the assessment of noise impacts specifically attributable to the development employs information contained within Chapter 7: Transportation and Access of this Environmental Statement.

10.2 The 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;
- the likely residual effects after these measures have been employed; and,
- the cumulative effects.

10.3 This chapter has been prepared by Entran Limited.

LEGISLATION, PLANNING POLICY AND GUIDANCE

National Policy

National Planning Policy Framework (NPPF) (March 2012)

10.4 The NPPF (Ref. 10.1) sets out Government planning policy for England and how it is expected to be applied. As part of the Framework it specifically states in respect to noise matters:

‘Planning policies and decisions should aim to:

- *avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;*

- *mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;*
- *recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and,*
- *identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.'*

Noise Policy Statement for England NPSE (March 2010)

10.5 The Government is committed to sustainable development and the Department for Environment Food and Rural Affairs (Defra) plays an important role in this by working to secure a healthy environment in which current and future generations can prosper. One aspect of meeting these objectives is the need to manage noise for which Defra has the overall responsibility in England.

10.6 In March 2010, the Noise Policy Statement for England (NPSE) (Ref. 10.2) set out the long-term vision of Government noise policy as 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.'

10.7 The long-term vision is supported by the following aims:

'Through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development:

- *Avoid significant adverse impacts on health and quality of life;*
- *Mitigate and minimise adverse impacts on health and quality of life: and,*
- *Where possible, contribute to the improvement of health and quality of life.'*

10.8 The explanatory note to the policy statement emphasises that sustainable development is a core principle underpinning all government policy. In this respect, there is a need to integrate consideration of the economic and social benefit of the activity under examination with proper consideration of the adverse environmental effects.



10.9 To achieve these objectives the NPSE sets out three noise conditions to be determined by the assessor:

NOEL - No Observed Effect Level

10.10 This is the level below which no effect can be detected. In simple terms, below this level there is no detectable effect on health and quality of life due to the noise.

LOAEL - Lowest Observed Adverse Effect Level

10.11 This is the level above which adverse effects on health and quality of life can be detected.

SOAEL - Significant Observed Adverse Effect Level

10.12 This is the level above which significant adverse effects on health and quality of life occur.

10.13 The NPSE considers that noise levels above the SOAEL would be seen to have, by definition, significant adverse effects and would be considered unacceptable.

10.14 Where the assessed noise levels fall between the LOAEL and the SOAEL noise levels, the NPSE requires that:

‘All reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development....This does not mean that such adverse effects cannot occur.’

10.15 No objective values are offered within the NPSE, as the document does indicate that each site should be considered on its own merits. Consequently, consideration of the observed effects is made through an assessment methodology as detailed later in this chapter.

Local Policy

Welwyn Hatfield District Plan (Adopted 2005) and the Welwyn Hatfield District: Supplementary Design Guidance (February 2005)

10.16 The Welwyn Hatfield District Plan (Ref. 10.3) and the Supplementary Design Guidance (Ref. 10.4) outlines the Council's approach to the management of the environment, including general guidance that relate to the noise environment:

10.17 Policy R19 approach required for the assessment of noise impacts by the Local Planning Authority and states:

'Proposals will be refused if the development is likely:

- (i) To generate unacceptable noise or vibration for other land uses; or*
- (ii) To be affected by unacceptable noise or vibration from other land uses.*

Planning permission will be granted where appropriate conditions may be imposed to ensure either:

- (iii) An adequate level of protection against noise or vibration; or*
- (iv) That the level of noise emitted can be controlled.*

Proposals should be in accordance with the Supplementary Design Guidance.'

10.18 In dealing with noise, the Supplementary Design Guidance states:

'The Council will expect noise-sensitive developments to be located away from existing or proposed (programmed development such as new roads) sources of significant noise and conversely will expect noisy developments to be situated where the impact of the noise is not such an important consideration or where its impact can be minimised.

Where it is important for development to take place to meet strategic development requirements in the District (i.e. residential development to meet the housing allocation), the Council will expect adequate amelioration measures to be put in place to enable the development to go ahead.'

Other Guidance

The Institute of Environmental Management & Assessment (IEMA) Guidelines for Environmental Noise Impact Assessment (2014)

10.19 The Institute of Environmental Management and Assessment (IEMA) has published the '*Guidelines for Environmental Noise Impact Assessment*' (Ref. 10.5). The guidelines are

applicable to noise impact assessment for any scale of development proposal, including core principles to achieve effectively integration with the EIA, and provide advice on the issues that need to be considered in a noise impact assessment and whether the appropriate conclusions are being reached. The factors include:

- The appropriateness of the noise parameters used for the situation;
- The reference time period used in making the assessment;
- The level, character and frequency content of the noise sources under investigation; and,
- How the predicted noise levels relate to relevant Standards and guidelines.

10.20 The guidelines also recommend that the assessor should determine the degree of impact based on evidence derived from the assessment.

The Professional Practice Guidance on Planning and Noise (May 2017)

10.21 The ‘*Professional Practice Guidance on Planning and Noise*’ (ProPG) (Ref. 10.6) has been recently produced by a working group consisting of representatives of the Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH) to provide acoustical practitioners with guidance on the management of noise within the planning system in England.

10.22 The preparation of the ProPG acknowledges and reflects the Government’s overarching NPSE, the NPPF and Planning Practice Guidance (including PPG-Noise), as well as other authoritative sources of guidance. It provides advice for Local Planning Authorities (LPAs) and developers, and their respective professional advisers which complements Government planning and noise policy and guidance and, in particular, aims 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;
- promote appropriate noise exposure standards; and,
- assist the delivery of sustainable development.



10.23 The guidance, which has only recently been published, it is considered of interest to the Proposed Development under consideration.

Construction Phase

British Standard BS 5228: 2009, Parts 1 & 2, Code of Practice for Noise and Vibration Control on Construction and Open Sites (BS 5228 + A1: 2014)

10.24 Criteria for the evaluation of on-site construction noise have been derived for use on other construction projects and draws upon the guidance of British Standard BS 5228-1: 2009, Parts 1 & 2, *Code of Practice for Noise and Vibration Control on Construction and Open Sites* including the 2014 Amendment Number 1 (Ref. 10.7). This Standard defines an estimation procedure for site noise prediction and the level of sound in the neighbourhood that arises from a site, which will depend on the following factors, including:

- The sound power outputs of processes and plant;
- The periods of operation of processes and plant;
- The distances from sources to receiver;
- The presence of screening by barriers;
- The reflection of sound;
- Soft ground attenuation;
- Metrological conditions; and,
- Atmospheric absorption of sound.

10.25 It is generally recognised that for operational noise, the likelihood of complaints are related to the difference between the industrial noise and the existing background noise level. However, BS 5228 + A1: 2014 recognises a number of factors are likely to affect the acceptability of noise arising from a construction site and the degree of control necessary. These are outlined as follows:

- Site location;
- Existing ambient noise levels;
- Duration of site operations;
- Hours of work;
- Attitude to the site operator;
- Noise characteristics; and,
- Provision of additional mitigation.

10.26 BS 5228-1: 2009 + A1: 2014 also recognises that the longer the duration of activities on-site, the more likely that the noise from the Site will become an issue for the sensitive receptors. The standard also recognises the importance of good public relations and communication between the contractors and the local residents. Local residents might be willing to accept higher levels of noise where they know that such levels will only last for a short time, construction activities are carried out in accordance with the stated schedule and that the community is informed of their likely durations.

10.27 BS 5228-1: 2009 + A1: 2014 includes example thresholds of 'significant effects' (which to avoid confusion with EIA terminology can be considered to be the threshold values of the potential for disturbance) at residential dwellings, based on the existing ambient noise level. These thresholds can be based on fixed noise limits or the potential significance based upon noise change. BS 5228-1: 2009 + A1: 2014 Example Method 1 or the 'ABC' method, provides Threshold values for the activity noise level based on the background noise level. The Annex E states that a '*potential significant effect*' is indicated if the equivalent continuous sound level arising from the Site exceeds the threshold level for the appropriate category attributable to the Site.

10.28 Alternatively, Example Method 2 of BS 5228-1: 2009+ A1: 2014 states that '*noise levels generated by site activities are deemed potentially significant if the total noise pre-construction ambient plus site noise exceeds the pre-construction ambient noise by 5dB or more*'.

Operational Phase

British Standard BS 4142: 2014 Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142)

10.29 British Standard BS 4142: 2014 *Methods for Rating and Assessing Industrial and Commercial Sound* (Ref. 10.8) is intended to be used for the assessment of whether noise of industrial and/or commercial nature is likely to give rise to complaints from people residing in nearby dwellings. The Standard, which was updated in 2014, states that such noise can include:

- sound from industrial and manufacturing processes;
- sound from fixed installations which comprise mechanical and electrical plant and equipment;
- sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and,

- sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

10.30 The procedure contained in BS 4142 for assessing the likelihood of complaints is to compare the measured or predicted noise level from the source in question, the 'specific noise level', at the assessment position with the background noise level. Where noise contains acoustic features, such as tonality, impulsivity or other noticeable characteristics then a correction is added to the specific noise level to obtain the 'rating level' that reflects the contextual setting of the Site.

10.31 To assess the likelihood of complaints, the measured background noise level is subtracted from the rating noise level. Clause 11 of BS 4142 states:

'Typically, the greater this difference, the greater the magnitude of the impact;

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and,*
- *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.'*

10.32 The Standard recognises that it is necessarily general in nature and does not cover all situations but is regarded as helpful with certain aspects of environmental planning and is regularly used in conjunction with recommendations on noise levels and methods of measurement published elsewhere.

The Calculation of Road Traffic Noise (CRTN) and the Design Manual for Roads & Bridges (DMRB)

10.33 CRTN (Ref. 10.9) contains procedures for calculating levels of road traffic noise for use in assessing not only the entitlement for compensation under the Noise Insulation Regulations 1975 (as amended 1988) but also for more general applications such as the environmental appraisal of road schemes and land use planning.

10.34 The Design Manual for Roads and Bridges (DMRB) (2011) (Ref. 10.10), produced by the Highways Agency, sets out the steps to be taken in the assessment of the noise impacts of a road scheme. Although much of this document is of no direct application to the Development, the document does cite one particularly pertinent item of research evidence on the effect of changes in traffic noise level on the population.

10.35 In summarising the main research into traffic noise nuisance, Annex 5 of volume 11, section 3 of the DMRB states:

'Later surveys of residents before and after changes in noise exposure had occurred as the result of road projects indicated that people are more sensitive to abrupt changes in traffic noise than would have been predicted from the steady state evidence described above. In the period following a change in traffic flow, people may report positive or negative benefits when the actual noise changes are as small as 1 dB (A). As this noise change is equivalent to an increase of 25% or a decrease in traffic flow of 20%, this reaction may be partly attributed to an awareness of the changes in traffic rather than noise.'

10.36 The DMRB also contains data for estimating the extent of traffic noise annoyance in terms of the percentage of people bothered very much or quite a lot by road traffic noise.

World Health Organisation: Guidelines for Community Noise

10.37 The 'Guidelines for Community Noise' (Ref. 10.11) identify that, in dwellings, the critical effects of noise are on sleep, annoyance and speech interference. For noise affecting dwellings the guidelines state:

'To protect the majority of people from being seriously annoyed during the daytime, the sound pressure level on balconies, terraces and outdoor living areas should not exceed 55 dB L_{Aeq} for a steady, continuous noise. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound pressure level should not exceed 50 dB L_{Aeq} .'

10.38 Consequently, to avoid any possibility of sleep disturbance, indoor guideline values for bedrooms are 30 dB L_{Aeq} for continuous noise and 45 dB L_{Amax} for single sound events. These correspond to sound pressure levels at the outside façades of the living spaces which do not exceed 45 dB L_{Aeq} and 60 dB L_{Amax} , so that people may sleep with bedroom windows open. These values have been obtained by assuming that the noise reduction from outside to inside with the window partly open is 15 dB.



British Standard BS 8233: 2014 Guidance on Sound Insulation and Noise Reduction for Buildings (BS 8233)

10.39 The scope of BS 8233 (Ref. 10.12) is the provision of 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 or refurbished buildings undergoing a change of use rather than to assess the effect of changes in the external noise climate.

10.40 This Standard suggests suitable internal noise levels within different types of buildings, including residential dwellings. Section 7.3 of BS 8233 states that an internal noise level of 30 dB $L_{Aeq, T}$ within bedrooms is a '*desirable*' standard'. For living areas during the daytime, the standard recommends 35 dB $L_{Aeq, T}$ as a desirable standard for resting.

10.41 The Standard also states that '*where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.*'

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Construction Phase

10.42 A qualitative appraisal of the potential effects of construction noise and vibration from the Proposed Development was carried out in accordance with British Standard BS 5228-1: 2009 + A1: 2014. The appraisal was carried out with reference to the following parameters:

- The Site's location in relation to sensitive receptors;
- The construction processes/activities and phasing;
- The category, quantity and location of construction plant;
- The characteristics of the Site; and,
- Operational times.

10.43 Using BS 5228-1: 2009 + A1: 2014 an assessment of construction noise levels has been undertaken at a number of, potentially most affected, receivers close to the Site. The significance of the predicted noise levels was determined through comparison against the baseline measured levels as well as against typical absolute standards.

10.44 In the absence of detailed construction information, a qualitative assessment was undertaken and recommendations for appropriate mitigation measures in accordance with '*Best Practicable Means*' (as defined within the Environmental Protection Act, 1990) will be made, as necessary.

10.45 The receptors that could be most affected by construction noise and vibration are considered to be the residential properties close to the Site boundary at Wises Lane.

Operational Phase

10.46 The assessment of the operational phase of the Proposed Development is split into three sections:

- Assessment of the off-site road traffic noise effects;
- Assessment of the suitability of the Application Site for noise-sensitive development; and,
- Potential noise effects of the Proposed Development.

10.47 To assess the suitability of the Site for noise-sensitive uses, and determine the potential effects of the Proposed Development, the following work has been carried out:

- Consultation with the Environmental Health Department at Welwyn Hatfield Council in order to discuss and agree the scope of the assessment, methodologies to be adopted and the protocols of the baseline measurement program;
- Interpretation of measured background noise levels at various representative locations around the Site to provide a baseline for the assessment;
- Quantitative prediction and assessment of noise levels at local existing potentially sensitive receptors that could be affected by a change in road traffic noise levels following the Proposed Development;
- Quantitative assessment of measured and predicted noise levels on future users of the Site;
- Determination of the potential significance of effects associated with the operational phases of the Proposed Development;
- Provision of proposals for mitigation measures, where appropriate, in order to minimise any potential negative effects from and on the Site; and,



- Prediction of any residual effects, which may remain following implementation of mitigation measures.

10.48 Noise due to changes in road traffic movements off-site have been assessed, where traffic flows in the local area are likely to change significantly.

10.49 With respect to noise effects on proposed future residential receivers, a noise assessment has been undertaken based upon measured baseline data in order to determine initial suitability of the Site for residential development.

10.50 The potential for noise effects from any noise generating parts of the Proposed Development on the noise-sensitive residential parts of the Proposed Development will be discussed with reference to the potential for noise nuisance from such activities. Potential effects from any commercial uses or new building services will be considered with reference to BS 4142.

10.51 The development of iterative and practicable mitigation strategies is an important consideration at the interface with the principal noise sources and will have to be incorporated into the Proposed Development.

Modelling Process

10.52 Noise emission levels as a result of the Proposed Development have been calculated using predictive computer noise modelling. The noise modelling software (Cadna-A) uses algorithms based on ISO 9613 '*Attenuation of sound during outdoor propagation*' (Ref. 10.13) to predict noise levels generated at receiver locations by noise sources.

10.53 The noise levels have been predicted across the Site. To account for multi-storey buildings, noise levels have been predicted at 1.5m above the ground and 4m above the ground to represent ground and first floor levels at all receptor locations. The noise levels presented in the tables below are the greater of these predicted levels, and accordingly over-predict the potential impact.

10.54 The primary noise source associated with the Proposed Development would be from additional vehicle movements both within the Site and on the wider road network within the vicinity of the Site. The software also uses the CRTN procedure to calculate noise levels from free-flowing traffic on roads.

10.55 The noise predictions have not considered any shielding effects from fences or barriers as it cannot be assured that these are acoustically effective at this time. Again, this leads to an over-prediction of the potential impact.

Potential Environmental Effects

10.56 The significance of potential noise effects has been determined using a two-stage process, with criteria developed from best practice techniques and expert knowledge (e.g. DMRB as well as the IEMA Guidelines for Environmental Noise Impact Assessment). Effect significance is derived from measures of the magnitude (or scale) of the impact and the sensitivity (or importance) of the receptor affected.

10.57 The first stage involves determination of the magnitude of the impact and the sensitivity of the potentially affected receptors. The second stage involves comparing the determined levels of magnitude and sensitivity to estimate the significance of the potential effect. Since there are no known published 'standard' criteria for determining the significance of noise effects the published regulations, standards and guidelines relating to noise produced from different sources including roads, industrial sites, construction operations and occupational exposure, as previously mentioned, are employed.

10.58 In determining whether an effect on a receptor is significant, consideration has therefore been made to a wide range of criteria relating to the nature of the receptors, expected duration of exposure and the predicted increase in noise levels over and above baseline conditions. Having determined the magnitude of the impact and the sensitivity of the receptors, these two measures can be subjectively compared to determine the significance of the effect.

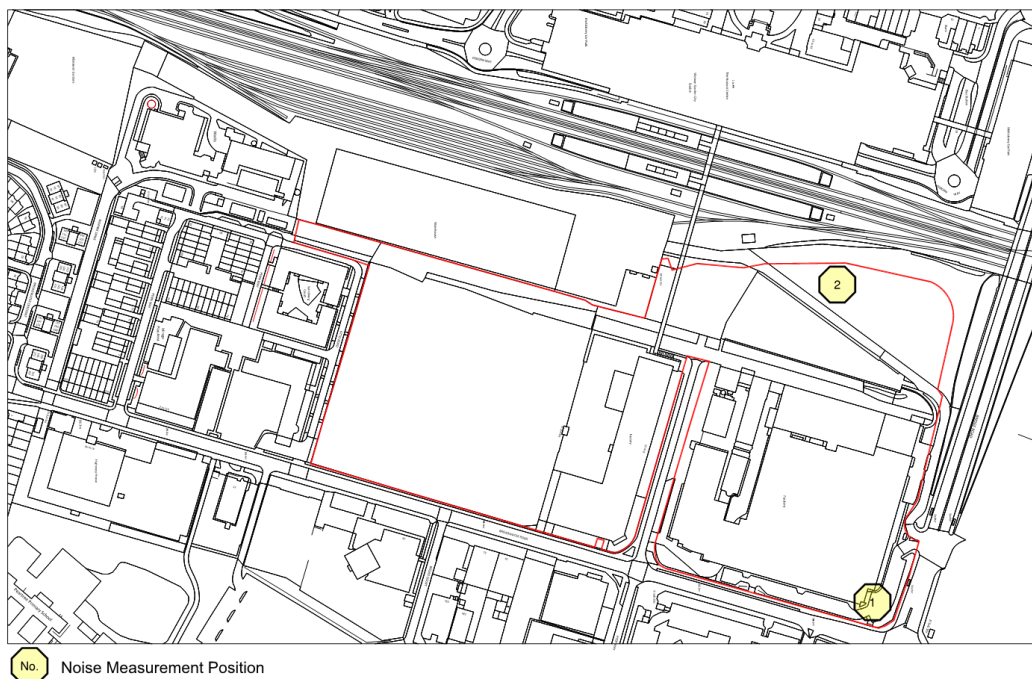
10.59 The full methodology is detailed within Chapter 3: Assessment Approach and Methodology with the levels of significance effect (either beneficial or adverse) defined as follows:

Table 10.1 – Significance of Effects

Effect Classification	Description
Major significant effect	Significant change in environmental conditions causing breaches of legislation or exceeding of statutory objectives. Likely to impact on resource / receptor designated as being of national or international importance. Likely to affect a large number of people on a permanent basis.
Moderate significant effect	Change which is unlikely to cause a breach of legislation but likely to impact on resource / receptor or regional or local importance. Likely to affect a small number of people on a permanent basis.
Minor significant effect	Change likely to impact on a resource / receptor which does not have a statutory designation but is of some local interest or importance. Likely to have a temporary impact on a small number of people.
No significant effect	A change to environmental conditions may occur but is unlikely to be damaging either to the local environment or to people. Feature effected is of little interest or importance.

BASELINE CONDITIONS

10.60 Measurements of the baseline noise climate have been undertaken at representative positions close within the Site, as indicated in the Figure below. The positions were selected to provide background ambient noise levels consistent with the study area but have necessarily taken account of the specific site availability, security and safety concerns. That notwithstanding, the survey positions, which are identified below, provide a robust and representative account of underlying noise levels at and around the Site.



10.61 The field noise surveys have been conducted over a continuous 6-day period using precision sound monitoring equipment. The purpose of this monitoring was to record the pre-existing noise levels at or within the vicinity of the Site boundary over typical day and night-time periods.

10.62 Automated noise measurements were undertaken in free-field conditions between 23rd and 28th November, 2017. The noise levels at the measurement positions are considered representative of the typical levels experienced within the study area and therefore present a robust account of background noise levels for comparison predictions.

10.63 Measurements were taken in accordance with guidance given in British Standards BS 7445: 2003, Part 1 '*Description and Measurement of Environmental Noise*' (Ref. 10.14). The microphones were located in free-field conditions, 1.2m above the local ground level and at least 3.5m away from any reflective surfaces. The measurements were conducted 10m from the boundary of the Site, close to the junction of Broadwater Road (A1000) with Bridge Road, Welwyn Garden City (OS ref. 524268, 213017) and to the East Coast Main Line Railway (OS ref. 524043, 212984), in order to replicate acoustical conditions at the façade of the proposed noise sensitive development.

10.64 Weather conditions for the duration of the measurement periods varied from light cloud cover and mild with very light winds (<2 m/s) to cold and cloudy with winds gusting to a maximum of 4 m/s (averaging 3 m/s). No prolonged rain showers occurred during the monitoring period. Consequently, conditions were considered generally conducive to environmental noise measurement.

10.65 The noise meters were field calibrated on site before and after monitoring and no significant deviation was noted. Valid calibration certificates are held for all of the equipment use on site and are available on request.

10.66 Tables 10.2 and 10.3 below summarise the noise level range and detail the number of occurrences during the day and night-time periods respectively. Full presentations of the measurement data can be found within Appendix 10 of this chapter.

Table 10.2: Summary of Noise Measurement Results from NMP 1

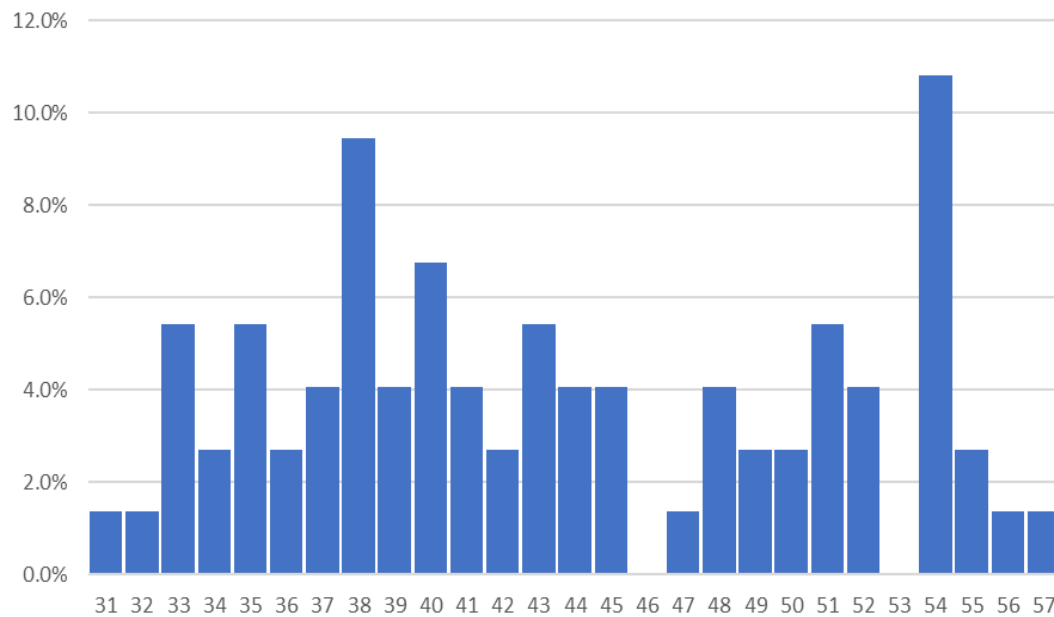
Location	Period	Noise Level, dB		
		$L_{Aeq,T}$	$L_{A90,T}$	L_{AFmax}
NMP 1	Daytime	69.0	61.9	104.4
	Night-time	62.2	54.0	93.3

Table 10.3: Summary of Noise Measurement Results from NMP 2

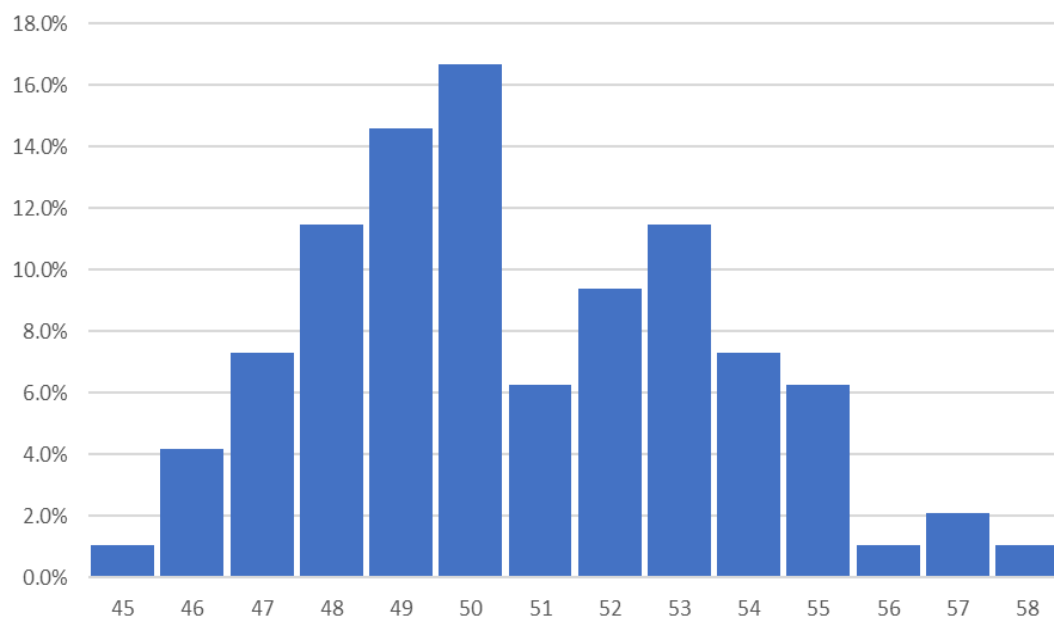
Location	Period	Noise Level, dB		
		$L_{Aeq,T}$	$L_{A90,T}$	L_{AFmax}
NMP 2	Daytime	59.3	53.0	89.4
	Night-time	52.2	50.0	77.0

10.67 In order to determine the representative night-time background noise levels, the statistical distribution of the night-time 15-minute L_{A90} values are presented in the Figures below.

Statistical Analysis to Determine the Background Night-time Sound Level ($L_{A90, 15\text{mns}}$) close to the Broadwater Road at Welwyn Garden City Noise Measurement Position between 23rd & 28th November, 2017



Statistical Analysis to Determine the Background Night-time Sound Level ($L_{A90, 15\text{mns}}$) close to the East Coast Main Line Railway at Welwyn Garden City Noise Measurement Position between 23rd & 28th November, 2017



10.68 Using the methodology contained within section 8 of BS 4142, it can be seen that the most commonly occurring values are 54 and 50dB $L_{A90, 15\text{mins}}$ respectively and in the context of the Site these levels can be considered representative of the night-time background noise level in the vicinity of the Site for the purposes of the assessment.

IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Construction Phases

10.69 It is inevitable with any major development that there will be some disturbance caused to properties within the vicinity of the Site during the construction phase. Disruption due to construction is generally a more localised phenomenon than the effects of the scheme after development, and is temporary in nature. The noise sensitive receptors that are likely to be most affected by the construction works are identified within Table 10.4 below. Other receptors will be affected but at a lower magnitude than those identified in within the Table.

Table 10.4 – Receptors

Receptor	Description
Albany Place, Broadwater Road	A modern 2-storey office complex located opposite the eastern boundary of the Application Site.
Birkin Court, Broadwater Road	A development of residential apartments and townhouses located immediately south-east of the Application Site along Broadwater Road.
Salvisberg Court, Otto Road	A development of Residential Apartment directly south of the Application Site.
The Howard Centre	A retail building west of the East Coast Mainline and Application Site.

10.70 There are techniques available to predict the likely noise and vibration effects from construction operations, such as those contained within BS 5228-1: 2009 + A1: 2014. However, the methodology is based on quite detailed information on the type and numbers of plant that is being used, as well as their location and the length of time they are in operation.

10.71 Full details on the type and numbers of plant and machinery are not available at this stage. Nevertheless, an estimate of the likely effects of noise from the construction phases has been made for those properties nearest to the development. The predictions are based on the



methodology given in BS 5228-1: 2009 + A1: 2014 and are in terms of the Equivalent Continuous Sound Level, L_{Aeq} , over the core working day. The predictions are 'worst case' in that it is assumed that there will be no particular mitigation measures implemented.

10.72 For the purposes of predicting the likely noise and vibration effect, the construction works have been divided into the following phases that will be undertaken during the construction programme:

- Site preparation enabling works and soil excavation (Task A);
- Structure and concreting (Task B);
- Building fabrication (Task C); and,
- Fit out and finishing works (Task D).

10.73 The following equipment and mechanical plant is assumed to be employed during the construction phases.

Table 10.5: Indicative plant to be used during construction activities

Plant and equipment	Construction Activity			
	Site Enabling & Ground Works	Concreting Activities	Building Fabrication	Finishing Works
Bulldozers	√			√
Concrete silo & ready mix lorries		√		√
Concrete splitters & concrete saws	√			
Cranes and hoists	√	√	√	√
Cutters, drills & small tools	√	√	√	√
Excavators and breakers	√			√
Generators	√	√	√	√
Concrete pumps		√		
Fork lift trucks	√	√	√	√
Hydraulic cutters	√	√	√	√
Asphalt laying equipment				√
Scaffolding and hydraulic access platforms	√	√	√	√
Temporary supports	√	√	√	√
Construction vehicle movements	√	√	√	√

10.74 The properties along Broadwater Road are approximately 20 metres from the proposed closest construction activities and, therefore, are the closest existing residential noise sensitive properties to the daytime construction works that could potentially suffer the greatest magnitude of effect.

10.75 The predicted range of noise levels are provided in Table 10.6 below. These are presented as the worst-case situation (i.e. when the construction activity is being undertaken at the closest part of the Site to the receptor location) when all the identified construction plant and equipment is assumed to be employed during the specific construction phases.

Table 10.6: Predicted ‘Worst Case’ Construction Noise Levels – L_{Aeq} , working day dB

Receptor	Construction Activity			
	Site Enabling & Ground Works	Concreting Activities	Building Fabrication	Finishing Works
Albany Place, Broadwater Road	70-75 dBA	70-75 dBA	65-70 dBA	65-70 dBA
Birkin Court, Broadwater Road	70-75 dBA	70-75 dBA	65-70 dBA	65-70 dBA
Salvisberg Court, Otto Road	70-75 dBA	70-75 dBA	65-70 dBA	65-70 dBA
The Howard Centre	65–70 dBA	65–70 dBA	60-65 dBA	55–60 dBA

10.76 It can be seen from the above table that noise levels are unlikely to exceed 75dB $L_{Aeq,T}$ at residential receptors close to the Site boundary, such as Birkin Court or Salvisberg Court, during the construction works, even when they are being undertaken at a position closest to the Site boundary. For properties away from the Site boundary the noise level during closest construction activities will be no more than the 65-70dB $L_{Aeq,T}$ range for the daytime construction hours.

10.77 Similar magnitudes of noise would also be expected at any future receptors built as part of a phased development in close proximity to the construction works. However, the likelihood of such effects is dependent on the final construction phasing and proximity to the receptors to the works.

10.78 That notwithstanding, the extent and duration of works in such close proximity will be limited and whilst noise from construction activities will be likely to exceed ambient noise levels in the vicinity of the Site throughout the whole of the construction works the range of noise levels during more typical operations (i.e. those located in working positions near the centre of the Site) will only be marginally above underlying ambient noise levels.

10.79 Consequently, using the assessment matrix detailed in Chapter 3 and the methodology outlined in this chapter, the noise from construction works is predicted to result in a discernible change in baseline noise conditions as worse-case at existing residential dwellings close to the Site boundary. Therefore, the significance of adverse effects at noise-sensitive receptors away from the immediate Site boundary, such as at the Howard Centre, has been determined as being a ‘Minor Adverse’ effect. At Birkin Court or Salvisberg Court, adjoining the Site boundary, the

effect will be more pronounced with the significance of negative effects being considered nearer to 'Moderate Adverse' during the very closest operations. Nevertheless, the effects associated with construction noise will be temporary and intermittent in nature.

10.80 Generic mitigation measures to reduce the noise effect during the construction phase are presented later in this chapter.

Vibration

10.81 There are currently no British Standards that provide a methodology to predict levels of vibration from construction activities, other than that contained within BS 5228: 2009, which relates to percussive or vibratory piling only. It is generally accepted that for the majority of people, vibration levels in excess of between 0.15 and 0.3 mm/s peak particle velocity are just perceptible. Table 10.7 below details the distances at which certain activities give rise to a perceptible level of vibration, these figures are based on historical field measurements:

Table 10.7 – Vibrational Effects

Construction Activity	Distance from activity when vibration may just be perceptible (metres)
Excavation	10 – 15m
Vibratory Compaction	10 – 15m
Heavy Vehicles (e.g. dump trucks)	5 – 10m
Hydraulic Breaker	15 – 20m
Auger Piling (e.g. CFA Piling)	15 – 20m

10.82 Given the above figures, and that the closest works will be approximately 20 metres or more from the nearest residential buildings for those activities expected to be incorporated in the construction works, it is likely that perceptible vibration will be a marginal consideration.

10.83 Therefore, the guidance contained within BS 5228: 2009 would conclude that since vibration levels will be potentially above the threshold of perceptibility, the likelihood of the demolition or construction works generating adverse comments about vibration is within the range designated as a 'low to medium' magnitude.



10.84 For the purpose of this assessment, vibration effects are considered to be temporary and intermittent but of a perceptible magnitude as a worst case. Consequently, at the most affected receptors adjoining the Site boundary, such as along Broadwater Road, will result in the significance of effects being no worse than 'Minor Adverse'. However, beyond those receptors immediately at the interface with the Site boundary and for the construction works which are not undertaken at that interface the significance of effects will be negligible and, as such, will result in no significant effect.

10.85 Mitigation measures to reduce the noise effect during the construction phase are presented in a later section of this chapter.

Construction Traffic

10.86 Whilst at this stage it is difficult to estimate the number of construction vehicles accessing the Site over the course of a day, it is anticipated that this would not exceed an average of 20 HGV 2-way movements per day, which would result in an increase of significantly less than 20% of current traffic levels experienced on the wider network.

10.87 Consequently, using the prediction methodology detailed within CRTN and DMRB, the change in overall daytime road traffic noise levels due to the increase in construction related traffic will be less than 1dBA at all receptors on the wider road network and, as such, will result in no discernible change to baseline noise conditions. Consequently, the significance of effects from construction related traffic movements will be negligible on the wider road network and will result in no significant effect.

Completed Development

10.88 The potential noise and vibration effects of the completed Proposed Development could arise from the following sources:

- increased levels of road traffic specifically attributable to the Proposed Development; and,
- noise from new fixed installations and mechanical plant associated with the Proposed Commercial Elements of the Development uses (e.g. electrical infrastructure or building services).

10.89 It is understood that the likely changes to traffic flows will be most notable during the daytime period but that electrical and mechanical plant will operate over a 24-hour period.



Consequently, an assessment of the likely noise effect of the Proposed Development has been undertaken for the appropriate time periods in accordance with national standards and guidelines as well as any relevant Local Authority guidance, standards or policies.

Noise from Road Traffic Movements

10.90 Road traffic associated with the Proposed Development is likely to give rise to some increase in noise levels at the existing dwellings and other noise sensitive locations around the Site. However, the Proposed Development has been subject to a recent traffic study for this EIA, which has established baseline traffic flows and predicted flows for a future year (2025) after opening of the completed scheme.

10.91 Baseline traffic flow figures for the 18-hour (06.00-00.00) 2-way Annual Average Weekday Traffic (AAWT) flows have been provided that includes information on the composition of traffic. However, it has been assumed that traffic speeds will be equal to the speed limit for the appropriate class of each road. Details of the traffic movements are contained within Chapter 7: Transportation and Access of this ES.

10.92 In order to quantify the change in traffic noise levels, these traffic data have been used, in conjunction with the prediction algorithms contained within the CRTN, to calculate the increase or decrease in road traffic noise associated with the introduction of the new development. The predictions have been made using a proprietary noise modelling software programme for affected receptors within the immediate vicinity of the Site.

10.93 The modelling software employs the standard prediction algorithms contained within ISO 9613-2 and CRTN to predict noise levels after determining the cumulative effects of vehicle flow, vehicle speed, percentage of heavy goods vehicles, topography and ground cover between the road and the receiver, as well as the characteristics of the road surface.

10.94 The predictions consider the 2-way AAWT flows, which are presented in Table 10.8 below, to reflect the 'worst case' situation:

**Table 10.8: Summary of AAWT Traffic Flows**

Road Segment	18-Hour 2-Way AAWT Traffic Flow		
	Existing (2017)	Future (2025) without Development	Future (2025) with Development
Bridge Road West	15739	16505	17091
Bridge Road	15739	16605	19016
Bessemer Road	12619	13313	16122
Bridge Road East	12914	13624	14546
Broadwater Road (North of Hydeway)	13764	14521	18520
Broadwater Road (South of Hydeway)	13764	14521	18752
Broadwater Road (South of the Development Site)	13764	14521	18726

10.95 The predicted Basic Noise Levels at the most affected sections specifically attributable to road traffic movements from the existing baseline conditions to the future year completed Proposed Development are presented in Table 10.9 below:

Table 10.9: Summary of the Predicted Basic Noise Levels from Road Traffic Movements

Road Segment	Basic Noise Level (dB LA10, 18hr)		
	Existing (2016)	Future plus Committed (2025) without Development	Future plus Committed (2025) with Development
Bridge Road West	68.5	68.7	68.9
Bridge Road	68.5	68.8	69.3
Bessemer Road	67.6	67.8	68.6
Bridge Road East	67.7	67.9	68.2
Broadwater Road (North of Hydeway)	67.9	68.2	69.2
Broadwater Road (South of Hydeway)	67.9	68.2	69.3
Broadwater Road (South of the Development Site)	67.9	68.2	69.3

10.96 The predicted change in noise levels at the most affected sections specifically attributable to road traffic movements from the existing baseline conditions to the future year with the completed Proposed Development are presented in Table 10.10 below:

Table 10.10: Summary of the Predicted Change in Basic Noise Levels from Road Traffic Movements

Road Segment	Change in Basic Noise Level (dB L _{A10, 18hr})	
	Existing (2017) to Future Baseline (2025) only	Existing (2017) to Future (2025) plus Development
Bridge Road West	0.2	0.4
Bridge Road	0.3	0.8
Bessemer Road	0.2	1.0
Bridge Road East	0.2	0.5
Broadwater Road (North of Hydeway)	0.3	1.3
Broadwater Road (South of Hydeway)	0.3	1.4
Broadwater Road (South of the Development Site)	0.3	1.4

10.97 For the 'worst case' situations, the maximum increase in the L_{A10,18hr} noise index will be 1.4 dB along Broadwater Road (South of Hydeway and the Development Site), 1.3 dB along Broadwater Road (North of Hydeway) and no more than 1.0dB on the remainder of the road network used in the ES. However, this increase also includes the future growth and, when this is taken in to account, the maximum increase in the L_{A10,18hr} noise index specifically attributable to the Proposed Development is less than 1.2 dB on all of the local road network.

10.98 Using the standardised data table methodology contained within Annex 6 of DMRB, the estimated level of traffic noise nuisance, in terms of the percentage of people '*bothered very much or quite a lot by traffic noise*' would result in a 3% increase of people being '*bothered very much or quite a lot by traffic noise*' along Broadwater Road but no more than 1% in all other areas affected by the development related traffic as a 'worst case'.

10.99 The predicted increase in noise along Broadwater Road will be just noticeable and permanent but will not exceed recognised or statutory objectives. Therefore, the significance of effects from traffic movements against the methodology detailed in Chapter 3 is considered to be a 'Minor Adverse' effect at those limited number of receptors located along Broadwater Road.

10.100 The effect from road traffic movements specifically associated to the Proposed Development along the remaining road network will be much less pronounced with an indiscernible change in baseline noise conditions at the most affected noise-sensitive receptors. Consequently, the significance of effects from traffic movements against the methodology detailed in Chapter 3 is considered to be a 'Negligible' effect at all other receptors on the local road network.

Noise from New Fixed Mechanical and Electrical Installations

10.101 Noise levels generated by new fixed mechanical and electrical plant that maybe experienced by local receptors depend upon a number of variables, the most significant of which are:

- the noise generated by plant or equipment used on-site, generally expressed as sound power levels;
- the distance between the noise source and the receptor;
- the attenuation due to ground absorption, atmospheric and barrier effects; and,
- the periods of operation of the plant on the site, known as its '*on-time*'.

10.102 The Proposed Development may include office, retail, healthcare and civic buildings as well as installations of mechanical and electrical equipment, Air handling systems mounted externally around the proposed residential and commercial buildings and a combined heat and power facility. However, at this early stage limited information has been supplied with regard to the fixed and mechanical plant requirements that are to be installed as part of the Proposed Development or any of the mitigation measures that will be included.

10.103 Consequently, it is not possible to present an inclusive assessment of the noise effects of the plant. However, in order to ensure that background noise levels at the nearest noise sensitive receptors do not increase significantly as a result of the development design, noise limits for electrical and mechanical plant have been provided. The assessment has been made in accordance with the general principles of BS 4142 and recognition that noise rating levels below about 35 dB are considered to be very low

10.104 Therefore, in order to achieve this, the plant installations should be designed to meet the following noise limits, which are consistent with the context of the acoustical setting:

Table 10.11: Day and Night-time Noise Level Limits for Fixed Installations of Mechanical Plant Associated with the Proposed Development

Receptor	Daytime Noise Limit for Fixed Installations of Mechanical Plant, $L_{Ar,Tr}$ (dB)	Night-time Noise Limit for Fixed Installations of Mechanical Plant, $L_{Ar,Tr}$ (dB)
Any Noise Sensitive Receptor	40	35

10.105 If fixed installations and mechanical plant were designed and specified to achieve the above-mentioned noise limit, an assessment of the predicted noise levels against the guidance contained within the Guidelines for Environmental Noise Impact assessment would suggest that for all locations specific noise from plant would be barely discernible and, therefore, would result in no significant effect.

Site Suitability Assessment

10.106 During the noise survey, it was noted that the Site experiences noise mainly from transportation and localised existing commercial sources. Noise from the adjoining commercial premises was noted to be of a low magnitude and barely noticeable above the existing road traffic and rail sources. Therefore, it has been determined that in general the Site can be identified as a location which experiences noise predominately from transportation sources.

10.107 The equivalent continuous sound level, $L_{Aeq,T}$ from transportation sources at the Site for the day and night time periods have been determined for the future year with the completed Proposed Development (2025) using the computational predictive noise software. The model has combined data from the noise level measurements and predictions of road and rail sources to calculate the noise levels across the study area.

10.108 The equivalent continuous noise levels across the Proposed Residential Development areas of the Site typically fall within the 65dB $L_{Aeq,T}$ contour for the daytime and 60dB $L_{Aeq,T}$ contour for the night-time. Such levels equate to the Noise Exposure Category C as defined within the superseded Planning Policy Guidance Note 24: Planning and Noise (PPG24) (Ref. 10.15). The noise levels would be contained within the '*Medium Noise Risk Category*' as detailed within the ProPG guidance, which provides a situation where mitigation measures will be required to ameliorate and minimise noise in order to make noise-sensitive development acceptable and which clearly demonstrates that any significant adverse noise impact will be avoided in the finished development.

10.109 Consequently, commensurate measures will need to be introduced in order to control the source of, or limit the exposure to, noise from transportation sources. Such measures will need to be proportionate and reasonable, but may include one or more of the following:

- Engineering – the reduction of noise at the point of generation (e.g. By using quiet machines and/or quiet methods of working); containment of noise generated (e.g. By insulating buildings which house machinery and/or providing

purpose-built barriers around the site); and protection of surrounding noise-sensitive buildings (e.g. By improving sound insulation in these buildings and/or screening them by purpose-built barriers);

- Lay-out – an adequate distance between the source and noise-sensitive building or area; screening by natural barriers, other buildings, or non-critical rooms in a building; and/or,
- Administration – by limiting operating times of source; restricting activities allowed on the Site; specifying an acceptable noise limit.

10.110 The noise from the existing transportation sources has potential to be an intrusion to future residents and, therefore, will need to be taken into account when developing the Site.

10.111 Therefore, a set of generic façade treatments to mitigate the potential effects of noise have been recommended below to achieve appropriate internal noise levels.

MITIGATION

Construction Phases

10.112 It will be ensured that noise during the construction phases does not give rise to unacceptable impact through the use of either a formal Construction Environmental Management Plan (CEMP) or through the imposition of agreements made under the Control of Pollution Act Section 61 Prior Consent process, or a combination of the two procedures. The Section 61 process typically controls construction noise through agreement of methods, working hours, noise limits and, where appropriate, a noise monitoring programme. Notwithstanding this, a minimum initial requirement to control noise will be placed upon the contractor to minimise disturbance. This requirement will be written into the contracts of those undertaking construction. From the experience of other projects, contractors are able to exercise a significant degree of control over on-site activities and by attention to the recommendations set out in BS 5228-1: 2009 + A1: 2014.

10.113 Whilst the detailed measures will be incorporated into CEMP (or equivalent) that will be subject to LPA approval, this assessment has outlined the mitigation measures that will be employed to minimise impacts. Good practice noise mitigation measures in line with 'Best Practical Means' (as set out in BS 5228-1: 2009 + A1: 2014) will be utilised throughout the construction phases as outlined below:



- Good maintenance of plant to ensure that excessive noise levels are not generated;
- Regular integrity checks of noise mitigation measures fitted to items of plant. Such measures are likely to include silencers and engine covers. Where repair or replacement is required, the plant will, where possible, be taken out of use until repair or replacement of parts has been undertaken;
- If plant or machinery is found to be generating excessive noise, the plant will, where possible, be taken out of service until repairs can be undertaken to reduce noise levels generated;
- Plant will be switched off when not in use;
- High revving of engines will be minimised;
- Mobile plant under the control of the on-site management may be fitted with 'smart' or 'white noise' reversing alarms; and,
- Good communication with local residents through a community liaison group.

10.114 Construction will primarily be undertaken during the daytime to avoid the more sensitive night-time periods and in addition, the Site will be registered under the Considerate Constructors Scheme (www.ccscheme.org.uk). Under the scheme, sites commit to minimise noise and other potential disturbances and are regularly inspected.

Completed Development

Noise from Road Traffic

10.115 It has been determined that for this Proposed Development the worst-case effects of road traffic will be just noticeable along Broadwater Road, although the increase will not exceed recognised or statutory objectives. However, voluntary traffic noise mitigation measures could be adopted to ameliorate the potential effects. These could include acoustic screen and barriers or speed reduction measures to minimize noise emissions.

10.116 The proposed noise-sensitive development at the Site will experience noise levels that are contained within the 65 dB $L_{Aeq\ 16h\ (07.00-23.00)}$ or 60 dB $L_{Aeq\ 8h\ (23.00-07.00)}$ contour and, as such, it will be necessary to include sufficient and adequate façade treatments to the proposed noise-sensitive buildings. For noise-sensitive properties the envelope construction should consist of the following measures (or equivalent acoustically performing elements):

Table 10.12: Example envelope constructions for external levels not exceeding 60 dB $L_{Aeq,16h}$ or 60 dB $L_{Aeq,8h}$ (e.g. at the site interface with the road and rail sources)

Element	Recommended Envelope Construction
Wall Assembly	Solid brickwork, brick/block cavity, brick clad timber frame or timber frame with lightweight cladding.
Windows	Double glazing, 10/12/6 mm, well-sealed when closed. ($R_w \geq 38\text{dB}$).
Roof Assembly	Tiled/slatted or insulated roof, 9 kg/m ² plasterboard ceiling.
Ventilators	Acoustic trickle ventilators ($D_{n,e,w} \geq 35\text{ dB}$) in all habitable rooms.

10.117 By employing such attenuating measures, it is possible to attain an internal ambient noise level at or below the level recommended as 'desirable' within BS 8233: 2014 and the WHO criteria.

10.118 The predicted sound pressure levels on balconies, terraces and outdoor living areas will also be likely to exceed the levels recommended as 'reasonable' within BS 8233: 2014 and, as such, any open amenity spaces, including balconies, at the site boundary interface with the adjoin road network should be avoided or include a provision for screening within the Proposed Development designs.

10.119 For any residential buildings, that are screened from the adjoining road network, the envelope construction should consist of the following measures (or equivalent acoustically performing elements):

Table 10.13: Example envelope constructions for external levels not exceeding 55 dB $L_{Aeq,16h}$ or 45 dB $L_{Aeq,8h}$

Element	Recommended Envelope Construction
Wall Assembly	Solid brickwork, brick/block cavity, brick clad timber frame or timber frame with lightweight cladding.
Windows	Any practical window specification (i.e. 4/16/4 mm), well-sealed when closed. ($R_w \geq 31\text{dB}$).
Roof Assembly	Tiled/slatted or insulated roof, 9 kg/m ² plasterboard ceiling.
Ventilators	Trickle ventilators.



Noise from Fixed Mechanical and Electrical Installations

10.120 There are a number of measures that can be introduced to control noise from the mechanical and electrical plant installations associated with the noise-generating elements of the development proposals, including the provision of acoustically attenuated outlets or enclosures.

10.121 Limiting noise emission levels through appropriate Conditions of Use will ensure that noise emissions will be controlled in accordance with the assessment methodology detailed within Clause 11 of BS 4142 and ensure that no significant effects are experienced by noise-sensitive receptors.

ASSESSMENT OF CUMULATIVE EFFECTS

10.122 In addition to providing a description of the Proposed Development and the likely significant effects on the environment, the EIA Regulations also require that cumulative effects are described (i.e. those relating to the effects of the Proposed Development in conjunction with the effects associated with other relevant committed / proposed developments) as the accumulation of effects from several developments, that individually might be insignificant, could amount to a significant effect when considered together.

10.123 The relevant committed / proposed developments are set out below:

- The former Xerox Campus, Bessemer Road, Welwyn Garden City;
- Land at the Pall Mall distribution site, Welwyn Garden City;
- Mercury House, Broadwater Road, Welwyn Garden City;
- The former Argos Direct Distribution Depot, Bessemer Road, Welwyn Garden City; and,
- Land East of Bessemer Road, Welwyn Garden City.

10.124 It should be noted that the noise and vibration assessment has already considered the increase of road traffic movements from the future committed developments outlined above as part of the predicted future baseline conditions. However, in order to provide consistency with the EIA Regulations the potential cumulative effects are presented below.

Short Term

10.125 The construction activity at each of the future committed development sites has the potential to cause localised noise disturbance around each development site.

10.126 However, it is not known whether the construction activities from each development will occur at the same time as those on the Site. Nevertheless, there are unlikely to be any cumulative effects from construction noise due to the intervening distance between the Site and the other development sites.

Long Term

10.127 The committed developments would lead to additional traffic movements on local roads. However, a significant increase in traffic noise levels would only occur where the traffic flows increase by 25% or greater.

10.128 The assessment has considered the additional traffic movements from the committed developments and determined that the significance of effects will be no worse than 'negligible' at the most affected receptors on the wider road network.

10.129 Consequently, there are no other expected significant cumulative effects due to the intervening distance between the Site and the other development sites.

10.130 There is also the potential for a '*creeping*' background noise level to occur as a result of the combined noise sources being introduced at all of the schemes coming forward. However, the Proposed Developments will be subject to secured Conditions of Use that ensures the noise rating level emitted from fixed plant and machinery will not exceed the background noise level at any time.

10.131 Such a Condition of Use, which is consistent with other the other committed development sites, ensures that background noise levels at noise sensitive receptors are protected from any significant increases.

10.132 Additionally, this assessment has considered the predicted noise levels specifically attributable to the Proposed Development in the context of the most relevant design standards and guidelines for internal and external noise amenity and included an adequate and effective provision of measures to mitigate noise effects.

10.133 Consequently, it is concluded that the acoustical characteristics of the development scheme will have a limited impact from either road traffic or commercial noise sources and, that in light of the intervening distance between the Site and other sites, any cumulative effects will be unlikely to be significant at any noise-sensitive receptors even as a worst case.

RESIDUAL EFFECTS

Construction

10.134 The effect of the construction works will be to significantly increase ambient noise levels at the most affected façades of noise sensitive properties adjoining the Site by up to 10dB(A) during worst case activities. The noise effect at those sensitive receptors adjacent to the Site boundary during construction will result in a considerable change in baseline noise levels during any ground works and concreting activities and as such will be 'Moderate Adverse'. However, the works will be temporary in nature and for all other activities (e.g. building fabrication) the residual effect will be 'Minor Adverse'. Whilst the effect within other noise sensitive receptors away from the immediate Site boundary are predicted to be no more than 'Minor Adverse' during worst case construction activities, the magnitude of the noise effects will be less than at those closest receptors.

10.135 With proposed mitigation measures implemented, internal noise levels within the Proposed Development would achieve the 'reasonable' design range as detailed with BS 8233: 2014 at all noise-sensitive receptors during worst case construction works provided that windows were kept closed as a minimum amelioration measure available to an occupant.

10.136 There will also be a minor adverse perceptible vibration effects during the construction works undertaken in close proximity to the Site boundary according to the methodology detailed in Chapter 3.

Completed Development

10.137 The effects from road traffic movements specifically associated to the Proposed Development along Broadwater Road will result in a small and barely discernible change in baseline noise conditions at the most affected noise-sensitive receptors, although the increase will not exceed recognised or statutory objectives. Therefore, the significance of effects from traffic movements is considered to be a 'Minor Adverse' effect at a limited number of noise-sensitive properties.

10.138 For the rest of the affected local road network, the predicted increase in noise level will be imperceptible even as a worst case and, therefore, the effect will be less pronounced with a 'Negligible' effect expected at all of the affected receptors.

10.139 The noise from the proposed office, retail, healthcare and civic buildings as well as installations of mechanical and electrical equipment, Air handling systems mounted externally around the proposed residential and commercial buildings and the combined heat and power facility has the potential to be intrusive to both existing and future noise-sensitive receptors. Consequently, measures to mitigate the noise emitted from the associated uses, such as the selection of suitably quiet equipment, screening or barriers will be required to minimise the effects. However, such measures are considered to be both practical and effective in limiting the adverse effects of noise.

SUMMARY

10.140 The effects of noise and vibration from the construction and use of the Proposed Development has been assessed. Throughout, the assessment has been undertaken with reference to British Standards and national and international guidance on noise and vibration impacts.

10.141 The assessment has found that the noise effects at the closest residential properties during construction of the Proposed Development will be a moderate adverse effect as a worst case during certain phases of the construction programme. However, the effects will be temporary in nature and limited to receptors closest to the construction works. The adoption of the mitigation measures outlined in this chapter would reduce this effect for typical working conditions but remain as a moderate adverse effect as a worst case.

10.142 There will be negligible noise effects associated with the predicted increases in construction road traffic sources as a result of the Proposed Development.



10.143 Noise sensitive receptors along the road network serving the Proposed Development will experience a discernible increase in noise levels as a result of the predicted increase in vehicle movements. However, the magnitude of the effects will not exceed any recognised or statutory objectives and, as such, the effects are predicted to be minor even for the most affected receptors.

10.144 The effect associated with future fixed and mechanical plant installations is also considered to be potentially adverse. However, a proportional level of mitigation measures secured via Conditions of Use will ensure that the effect is significantly reduced.

10.145 It is anticipated that there will be no other permanent noise or vibration effects.

10.146 Consequently, the Proposed Development and measures outlined to mitigate any significant noise effects are considered to be both practical and effective in limiting the adverse effects of noise. They are also proportionate and consistent with other such development projects in similar suburban settings.

10.147 It is, therefore, concluded that both existing and future residents of the Proposed Development at or around the Site will be protected from the dominant sources of noise, assuming appropriate mitigation measures are included within the development to achieve appropriate internal noise levels.

10.148 As such, it is considered that noise and vibration effects do not present a constraint to the granting of planning permission for a residential-led development at the Site.

10.149 Table 10.14 contains a summary of the likely effects of the Proposed Development.



Table 10.14: Noise and Vibration Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Noise during construction of the installation	Temporary	Minor Adverse to Moderate Adverse at the closest noise-sensitive receptors to the Proposed Development	The adoption of <i>Best Practicable Means</i> , as defined in the Control of Pollution Act 1974 and Construction Environmental Management Plan	Minor Adverse Effect (Temporary) with Moderate Adverse Effects during the certain phases of the works closet to the site boundary.
Vibration during the construction of the installation	Temporary	Minor Adverse at the closest noise-sensitive receptors to the Proposed Development	The adoption of <i>Best Practicable Means</i> , as defined in the Control of Pollution Act 1974 and Construction Environmental Management Plan	Minor Adverse Effect (Temporary)
Noise from construction traffic movements	Temporary	No Significant Impact	The adoption of <i>Best Practicable Means</i> , as defined in the Control of Pollution Act 1974 and Construction Environmental Management Plan	No Significant Impact
Noise from road traffic movements	Permanent	Minor Adverse at the closest noise-sensitive receptors to the local road network	None	Minor Adverse Effect
Noise from fixed and mechanical plant installations	Permanent	Unknown (potentially adverse)	Acoustic Treatments	No Significant Impact

REFERENCES

Ref. 10.1: Communities and Local Government (2012) National Planning Policy Framework, Department for Communities and Local Government

Ref. 10.2: Department for the Environment, Food and Rural Affairs (2010) Noise Policy Statement for England, DEFRA

Ref. 10.3: Welwyn Hatfield District Plan (Adopted 2005), Welwyn Hatfield Council

Ref. 10.4: Welwyn Hatfield District: Supplementary Design Guidance (February 2005), Welwyn Hatfield Council

Ref. 10.5: The Institute of Environmental Management and Assessment (IEMA) 'Guidelines for Environmental Noise Impact Assessment' (2014)

Ref. 10.6: The Professional Practice Guidance on Planning and Noise (May 2017), Association of Noise Consultants (ANC), Institute of Acoustics (IOA) and Chartered Institute of Environmental Health (CIEH) Working Party

Ref. 10.7: Committee Reference B/564/1 (2009) 'British Standard 5228-1:2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites –Part 1 & 2 with Amendment A1, London: British Standards Institution

Ref. 10.8: Technical Committee EH/1 (2014) 'British Standard 4142 Rating industrial noise affecting mixed residential and industrial areas.' London: British Standards Institution

Ref. 10.9: Department of Transport – Welsh Office, (1988), 'Calculation of Road Traffic Noise', London: HMSO Publications

Ref. 10.10: Great Britain Department for Transport, Highways Agency, 2011, 'Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7 HD 213/11 Noise and Vibration'. London

Ref. 10.11: Berglund, B. et al. Guidelines for Community Noise. World Health Organisation. 2000

Ref. 10.12: Committee Reference B/564/1 (2014) 'British Standard: 8233 Sound Insulation and noise reduction for buildings'. London: British Standards Institution

Ref. 10.13: International Organization for Standardization 9613. Acoustics: Attenuation of sound during propagation outdoors. Part 2: General method of calculation. 1996

Ref. 10.14: Technical Committee EH/1 (2003) British Standards 7445: 2003 Part 1 'Description and Measurement of Environmental Noise', London: British Standards Institution



Ref. 10.15: Department of the Environment (1994) 'Planning Policy Guidance PPG24: Planning and Noise', London: HMSO Publications



11 TOWNSCAPE AND VISUAL AMENITY

INTRODUCTION

11.1 This Chapter presents an assessment of the likely significant effects of the Proposed Development on townscape character and visual amenity.

11.2 This Chapter provides a description of the methods used in the assessment, followed by a description of the relevant baseline conditions of the Site and surrounding area. An assessment of the likely significant effects of the Proposed Development during the demolition and construction works and once the Proposed Development is completed and operational is then presented. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any adverse effects identified, together with an assessment of the significance of likely residual effects.

11.3 This Chapter should be read in conjunction with the following Figures contained in **Appendix 11.4**

- **Figure 11.1: Site and Study Area**
- **Figure 11.2: Planning Policy and Designations**
- **Figure 11.3: Heritage Trails**
- **Figure 11.4: History of Development for Shredded Wheat Factory**
- **Figure 11.5: Land Use**
- **Figure 11.6: Scale**
- **Figure 11.7: Spatial Context**
- **Figure 11.8: Townscape Character Areas**
- **Figure 11.9: Zone of Theoretical Visibility**
- **Figure 11.10: Viewpoint Location Plan**

11.4 In addition, the following technical appendices accompany the text and are referred to throughout the Chapter:

- **Appendix 11.1: TVIA Methodology**
- **Appendix 11.2: Planning Policy and Guidance**
- **Appendix 11.3: Viewpoint Sheets and Wireline Assessment**
- **Appendix 11.4: Figures**

11.5 To aid the reader, a glossary of terms is provided in **Appendix 11.1**.

11.6 This TVIA considers the contribution heritage features make to the character and value of the townscape and visual receptors, along with an assessment of the likely effect of the Proposed Development on the townscape character and views associated with heritage features. It must be noted that this assessment has been carried out in landscape and visual terms only, as an assessment of impact on heritage assets and their wider cultural setting (e.g. impacts on cultural and historic associations) are considered to be beyond the remit of this TVIA and are covered by **Chapter 15** Cultural Heritage. The TVIA does not assess direct or any other indirect effects on heritage or ecological resources.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

11.7 The assessment was undertaken in accordance with the principles of good practice set out in the following published guidance produced by the relevant professional organisations concerned with landscape / townscape and visual impact assessment:

- Landscape Institute and the Institute of Environmental Management & Assessment (2013), Guidelines for Landscape and Visual Impact Assessment Third Edition (GLVIA3) (Ref. 11.1) Routledge;
- Landscape Institute (2013), GLVIA3 Statement of Clarification 1/13 (Ref. 11.2);
- Landscape Institute (2011), Advice Note 01/11, Photography and Photomontage in Landscape and Visual Impact Assessment (Ref. 11.3); and

11.8 Townscape assessment is comprised of two interrelated parts:

- a townscape assessment, which considers the effects of the Proposed Development on the physical townscape and the potential for changes in its character;
- a visual assessment, which considers the potential changes to the visual context arising from the Proposed Development including general setting and views for local residents, walkers, visitors and vehicular traffic, collectively these are described as 'receptors'.

11.9 The assessment was undertaken through a combination of desktop study and a site survey carried out in November 2017. The overall approach used to identify and assess townscape and visual effects is summarised as follows:

- collate baseline information through desk study research and field based survey work, select appropriate townscape and visual receptors and establish their value;
- determine susceptibility of townscape and visual receptors to the type of change proposed (i.e. the Proposed Development);



- combine value with susceptibility to determine sensitivity of townscape and visual receptors to the nature of change proposed (i.e. the Proposed Development);
- determine the nature and magnitude of change likely to be experienced by townscape and visual receptors as a result of the Proposed Development; and
- assess the significance of effects on townscape and visual receptors through consideration of the sensitivity of receptors and the magnitude of change.

11.10 The assessment methodology is described below with further technical details provided in **Appendix 11.1**.

Establishing Baseline Conditions

Desk Study

11.11 The desk study included a review of the following sources of information:

- The National Planning Policy Framework (2012) (Ref. 11.5);
- Saved policies of Welwyn Hatfield District Local Plan (2005) (Ref. 11.6);
- Broadwater Road West, Supplementary Planning Guidance, Welwyn Hatfield Borough Council (2008) (Ref. 11.7);
- Welwyn Garden City Conservation Area Appraisal, Welwyn Hatfield Borough Council (2007) (Ref. 11.8);
- Ordnance Survey Mapping at 1:25,000 and 1:10,000 scale;
- Aerial photography of the Application Site and wider area (Google Earth, www.maps.google.co.uk and www.bing.com/maps);
- Multi Agency Geographic Information for the Countryside (MAGIC) interactive mapping (www.magic.gov.uk); and
- National Heritage List for England Map Search, Historic England (<http://www.historicengland.org.uk>).

Zone of Theoretical Visibility

11.12 To establish the spatial scope of the assessment and identify those areas of the townscape that theoretically are visually connected with the Site, a 'Zone of Theoretical Visibility' (ZTV) was identified through digital computer modelling. **Figure 11.9** illustrates an overlay of the ZTV for three scenarios:

- ZTV 1: represents areas where only the existing built form on the Site is theoretically visible, based on existing building heights from topographical



survey data, excluding the existing On-Site chimney and silos associated with the former Shredded Wheat Factory.

- ZTV 2: represents areas where only the existing chimney and silos on the Site are theoretically visible, based on existing building heights from topographical survey data, set at circa 36.5m for the chimney and 32m for the silos, excluding the remaining built form within the Site. The existing silo and chimney building heights are based on an average height across the ground plane, taken from a building survey produced by CSL Surveys, where all levels are related to ordnance survey datum using GPS.
- ZTV 3: represents the proposed built form within the Site (excluding the existing built form, chimney and silo within the Site) that would theoretically be visible, based on the proposed building heights for the Proposed Development.

11.13 The extent of the study area was determined by considering together the preliminary study area, the results of the ZTV modelling and the initial findings of the baseline appraisal and assessment process. Whilst the ZTV indicated that the Proposed Development might be visible beyond 1km of the Site, it was considered that any views experienced by receptors in these areas would be either very distant or largely screened and that the magnitude of change would be very low. It is considered that any direct or indirect townscape effects arising as a result of the Proposed Development at a distance of greater than 1km would be insignificant and are therefore not considered further within this assessment.

11.14 Following a request from Historic England and due to the ZTV indicating potential visibility, long distance views from Hatfield House and Gardens (a Registered Park and Garden of Historic Interest located approximately 4.2km from the Site) were considered as part of the visual assessment.

Identifying Receptors for Assessment

11.15 Townscape and visual receptors were identified during desk study and have been verified during field survey work to provide a baseline against which to describe those effects likely to arise as a result of the Proposed Development. Receptors used within this assessment include:

- townscape character types or areas;
- physical townscape / landscape features and elements; and
- views experienced by people and their visual amenity.



11.16 Survey work was undertaken in November in 2017. The findings of the ZTV were confirmed during this field survey work. The survey work also informed the identification of those features or elements that contribute to the character of the area and the selection of appropriate viewpoints / receptors to assess the likely visual effects of the Proposed Development.

11.17 A townscape character assessment of the local area within 1km radius of the Site was undertaken following the Government guidance 'Landscape and Seascape Character Assessments' (Natural England and Department for Environment, Food and Rural Affairs, 2014) through desk study of maps, aerial photography, plans and documents followed by field surveys. The aim was to identify homogenous zones, referred to as Local Townscape Character Area (LTCA) that can be categorised in terms of quality and character in order to assess the potential effects that the Proposed Development would have on a particular townscape.

11.18 Viewpoints were agreed in consultation with Welwyn and Hatfield Borough Council (WHBC) and Historic England to inform the TVIA for the previous application on the Site. A series of representative and specific viewpoint photographs were captured during field work in November 2017, in accordance with 'Landscape Institute Advice Note 01/2011'. These are presented as a series of panoramic viewpoints within the Wirelines Assessment included at **Appendix 11.3**. Viewpoint photographs were taken in November 2017 in winter to provide a worst case visual scenario when trees and vegetation are not in leaf.

Determining Receptor Value

11.19 Factors that have been considered in the determination of townscape value include townscape designations and the level of importance that they signify (i.e. whether international, national or local), relevant local planning policy and guidance, the quality, condition and rarity of individual features or elements within the townscape and any verifiable local community interest (e.g. town square, allotments, parks etc.). The value of townscape receptors are determined against the criteria set out in Table 11.1 in order to establish a consistent and objective baseline against which the potential effects arising as a result of the Proposed Development can be assessed. Professional judgement is applied to determine the value attributed in response to these criteria. The factors listed below are not considered to be exhaustive and for any one receptor, these factors may overlap between degrees of value. Therefore not all criteria need to be attributed to any one receptor for that value to be assigned.

Table 11.1 – Criteria Used to Determine Townscape Value

Value	Criteria
High	<ul style="list-style-type: none"> – International or National level designated areas (e.g. World Heritage Sites, National Parks, AONBs, Listed Buildings, Scheduled Monuments and/or Registered Historic Park and Gardens etc) are present within the receptor. – The area is considered to be an important component of the country's character and is experienced by a high number of tourists. – Rare and/or distinctive elements and / or features are key components that contribute to the character of the area / quality of the townscape resource. – Areas containing strong structures with noteworthy features or elements exhibiting a sense of place. – A townscape of high quality and condition primarily containing valued components combined in an aesthetically pleasing composition and lacking prominent disruptive visual detractors
Medium	<ul style="list-style-type: none"> – Regional, County or Local level designated areas (e.g. Conservation Areas, Green Belt, and/or Country Parks etc) are present within the receptor. – The area is considered to be an important component of the region or county's character and is experienced by a reasonable proportion of its population. – A townscape of medium quality and condition containing valued components combined in an aesthetically pleasing composition with low levels of disruptive visual detractors, exhibiting a recognisable visual cohesion or structure. – The townscape, or areas within it, may have a moderate level of tranquillity. – Rare or distinctive elements and / or features may be present and would contribute to the character of the area / quality of the townscape resource.
Low	<ul style="list-style-type: none"> – No townscape and/or landscape designations are present but the townscape may be valued locally (e.g. town square, allotments and/or public open spaces etc). – Use of the area is likely to be limited to the local community. – A townscape of low quality with limited distinctiveness and features – The condition of the townscape and its individual elements is poor and is generally poorly maintained or damaged / degraded. – An area containing some valued features but lacking a coherent and aesthetically pleasing composition with frequent or dominant detracting visual elements.

11.20 The value attached to a view has regard to formal designation and indicators of value attached to views by people. **Table 11.2** sets out the criteria that have been considered when determining the value attached to the views of visual receptors in order to establish a consistent and objective baseline against which the potential impacts arising as a result of the Proposed Development can be assessed. As noted for Townscape Value above, the list of factors noted in the criteria below is not considered exhaustive and professional judgement is applied to determine an appropriate value for each view.

Table 11.2 – Criteria Used to Determine Value attached to Views

Value	Criteria
High	<ul style="list-style-type: none"> – Views from / over / toward a townscape / landscape of national importance recognised through National designation such as National Parks, AONBs, Listed Buildings and/ or Historic Parks & Gardens. – Views from / over / toward townscape / landscape viewpoints within highly popular visitor attractions / tourist destinations. – Protected views. – Views with important and / or national cultural associations. – Views to which receptors have a proprietary interest.
Medium	<ul style="list-style-type: none"> – Views from / over / toward townscape / landscape of regional or local importance, which may be subject to local designation. – Views from / over / toward townscape / landscape viewpoints within moderately popular visitor attractions / tourist destinations. – Views with local cultural associations.
Low	<ul style="list-style-type: none"> – Views from / over / toward townscape / landscape with no designations and of at most local importance. – Views from / over / toward townscape / landscape viewpoints which are not particularly popular or recognised as being destinations in their own right. – Views with no cultural associations

Assessment of Townscape Effects

11.21 The TVIA includes an assessment of a townscape receptor to accommodate change (i.e. the Proposed Development) without undue consequences for the maintenance of the baseline situation and / or the achievement of townscape planning policies or strategies), this is termed Townscape Susceptibility. The criteria for determining the susceptibility of townscape receptors are set out in **Table 11.3**. As noted for Townscape Value, the criteria for judging susceptibility are not considered exhaustive and are applied using professional judgement.

11.22 Townscape sensitivity is then determined by combining the value and susceptibility of the townscape as set out in **Table 11.4**.

11.23 Townscape effects are determined by considering the sensitivity of the receptor and the magnitude of change that would occur as a result of the Proposed Development. The criteria for determining the magnitude of change are set out in **Table 11.5**.



Table 11.3 – Criteria Used to Determine Townscape Susceptibility

Susceptibility	Criteria
High	<ul style="list-style-type: none">– The proposed development would conflict with relevant or specific local planning policies or strategies.– The scale or enclosure of the area means the receptor has a low ability to accept the type of development proposed due to the interactions between landform, vegetation cover and built form.– There is little or no existing reference or context within the receptor to the type of development proposed.– The majority of existing element(s) would not be easy to replace (e.g. ancient woodland, mature trees etc).– Detracting features or major infrastructure is not present in the area or, where present, these have little influence on the character or experience of the townscape.
Medium	<ul style="list-style-type: none">– The proposed development would not be supported by specific local planning policies or strategies but may be in line with general policy, guidance or strategies.– The scale or enclosure of the area means the receptor has a medium ability to accept the type of development proposed due to the interactions between landform, vegetation cover and built form.– There is some existing reference or context within the receptor to the type of development proposed.– Existing townscape and/or landscape elements can be relatively easily replaced.– Detracting features or major infrastructure is present in the area and these have a noticeable influence on the character or experience of the townscape.
Low	<ul style="list-style-type: none">– The proposed development would be in line with local planning policies, strategies or guidance and the Application Site may be allocated for the type of development proposed.– The scale or enclosure of the area means the receptor has a high ability to accept the type of development proposed due to the interactions between landform, vegetation cover and built form.– The proposed development would be in keeping with the land use of the existing context of the receptor.– Few / no existing townscape and/or landscape elements are present (e.g. brownfield sites) or, where these are present, these can easily be replaced.– Existing features are detracting and / or major infrastructure is present which heavily influences the character or experience of the townscape.



Table 11.4 – Criteria Used to Determine Townscape Sensitivity

SUSCEPTIBILITY	VALUE			
		Low	Medium	High
	Low	Low	Medium	Medium
	Medium	Medium	Medium	High
	High	Medium	High	High

Table 11.5 – Criteria for Determining Magnitude of Townscape Change

Value	Criteria
High	<ul style="list-style-type: none">– The size and scale of change is considered to be high due to the extent and proportion of existing townscape and/or landscape feature(s) or elements that would be lost / gained and the degree of alteration to aesthetic or perceptual qualities of the townscape; both of which would change key characteristics critical to the character of the receptor.– The geographical extent of change would influence the townscape at a regional level.– Effects would be considered long term and would either be irreversible or very difficult to reverse in practical terms.
Medium	<ul style="list-style-type: none">– The size and scale of change is considered to be medium due to the extent and proportion of the existing townscape and/or landscape feature(s) or elements that would be lost/ gained and the degree of alteration to aesthetic or perceptual qualities of the townscape; both of which would influence key characteristics of the character of the receptor.– The geographical extent of change would influence the townscape at a local level.– Effects would be considered medium term and would potentially be reversible, although it may not be practical to do so.
Low	<ul style="list-style-type: none">– The size and scale of change is considered to be low due to the extent and proportion of the existing townscape and/or landscape feature(s) or elements that would be lost/ gained and the degree of alteration to aesthetic or perceptual qualities of the townscape; both of which would be unlikely to influence the key characteristics of the receptor.– The geographical extent of change would influence the immediate setting of the proposed development.– Effects would be considered short term, would potentially be reversible and in practical terms would easily be achievable.

Value	Criteria
Negligible	<ul style="list-style-type: none"> – The size and scale of change is considered to be very low due to the extent and proportion of the existing townscape and/or landscape feature(s) or elements that would be lost/ gained and the degree of alteration to aesthetic or perceptual qualities of the townscape; neither of which would have any influence on the key characteristics of the receptor. – The geographical extent of change would influence the Application Site only. – Effects would be considered short term / temporary and / or easily reversible and in practical terms would very easily be achievable.

Assessment of Visual Effects

11.24 Visual receptors are people and comprise individuals or groups of people who are likely to be affected by the Proposed Development at specific viewpoints or along a series of viewpoints. Viewpoints have been selected to describe the range of likely effects on the views of people and their visual amenity arising as a result of the Proposed Development, taking into account a range of factors including the number and sensitivity of viewers likely to be affected.

11.25 The susceptibility of different receptors to changes in their views and visual amenity is a function of the occupation or activity of people experiencing a view at a particular location and the extent to which their attention is focussed on the view and visual amenity they experience. **Table 11.6** sets out the criteria that have been considered when determining the susceptibility of visual receptors to change. As noted for the value of views, the criteria for determining susceptibility are not considered exhaustive and are applied using professional judgement.

11.26 Sensitivity is specific to each visual receptor and reflects a balanced judgement on the value attached to the receptor and its susceptibility to the type of change proposed. Refer to matrix in **Table 11.7** which illustrates how visual sensitivity is determined by a combination of value and susceptibility of the visual receptor.

11.27 The significance of visual effects are then determined by considering the sensitivity of the receptor and the magnitude of change that would occur as a result of the Proposed Development. The criteria for determining the magnitude of change are set out in **Table 11.8**. To inform the judgement on the magnitude of change, a series of wirelines were produced, these are included in the Wirelines Assessment at **Appendix 11.3**.

Table 11.6 – Criteria for Determining Susceptibility of Visual Receptors

Susceptibility	Criteria
High	<ul style="list-style-type: none"> – Occupiers of residential properties. – People engaged in outdoor recreation whose attention is likely to be focussed on the townscape and/or landscape and / or particular views, or for whom their appreciation of views is an important factor in the enjoyment of the activity. – Tourists and visitors to heritage assets or other attractions where views of the surroundings are an important part of the experience. – People travelling through the townscape on roads, rail or other routes on recognised scenic routes or where there is a distinct awareness of views of their surroundings and their visual amenity.
Medium	<ul style="list-style-type: none"> – People at work and in educational institutions for whom the appreciation of setting is important to the quality of working / school life – People staying in hotels and healthcare institutions who are likely to appreciate views of their surroundings. – People engaged in outdoor recreation or sport which involves an appreciation of views. – People travelling through the townscape on roads, rail or other routes who are likely to experience views of their surroundings.
Low	<ul style="list-style-type: none"> – People at their place of work where the appreciation of the setting is not important to the quality of working life. – People engaged in outdoor recreation or sport which does not involve an appreciation of views. – People travelling through the townscape who are unlikely to experience views of their surroundings or for whom the appreciation of views is not an important part of their journey.



Table 11.7 – Criteria for Determining Visual Sensitivity

	VALUE			
SUSCEPTIBILITY		Low	Medium	High
	Low	Low	Medium	Medium
	Medium	Medium	Medium	High
	High	Medium	High	High

Table 11.8 – Criteria for Determining Magnitude of Change

Value	Criteria
High	<ul style="list-style-type: none">– The size and scale of change is considered to be high due to the extent of loss / addition / alteration of features within the view, the change to the composition of the view, the degree of contrast / integration of the proposal with the baseline situation and the nature of the view.– The geographical extent of change is considered to be high due to very close proximity of the receptor to the proposed development, the angle of view and the substantial extent of the view that would change as a result of the proposed development.– Effects would be considered long term and would either be irreversible or very difficult to reverse in practical terms.
Medium	<ul style="list-style-type: none">– The size and scale of change is considered to be medium due to the reasonable extent of loss / addition / alteration of features within the view, the change to the composition of the view, the degree of contrast / integration of the proposal with the baseline situation and the nature of the view.– The geographical extent of change is considered to be high due to close proximity of the receptor to the Proposed development, the angle of view and the reasonable extent of the view that would change as a result of the Proposed development.– Effects would be considered medium term and would potentially be reversible, although it may not be practical to do so

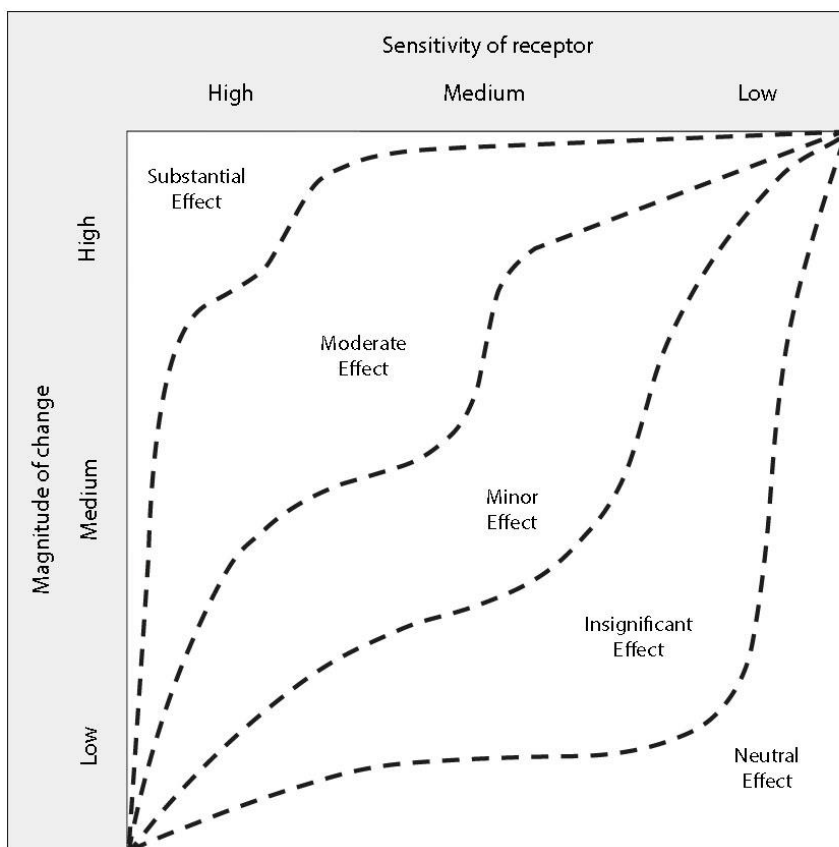


Value	Criteria
Low	<ul style="list-style-type: none">– The size and scale of change is considered to be low due to the limited extent of loss / addition / alteration of features within the view, the change to the composition of the view, the degree of contrast / integration of the proposal with the baseline situation and the nature of the view.– The geographical extent of change is considered to be low due to distance of the receptor from the Proposed development, the angle of view and the minimal extent of the view that would change as a result of the Proposed development.– Effects would be considered short term, would potentially be reversible and in practical terms would easily be achievable.
Negligible	<ul style="list-style-type: none">– The size and scale of change is considered to be very low due to the barely perceptible extent of loss / addition / alteration of features within the view, the change to the composition of the view, the degree of contrast / integration of the proposal with the baseline situation and the nature of the view.– The geographical extent of change is considered to be barely perceptible due to distance of the receptor from the Proposed development, the angle of view and the extent of the view that would change as a result of the Proposed development.– Effects would be considered short term or temporary, would easily be reversible and in practical terms would very easily be achievable.

Significance Criteria

11.28 The significance of townscape and visual effects was determined using professional judgement by considering the sensitivity of a receptor and the magnitude of change occurring to a receptor, guided by the significance matrix in the diagram below.

Table 11.9 - Determination of significance matrix



11.29 In addition, the criteria for determining the significance of townscape and visual effects shown in **Table 11.10** and **11.11** were also used. It is important to note that these criteria act as a guide for professional judgement but do not replace it.

Table 11.10 – Criteria for Determining Significance of Townscape Effects

Effect	Criteria
Adverse Effect of Substantial Significance	<ul style="list-style-type: none"> – Be at considerable variance with the character of the townscape. – Degrade or diminish the integrity of a wide range of characteristic features and elements. – Substantially damage the sense of place.
Adverse Effect of Moderate Significance	<ul style="list-style-type: none"> – Conflict with the character of the townscape. – Have an adverse effect on some characteristic features and elements – Diminish the sense of place.
Adverse Effect of Minor Significance	<ul style="list-style-type: none"> – Not quite fit with the character of the townscape. – Be at variance with some characteristic features and elements – Detract from the sense of place

Effect	Criteria
Insignificant Adverse Effect	<ul style="list-style-type: none"> – Result in a barely perceptible deterioration of townscape character. – Have a barely perceptible effect on characteristic features and elements. – Barely effect on the sense of place.
Neutral	<ul style="list-style-type: none"> – Maintain the character of the townscape. – Blend in with characteristic features and elements. – Enable the sense of place to be retained.
Insignificant Beneficial Effect	<ul style="list-style-type: none"> – Result in a barely perceptible improvement to townscape character. – Provide limited enhancement of characteristic features and elements. Barely improve the sense of place.
Beneficial Effect of Minor Significance	<ul style="list-style-type: none"> – Complement the character of the townscape. – Enhance characteristic features or elements. – Slightly enhance the sense of place.
Beneficial Effect of Moderate Significance	<ul style="list-style-type: none"> – Slightly enhance the character of the townscape. – Enable the restoration of characteristic features and elements partially lost or diminished as a result of changes from inappropriate management or development. – Enhance the sense of place.
Beneficial Effect of Substantial Significance	<ul style="list-style-type: none"> – Enhance the character of the townscape. – Enable the restoration of characteristic features and elements completely lost or diminished as a result of changes from inappropriate management or development. – Greatly enhance the sense of place.

Table 11.11 – Criteria for Determining Significance of Visual Effects

Effect	Criteria
Adverse Effect of Substantial Significance	<ul style="list-style-type: none"> – Cause a major deterioration to the view of a receptor of medium to high sensitivity that would constitute a total change in the view or would introduce a major discordant element into the view.
Adverse Effect of Moderate Significance	<ul style="list-style-type: none"> – Cause an obvious deterioration to the view of a receptor of low to medium sensitivity or a perceptible deterioration to the view of a highly sensitive receptor that would constitute a clear change in the view or would introduce a discordant element into the view.
Adverse Effect of Minor Significance	<ul style="list-style-type: none"> – Cause limited deterioration to the view of a receptor of medium to high sensitivity or greater deterioration to the view of a receptor of low to medium sensitivity that would constitute a noticeable change in the view or would introduce uncharacteristic features or elements into the view.



Effect	Criteria
Insignificant Adverse Effect	<ul style="list-style-type: none">– Result in a barely perceptible adverse change in the view associated with the introduction of uncharacteristic features or elements.
Neutral	<ul style="list-style-type: none">– Not be visible to the receptor. Any associated mitigation would represent an indiscernible change to the baseline situation.
Insignificant Beneficial Effect	<ul style="list-style-type: none">– Result in a barely perceptible beneficial change in the view associated with the introduction of characteristic features or elements.
Beneficial Effect of Minor Significance	<ul style="list-style-type: none">– Result in the perceptible improvement to the view of a receptor of medium to high sensitivity, a limited improvement to the view of a receptor of low to medium sensitivity or greater improvement to the view of a receptor of low sensitivity.
Beneficial Effect of Moderate Significance	<ul style="list-style-type: none">– Result in the limited improvement to the view of a receptor of high sensitivity, an obvious improvement to the view of a receptor of low to medium sensitivity or the major improvement to the view of a receptor of low sensitivity.
Beneficial Effect of Substantial Significance	<ul style="list-style-type: none">– Result in a major improvement to the view of a receptor of medium to high sensitivity.

Assumptions and Limitations

11.30 This assessment is based on views from publicly accessible locations. Where an impact on residential and other private views (e.g. commercial properties) is noted this has, necessarily, been estimated.

11.31 The viewpoints identified in this assessment are illustrative of the potential impact from a representative range of receptors including residences, rights of way, public open spaces, private open spaces, commercial operations, the road network etc. This chapter does not necessarily identify all locations from where the Proposed Development would potentially be visible.

11.32 The construction work for the Proposed Development is proposed over an approximate four year period, carried out in various phases, however it is not possible to determine the geographical location of these phases at the time of writing. As the effects for each receptor would be largely constrained to their facing edge and proposals in the background toward the centre of the Site, it is assumed that all construction work would commence and be completed at the same time. It is assumed that landscape mitigation would be implemented in various parts of the Site throughout the four year implementation period, alongside or at the end of the respective phase. As a result, to avoid over complication of the TVIA, the post-completion (Year



0) and post mitigation establishment (Year 15) is assumed as being achieved concurrently around the Proposed Development.

11.33 No limitations have been identified that would affect the conclusions of this assessment for EIA purposes.

LEGISLATION, PLANNING POLICY AND GUIDANCE

11.34 A detailed review of all planning policy has been undertaken and those of greatest relevance to the Site, the Proposed Development and the TVIA are included at **Appendix 11.2**. In summary, these include the relevant parts and policies of the following:-

- The National Planning Policy Framework (2012), specifically Sections 7, 8 and 12.
- The National Planning Practice Guidance (2014), specifically Paragraph 007 Ref ID: 26-007-20140306 titled 'Planning should promote local character (including landscape setting)
- Saved policies R1, R11, R17, R22, R25, R28 D1, D2, D4, D8, OS1 and EMP3 of Welwyn Hatfield District Plan (2005).
- The design guidance outlined in the Broadwater Road West Supplementary Planning Document (2008).



BASELINE CONDITIONS

Site Context

11.35 In townscape terms, the Site is situated within the Peartree industrial area of Welwyn Garden City, on an area of brownfield land previously used for industrial purposes featuring existing industrial buildings and the Grade II Listed former Shredded Wheat Factory, all of which occupy the Northern part of the Site. The Site and study area for the assessment are illustrated on **Figure 11.1**.

Townscape Character

11.36 Townscape character evolves over time and is largely shaped by cultural, technological and economic influences. The interaction of these various factors leads to the creation of a distinct, recognisable and consistent pattern of elements which combine to form townscape character.

11.37 **Table 11.12** identifies the 14 distinct LTCAs relevant to the Site which are illustrated on **Figure 11.8** and described below.

Table 11.12 – Local Townscape Character Areas (LTCA)

Area	LTCA
Area 1	Sherrards Park
Area 2	Shire Park Business Area
Area 3	Broadwater Road Industrial Area (Application Site)
Area 4	Peartree Modern Business & Industrial Area
Area 5	Peartree Residential Area
Area 6	Broadwater Crescent Residential Area
Area 7	Chequers Parkland
Area 8	Longcroft Lane Area
Area 9	Barleycroft Road
Area 10	Parkway Residential Area
Area 11	Handside Lane Area
Area 12	Parkway Retail Area
Area 13	Brockswood Lane Area
Area 14	The Campus



Area 1: Sherrards Park

11.38 The nearest point of LTCA 1 is approximately 300m, to the north west of the Site boundary. The Sherrards Park area was developed in the 1930s and the majority lies within the Welwyn Garden City Conservation Area. The key characteristics of this area include the following:

- 2 storey, red brick, residential housing featuring large gardens, wide verges and tree lined streets;
- linear residential streets lined either side by detached and semi-detached houses;
- landform in this area rises from Digswell Road towards Sherrards Park Wood; and
- strong sense of tranquillity within the area due to the numerous mature trees that provide a strong sense of enclosure and assist in filtering views of the surrounding urban area.

11.39 The strong sense of enclosure created within this LTCA by the coverage of mature trees and residential streets, combined with the built form and vegetation on its interface with the adjacent LTCA 14, significantly limits intervisibility from this LTCA towards the Site.

11.40 Whilst there are limited, distant, glimpsed views towards the tops of the existing silos within the Site (refer to Viewpoint 9), for the most part, the vegetation and built form within this LTCA prevent the Proposed Development having a significant effect on the character of this area, therefore, this LTCA is not considered further.

Area 2: Shire Park Business Area

11.41 The nearest point of LTCA 2 is approximately 220m, to the east of the Site boundary. This area formed part of the original masterplan for Welwyn Garden City as an industrial zone. Due to the decline in industrial activities over the last century the Shire Park Business Area has introduced modern office and business use to the area. The key characteristics of this area include the following:

- modern, uniform, 20th century medium to large offices and business units featuring formal ornamental planting, hedges and in some instances street trees;



- recent Times Square development off Bessemer Road (Chase New Homes) has been built on the former Xerox complex and comprises a 541 residential development with the first phase complete and Orion House offices;
- individual plots have associated car parking whilst commercial units feature larger spaces for HGV access and loading bays;
- Swallowfields Industrial Area;
- built form is typically two to three storeys high featuring pitched roofs;
- large infrastructure roads featuring a high capacity of vehicular movement and associated noise; and
- offices tend to be brick clad with large windows while industrial units are clad with composite materials and aluminium.

11.42 There is limited intervisibility between this character area and the Site due to the scale and mass of the built form within this LTCA combined with the intervening industrial built form located to the North of LTCA 3.

11.43 LTCA 2 is considered to be of **low value**. Whilst the buildings and landscaping within the office plots are well maintained, the townscape lacks distinctiveness and is absent of any distinct features or townscape designations.



Area 3: Broadwater Road Business Area (Application Site)

11.44 The Site lies within LTCA 3, covering approximately 40% of its total area and, as a result, has a strong influence on how this area is perceived. The LTCA includes the industrial zone, around Broadwater Road and Bridge Road, which once formed part of the original masterplan for Welwyn Garden City. The area features some of the oldest industrial development within Welwyn Garden City, most notably the former Shredded Wheat Factory (Grade II listed), which features visually prominent silos, located within the Site. The key characteristics of this area include the following:

- heritage industrial buildings, some of which listed, with small pockets of commercial and office use;
- a large proportion of derelict industrial buildings and associated land use, as a result of the decline in industrial activities over the last century, which is evident on the Application Site;
- large scale industrial activity, notably the gasometers on Tewin Road and the modern BioPark facility which the Application Site adjoins off Broadwater Road;
- main arterial roads Broadwater Road and Bridge Road bisect the area and create a visual, physical and noise detractor with new developments under construction including Bessemer Business Park; and
- whilst new businesses and office developments are present amongst the industrial uses, the large vacant plots and derelict industrial buildings retain the strongest influence as a post-industrial townscape.

11.45 LTCA 3 is considered to be of **low - medium value**, reflective of the condition and quality of the townscape and its associated elements, which are generally poorly maintained, degraded and in places derelict. The LTCA is improving in value, with high quality residential and commercial developments under construction off Bessemer Road and Bridge Road.

Area 4: Peartree Modern Business and Industrial Area

11.46 LTCA 4 lies adjacent the Site's eastern boundary, with LTCA 3 on the opposite side of Broadwater Road. A large proportion of Peartree was allocated for industrial development in the original masterplan for Welwyn Garden City. Few if any remnants of the original industrial built form remain having been replaced by modern industrial built form and offices over the last few decades. The key characteristics of this area include the following:

- piecemeal development varying in use and scale, giving a fragmented, discordant character;



- large expanses of hardstanding associated with car parking for the office blocks;
- a notable building within this LTCA is no. 29 Broadwater Road, which comprises a five storey angular modern office block; and
- main arterial roads (Broadwater Road and Bridge Road) lie on the LTCA boundary and create a visual, physical and noise detractor.

11.47 There is a strong intervisibility between this area and LTCA 3 due to their close proximity (refer to Viewpoints 11 and 14).

11.48 LTCA 4 is considered to be of **low value**, reflective of the area lacking coherence, owing to the mix of uses and scales of built form, within a townscape considered low quality with limited distinctiveness.

Area 5: Peartree Residential Area

11.49 The nearest point of LTCA 5 is approximately 150m, to the south east of the Site boundary. The Peartree residential area was built in the 1920s to 1930s for the workers of the factories on Broadwater Road. The key characteristics of this area include the following:

- one and a half to two storey, red brick residential housing with a diverse mix of ages, styles and types;
- a significant number of more modern 1980s properties present on Peartree Lane, whilst in other areas infill has occurred, replacing the original 1920s residential built form;
- residential built form is arranged as short terraces aligned with the roads with the occasional detached dwelling; and
- compared to the Western residential areas within Welwyn Garden City the housing within Peartree is of a much higher density with less open space and street planting.

11.50 There is a limited degree of intervisibility between LTCA 5 and the built form on Site. Glimpsed views of the tops of the silos are possible within a few of the open spaces and residential roads (refer to Viewpoint 4).

11.51 LTCA 5 is considered to be of **low value**, reflective of the area lacking unity, due to the diverse mix of housing ages and styles, the absence of townscape designations and the high density of houses within the area which overall reduces the sense of tranquillity.



Area 6: Broadwater Crescent Residential Area

11.52 LTCA 6 is located adjacent to the Site's southern boundary. This area was originally developed in the 1920s as a series of small residential closes, however the original dwellings suffered from severe damp leading to demolition and rebuild in 1986. The key characteristics of this area include the following:

- predominantly two storey, red brick, semi-detached and terraced houses;
- the former Roche Products Factory site, now a 21st Century residential development (The Mirage) featuring four storey apartments and three storey terraces;
- the offices of the Roche Products Factory (Grade II listed), designed by Otto R. Salvisberg in the 1940s, retained as part of the Mirage development, although yet to be refurbished;
- Broadwater Crescent is lined with street trees which, combined with the built form within the LTCA, provide a sense of enclosure to the area; and
- Due to the close proximity of neighbouring industrial buildings, such as the BioPark building, there is a visual industrial presence on the skyline (refer to viewpoint 5).

11.53 There is limited intervisibility between this area and the Site, with views of the silos and chimney available between buildings and street trees.

11.54 LTCA 6 is considered to be of **low value**, reflective of the mix and diversity of residential built form, the presence of industrial visual detractors and the lack of public open space which, combined with the high density of housing within the area, reduces the sense of tranquillity.

Area 7: Chequers Parkland

11.55 The nearest point of LTCA 7 is approximately 500m, to the south of the Site boundary. The area features a recreational green space and the Twentieth Mile Bridge adjacent to the East Coast Mainline railway. The key characteristics of this area include the following:

- the LTCA is enclosed by the A6129 and A1000 main arterial roads which isolates the area from the surrounding residential areas and forms a physical, visual and noise barrier; and
- the dual lane bridge which carries the A6129 has an engineered character due to its high brick walls and steel railings.



11.56 The strong sense of enclosure created within this LTCA by the coverage of mature trees within the recreational green space, combined with the built form and vegetation on its interface with the adjacent LTCA 6, significantly limits intervisibility from this LTCA towards the Site. Therefore this LTCA is not being considered further as part of the assessment.

Area 8: Longcroft Lane Area

11.57 The nearest point of LTCA 8 is approximately 170m, to the west of the Site boundary, separated by the East Coast Mainline railway. This area lies within Welwyn Garden City Conservation Area. The key characteristics of this area include the following:

- Longcroft Lane forms the principal straight residential road running south from the Town Centre;
- residential development is linear in character, with two storey red brick cottage style houses grouped in terraces;
- the residential built form dates back to the 1920s and 30s and formed part of the original Louis de Soissons masterplan;
- the layout of these properties display typical traits of the Garden City movement, with notably large gardens, generous public open space and wide verges lined with street trees; and
- the frontages of properties in this area are typically enclosed by formal hedges.

11.58 There is limited intervisibility between the area and the Site due to the built form and vegetation within the area, combined with intervening vegetation along the East Coast Mainline Railway and Osborn Way.

11.59 LTCA 8 is considered to be of **medium value**, reflective of the well maintained residential setting, unity of the built form and the amount of vegetation present within front gardens, streets and verges, which combine to provide an aesthetically pleasing composition to the area. The use of the area is likely to be limited to the local community.

Area 9: Barleycroft Road

11.60 The nearest point of LTCA 9 is approximately 570m, to the west of the Site boundary. The Barleycroft Road residential area was developed in the 1920s to 1930s and lies within the Welwyn Garden City Conservation Area. The key characteristics of this area include the following:

- a mix of 1920s detached properties and two storey post war terraces;



- the post war terraces differ from the earlier 1920s development due to the use of shared gardens and lawns and car parking spaces resulting in a large proportion of on street parking in the area; and
- the 1920s development typically comprises two to two and half storey red brick dwellings arranged around small greens.

11.61 The strong sense of enclosure created within this LTCA, by the coverage of mature trees and residential streets, combined with the built form and vegetation on its interface with the adjacent LTCA 10, significantly limits intervisibility from this LTCA towards the Site. Therefore this LTCA is not being considered further as part of the assessment process.

Area 10: Parkway Residential Area

11.62 The nearest part of LTCA 10 is approximately 380m, to the west of the Site boundary. The Parkway residential area lies within the Welwyn Garden City Conservation Area. The key characteristics of this area include the following:

- Neo-Georgian houses that are well maintained and designed by Louis de Soissons in 1924;
- Parkway provides a dramatic approach to the town centre from the south providing views North towards The Campus and Digswell Road;
- the central parkway garden is the defining feature; a linear park lined by a boulevard of tall Poplars allowing for dramatic views towards the Coronation Fountain;
- the main vista along Parkway runs on a north / south axis focusing views along its length;
- the built form includes short terraces and detached houses of two to two and a half storeys; and
- properties generally have short open frontages with plot boundaries delineated by white wooden post and chain fencing.

11.63 There is a limited degree of intervisibility between LTCA 10 and the Site due to the intervening built form and vegetation.

11.64 The strong sense of enclosure created within this LTCA by the central linear parkway featuring boulevard trees, combined with the built form and vegetation on its interface with the adjacent LTCA 8 and 12, significantly limits intervisibility from this LTCA towards the Site.

11.65 Whilst there are limited, distant, glimpsed views towards the tops of the existing silos, within the Site, for the most part, the angle of view, vegetation and built form within and adjacent to this LTCA prevents the Proposed Development having a significant effect on the character of this area, therefore this LTCA is not being considered further as part of the assessment.

Area 11: Hanside Lane Area

11.66 The nearest part of LTCA 11 is approximately 450m, to the west of the Site boundary. The Handside Lane Area lies within the Welwyn Garden City Conservation Area. The key characteristics of this area include the following:

- linear residential land use, containing a large portion of the original 1920s built form in Welwyn Garden City;
- a former rural road pre-dating Welwyn Garden City exhibiting some original features, notably portions of the hedgerows and trees;
- houses are typically two storey short terraces with the occasional detached properties; and
- unity of character is quite strong, however the integrity is affected by alterations made to individual housing plots, through the extension of on plot parking spaces.

11.67 The strong sense of enclosure created within this LTCA by the coverage of trees and linear residential streets, combined with the built form and vegetation on its interface with the adjacent LTCA 12, significantly limits intervisibility from this LTCA towards the Site. Therefore this LTCA is not being considered further as part of the assessment.

Area 12: Parkway Retail Area

11.68 The nearest point of LTCA 12 is approximately 35m, to the west of the Site boundary, separated by the East Coast Mainline railway. This area lies within the Welwyn Garden City town centre and Conservation Area. The key characteristics of this area include the following:

- the main commercial centre of Welwyn Garden City and the Northern extent of Parkway;
- defined by the large open green spaces, long vistas and a neo-Georgian department store building;
- an Eastern arm of Parkway branches off to form Howardsgate, a central open space framed by tall Poplars at the end of which is the modern Howard Centre;



- the Howard Centre (a shopping centre developed in the 1990s) and car park forms a prominent visual mass on the LTCA's Eastern boundary; and
- many of the original houses within the character area have been converted to either offices or surgeries.

11.69 LTCA 12 is considered to be of **high value**, reflective of the area exhibiting townscape and landscape elements of high quality and condition, large areas of formal public open space, prominent landscape vistas, boulevards of trees and neo Georgian built form that overall combines to form an aesthetically pleasing townscape composition. The LTCA's location within Welwyn Garden City town centre means it is experienced by the broader community including visitors and tourists.

Area 13: Brockswood Lane Area

11.70 The nearest point of LTCA 13 is approximately 500m, to the north west of the Site boundary. The key characteristics of this area include the following:

- Brockswood Lane, a long sinuous road which connects the town with the A1M motorway, lined on either side by detached and semi-detached two storey dwellings;
- there is very little unity within this area due to the variety of building styles and materials;
- the majority of built form dates from the 1920s, with more recent buildings, such as Woodside House, situated closer to the town centre;
- whilst this road is relatively busy with traffic, the area is enclosed on its Northern side by Sherrards Park Wood providing a slight rural character and a sense of tranquillity in comparison to the nearby town centre.

11.71 The strong sense of enclosure created within this LTCA by the coverage of mature trees and residential built form, combined with the built form and vegetation on its interface with the adjacent LTCA 14, significantly limits intervisibility from this LTCA towards the Site. Therefore this LTCA is not being considered further as part of the assessment.

Area 14: The Campus

11.72 The nearest point of LTCA 14 is approximately 50m from the Site boundary, to the north west of the Site, and separated by the East Coast Mainline railway. This area lies within the Welwyn Garden City town centre and Conservation Area. The key characteristics of this area include the following:



- The Campus borders a formal green open space featuring mature trees and pathways;
- institutional and civic buildings enclosing the campus green, displaying a variety of building styles ranging from modernist to neo Georgian;
- large areas of car parking, for the associated civic land uses, which visually detracts from the quality of the townscape area;
- the building styles vary, however the use of material is sympathetic to the traditional Garden City architecture; and
- The Campus is elevated at the Northern end of the Parkway providing a strong vista South down its length, framed by a tree boulevard.

11.73 LTCA 14 is considered to be of **high value**, reflective of the area exhibiting townscape and landscape elements of high quality and condition, large areas of formal public open space, prominent landscape vistas down the length of Parkway, boulevards of trees and modernist to neo Georgian built form that overall combines to form an aesthetically pleasing townscape composition. The LTCA's location within Welwyn Garden City town centre means it is experienced by the broader community including visitors and tourists.

Heritage

11.74 The heritage features of importance to the townscape and landscape of the Site and wider study area are described in **Chapter 15** of this ES and include the history and heritage value of the Site, listed buildings and their setting within and surrounding the Site. Statutorily and non-statutorily heritage designated sites and features within a 1km study area of the Site are illustrated on **Figures 11.2 & 11.3**.

On-Site Listed Buildings

11.75 The Site features the former Nabisco Shredded Wheat Factory (Grade II listed). The Proposed development of the former Shredded Wheat factory can be traced through three principal phases, as illustrated on **Figure 11.4**.

11.76 One of the first manufacturing industries to locate to the town was Shredded Wheat, as the American company considered the garden city image would be ideal for the production of their 'health' food. The Shredded Wheat factory finally ceased production in January 2008, after 73 years in Welwyn Garden City and a large proportion of the listed buildings currently lie derelict.



11.77 The listing of the factory includes the original production hall and silos designed by Louis de Soissons, built between 1926 and 1928. The silos are a strong visual landmark and are closely identified with Welwyn Garden City. The original 1920s parts of the factory complex designed by Louis de Soissons, including the production hall, boiler house, grain house and first 18 wheat elevators (silos) are considered to be of the highest significance architecturally and historically. The later 1930s to 1950s additions to the factory, whilst listed, are recognised as being of minor interest, architecturally mediocre and therefore of much less significance.

Listed Buildings Within the Surrounding Area

11.78 There are listed buildings beyond 1km of the Site, however the enclosure created by the townscape built form and vegetation significantly limits intervisibility with the Site, therefore these listed buildings are not being considered further as part of the assessment. The exception to this is Hatfield House (Grade I), 4.2km to the South of the Site, considered further under Registered Park and Gardens below. The following listed buildings are within 1km of the Site:

- Hand Side Farmhouse (Grade II)
- The Barn Theatre (Grade II)
- The Old Cottage (Grade II)
- Digswell Lodge (Grade II)
- Office block (Buildings 1 to 4) to Roche Products Factory (Grade II)

11.79 Hand Side Farmhouse, The Barn Theatre, The Old Cottage and Digswell Lodge have no intervisibility with the Site, due to the enclosure created by the surrounding built form and vegetation, as well as the orientation of the building, in the case of The Old Cottage. As such, these Grade II Listed buildings would be unaffected by the Proposed Development and are not being considered further as part of the assessment.

11.80 There is one listed building in close proximity that shares direct intervisibility with the Site. Office block (Buildings 1 to 4) to Roche Products Factory (Grade II) is a former office block to the Roche Factory, designed by Otto Salvisberg and constructed in the late 1930s. It is located on Broadwater Road, adjacent to the Site's Southern boundary. The listed building lies within the curtilage of a new 21st century residential development called 'The Mirage', but has yet to be refurbished.



Conservation Areas

11.81 The Site itself is not within a conservation area however it is in close proximity to the Welwyn Garden City Conservation Area, separated from it by the East Coast Mainline Railway. The Welwyn Garden City Conservation Area is located approximately 40m from the Site's western boundary and covers the pre-war Garden City, West of the line, including the Town Centre, Parkway and adjoining residential areas. Welwyn Garden City Conservation Area was designated in 1967; intended to preserve the architectural unity of the town.

11.82 The Welwyn Garden City Conservation Area Appraisal considers that the principal historic significance of Welwyn Garden City lies in its planning and states *"possibly the highest expression of the visionary physical, social, cultural and economic ideals of their period, drawn together by the Garden City's founders, management and professional. In planning terms the level of significance is global, attracting study and visits from many countries"*.

Registered Parks and Gardens

11.83 Hatfield House is a Grade I listed Registered Park and Garden, featuring medieval parkland located approximately 3km to the South of the Site, Hatfield House (Grade I) and The Palace (Grade I) both listed buildings located approximately 4.2km to the South of the Site. Hatfield Park lies adjacent to the east side of the village of Hatfield, and incorporates several former medieval hunting parks. The 7.5km² estate features an early 17th century mansion surrounded by extensive and complex gardens and park, created from the medieval parks of Hatfield. The grounds are gently undulating, with a plateau towards the West boundary, on which stands Hatfield House and Old Palace within the centre of the estate.

Land Use

11.84 The land use within the Site and wider study area is illustrated in **Figure 11.5**.

Within the Site

11.85 The north eastern part of the Site contains factory buildings, associated with the former Shredded Wheat Factory. The land to the south of Hyde Way and the north western part of the Site is brownfield land, partially cleared of built form featuring concrete foundations from previous built form and colonising scrub and tree vegetation.



11.86 Land use within the Site is considered to be of low value, reflecting the condition and quality of the townscape elements within the Site, which are considered generally poorly maintained, damaged and degraded.

Within the Study Area

11.87 The land use pattern for Welwyn Garden City still reflects Louis de Soissons' original 1921 masterplan; a town defined clearly by land use zones set nearly a Century ago. The town's shopping core remains in the same location, albeit much larger in size with many additions, not least the Howard Centre built in the 1990s. The industrial work zone remains in its original location although this has expanded considerably in size and is now more reliant on the road infrastructure than the railway. The Shire Park Business Area to the North East of the town has introduced office and business land use due to the decline in industrial activities. The Times Square development off Bessemer Road (Chase New Homes) has been built on the former Xerox complex and comprises a 541 residential development scheme with the first phase complete.

11.88 As a result of the industrial, commercial and office uses surrounding Broadwater Road and Bridge Road, Peartree residential area has become increasingly distanced, both physically and psychologically from the town's core, located on the opposite side of the railway lines. Due to the decline in industry in this part of Welwyn Garden City and the increase in demand for housing, the Site has been identified as an area suitable for mixed use development, by the Broadwater Road Supplementary Planning Document (2008), to assist in bridging the east and west sides of the town.

11.89 Land use within the wider study area spatially reflects the original Louis de Soissons' masterplan for Welwyn Garden City. The western residential area, shopping core and educational land uses surrounding the town centre within Welwyn Garden City Conservation Area exhibit a townscape of high quality and condition, considered to be **high value**.

11.90 The industrial, commercial and residential uses to the east, separated from the town centre by the East Coast Mainline Railway, exhibit a townscape of limited distinctiveness and is generally poorly maintained, considered to be of **low value**.



Open Space and Landscape

11.91 Public open space and green space provision within 1km of the centre of the Site is illustrated on **Figure 11.7**.

Within the Site

11.92 The Site lies on private, brownfield land which is enclosed by security fencing on its outer boundaries. Public access is restricted to Hyde Way which bisects the centre of the Site, connecting the Howard Shopping Centre in the west to Peartree residential area in the east.

11.93 The majority of the Site is covered by built form and large areas of hardstanding associated with the former industrial land use. The small proportion of vegetation within the Site, comprising tree and scrub vegetation, is concentrated along the Site's western boundary. An Arboricultural Implications Assessment and Arboricultural Method Statement, undertaken by Bradley Murphy Design and accompanies the planning application for the Site, confirms the majority of trees are located on the Western boundary and are classified as grade B and C, defined as low to moderate value. There are a small number of grade A trees, defined as high quality and value, located on the eastern boundary, at the interface with Hyde Way.

11.94 Overall open space and landscape within the Site is consider to be of **low value**, reflecting primarily the private access and the small proportion of landscape elements within the Site, which for the most part are of low to moderate value.

Within the Wider Study Area

11.95 In the wider study area the public open space and green space provision is concentrated within Welwyn Garden City town centre along Howardsgate, and Parkway. Areas of formal lawns, seating, boulevards of trees and framed views are key features of these spaces alongside the more informal open space at the Campus. Within the industrial and business park areas to the east of the town the amount of public open space and landscape is limited to verges and street tree planting. Within Peartree and Handside, residential development is centred around small pockets of public open space and wide tree lined verges.

11.96 Whilst there is a high proportion of public open green space within Welwyn Garden City town centre, desk top analysis and study visits have indicated a lack of formal play provision for young children across the town and an underuse of areas such as Parkway by the public, who



seem to prefer the more intimate and town centric Howardsgate or the more flexible open space of Campus.

11.97 The focus of existing public open space around the town centre adjacent to the Site provides the opportunity to link the east and west sides of Welwyn Garden City through the use of quality green spaces. As supported by the Broadwater Road West SPD (2008) which states: *“the provision of well landscaped open space and planting is intrinsic to the character of Welwyn Garden City and should be a key feature of this development”*.

Scale and Height

11.98 Building scales within 1km of the centre of the Site are illustrated on **Figure 11.6**. It is important to note that **Figure 11.6** only illustrates storey heights and does not show the existing building height. The following observations can be made:

- the large scale three storey buildings are concentrated within Welwyn Garden City town centre and include the 1990s Howard Centre;
- buildings within Welwyn Garden City town centre rarely rise above five storeys;
- the highest storey heights surrounding the Site are generally five storey buildings used for retail and industrial use, however, the Biopark located to the south of the Site is much greater than five storeys in height being taller than the existing silos within the Site;
- to the north of the Site the majority of built form is two storey;
- to the north Times Square includes up to seven storeys;
- to the southeast of the Site towards Peartree, the scale of the buildings decreases and are predominantly one to two storey;
- a large proportion of the industrial buildings surrounding Bridge Road and Broadwater Road are two to three storeys however their overall height often incorporates architectural detailing that increases the overall height. These buildings are equivalent of a five storey residential building as the storey heights are often around 5m where residential built form is usually around 3m;
- the residential development to the south of the Site (The Mirage) incorporates three to four storey high apartment buildings; and
- aside from the Biopark located to the south of the Site, the existing silos within the Site are the highest built form within and surrounding the Site.

Layout and Urban Grain

11.99 From an analysis of the urban grain within and surrounding the Site, the following observations can be made:

- the urban grain and layout is closely related to the current land use and informed by the large scale built form associated with the town centre, industrial zone and commercial areas;
- buildings are orientated on an approximate north / south and east / west axis still reflecting Louis de Soissons' original 1921 masterplan;
- within the town centre the architectural layout is defined by the low urban density dominated by open space; and
- there is a finer urban grain to the south east of the Site on the residential edge of Peartree that has been reflected in the more recent development to the south of the Application Site, north of Broadwater Crescent.

Viewpoints

11.100 The Zone of Theoretical Visibility within which the Proposed Development is likely to be visible is shown in **Figure 11.9**. The viewpoints subject to the visual assessment are identified in **Table 11.12** and their locations are shown on **Figure 11.10**. The description of each viewpoint is presented below and photographs of each existing viewpoint are provided in the Wirelines Assessment at **Appendix 11.3**.

Table 11.12 – Viewpoints

Viewpoint	Location
Viewpoint 1	Bridge Road (B195) looking South East from the railway bridge
Viewpoint 2	Broadwater Road (A1000) at the junction with Bridge Road (B195)
Viewpoint 3	Hyde Way looking West
Viewpoint 4	Knella Road / Peartree Lane, Peartree
Viewpoint 5	Corals Mead, Broadwater Crescent
Viewpoint 6	Welwyn Garden City Rail Station
Viewpoint 7	Parkway looking East along Howardsgate
Viewpoint 8	The Campus, Parkway
Viewpoint 9	Pentley Park, Sherrards Park
Viewpoint 10	Network Rail footbridge – 1
Viewpoint 11	Hyde Way / Broadwater Road junction
Viewpoint 12	Osborn Way footbridge
Viewpoint 13	Bridge Road (B195) looking south

Viewpoint	Location
Viewpoint 14	Broadwater House / Mercury Way / Albany Place
Viewpoint 15	Otto Road / Southern Site boundary
Viewpoint 16	Network Rail footbridge – 2
Viewpoint 17	Wigsmore North
Viewpoint 18	Broadwater Road / Penn Way
Viewpoint 19 A	Hatfield House (1 st Floor)
Viewpoint 19 B	Hatfield House (Roof)
Viewpoint 19 C	Hatfield House and Gardens (Southern Approach)

Viewpoint 1: Bridge Road (B195) Looking South East from the Railway Bridge

11.101 The viewpoint is located approximately 20m to the northwest of the Site boundary. Receptors on Bridge Road include vehicle users, cyclists and pedestrians. The bridge forms a key vehicular route for those travelling east / west and features a footpath that pedestrians use to access the town centre. Bridge Road forms part of the Welwyn Garden City Peartree Trail (as illustrated on **Figure 11.3**) which is a heritage walking trail for visitors and tourists to Welwyn. This view is also, therefore, representative for this group of receptors.

11.102 The view is characterised in the foreground by direct views of the East Coast Mainline railway and associated infrastructure. Beyond the railway there are direct views of the western part of the Site, comprising an open area of scrub land, to the rear of which in the middle ground, the original 1920s former Shredded Wheat Factory production hall and silos (Grade II listed) and prominent chimney are visible along the skyline.

11.103 In the distance, to the rear of the Network Rail bridge crossing, warehouses within the Pall Mall industrial estate are visible. There are glimpsed views through existing vegetation, in the distance, towards the Office block (Buildings 1 to 4) of the former Roche Products Factory (Grade II listed) and residential apartments within the Mirage development, off Penn Way.

11.104 Whilst the view allows for some appreciation of the listed buildings on the Site, the unkempt appearance of the building, the parcel of scrubland along with views of the railway and industry all detract from the visual amenity and result in a neglected appearance.

11.105 From Bridge Road, sequential views are experienced by receptors on the edge of a townscape of local importance designated a Conservation Area, therefore a **medium** value is attached to vehicle users, cyclists and pedestrian receptors in this location.



11.106 Bridge Road forms part of the Peartree Trail Heritage Trail and is used by a moderate proportion of visitors, to appreciate views of historic buildings and spaces within Welwyn Garden City. The value attached to viewpoint 1 from these heritage trail receptors is considered **medium**.

Viewpoint 2: Broadwater Road (A1000) at the Junction with Bridge Road (B195)

11.107 Receptors at the junction between Broadwater Road (A1000) and Bridge Road (B195) include vehicle users, cyclists and pedestrians, and users of the Peartree Trail, with the viewpoint approximately 40m, to the north-east of the Site boundary.

11.108 The foreground view is dominated by the Bridge Road and Broadwater Road junction, including associated infrastructure (lighting columns, traffic lights and signage) and vehicular movement. The recently built Mercury House, including a glass façade is also within the view and provides a positive enhancement to the immediate townscape in the view. The boundary and buildings, located within the north eastern part of the Site, are visible in the middle ground beyond the road junction. The Site boundary, lies adjacent to Broadwater and Bridge Road, and is delineated by a security fence, tall hedgerow and tree vegetation.

11.109 The 1950s factory, 1930s manufacturing hall and 1950s administration building, part of the former Shredded Wheat Factory (Grade II Listed), lie close to the boundary within the Site and are visible along the skyline in the middle ground. The disused buildings create a continuous building mass, on the edge of the Site, preventing views within and towards the 1920s production hall and earlier complex designed by Louis de Soissons. The tops of the 1930s silos are visible in the distance, to the rear of the 1930s manufacturing hall. The unkempt appearance of the former Shredded Wheat Factory buildings, boundary vegetation, visual street “clutter” such as street lighting and signage along with the vehicular traffic movement at the junction, all detract from the amenity of this view.

11.110 Whilst the general value of views from the Broadwater Road / Bridge Road junction for vehicle users, cyclists and pedestrian receptors is considered **low**, the road forms part of the Peartree Trail Heritage Trail and is used by a moderate proportion of visitors, to appreciate views of historic buildings and spaces within Welwyn Garden City. The value attached to the view from these heritage trail receptors is, therefore, considered to be **medium**.



Viewpoint 3: Hyde Way Looking West

11.111 Receptors along Hyde Way are occupiers of residential properties, vehicle users, pedestrians and cyclists, with the viewpoint approximately 250m, to the east of the Site boundary.

11.112 The view for vehicle users, pedestrians and cyclists, for the most part, is channelled and framed along Hyde Way by built form and vegetation towards the Site's eastern boundary. Breaks in the built form and vegetation provide glimpsed, filtered, distant views of the former Shredded Wheat Factory 1950s dispatch building along Broadwater Road, within the Site, whilst the top of the chimney and silos (Grade II Listed) are visible above vegetation, punctuating the skyline in the centre of the view.

11.113 Residential receptors include properties that directly front onto Hyde Way, at the junction with Peartree Lane, currently experiencing oblique, distant, glimpsed views of the top of the chimney and silos within the Site. The angle and orientation of these properties and the enclosure created by hedgerow and tree vegetation, limits views to the upper storeys, and for the most part, views are screened by intervening vegetation.

11.114 Whilst the general value of views from Hyde Way for vehicle users, cyclists and pedestrian receptors is considered **low**, the residential receptors discussed above, along Hyde Way, all have a proprietary interest in their views, therefore, a **high** value is attached to their view.

Viewpoint 4: Knella Road / Peartree Lane, Peartree

11.115 This viewpoint represents residential receptors, vehicle users, cyclists and pedestrians within the Peartree Estate on Peartree Lane and Knella Road, with the viewpoint approximately 300m, to the south east of the Site boundary.

11.116 Residential receptors include properties that directly front onto Peartree Lane and Knella Road, where residents currently experience, oblique, distant, partial glimpsed views of the top of the former Shredded Wheat Factory silos within the Site. The silos are visible along the skyline, above and to the rear of trees and residential built form located in the foreground and middle ground views, and viewed alongside offices at 29 Broadwater Road.



11.117 The angle and orientation of these residential properties and the enclosure created by surrounding residential built form and vegetation, limits views towards the Site and, for the most part, views are screened.

11.118 The view for vehicle users, pedestrians and cyclists along Knella Road and Peartree Lane, for the most part, are channelled and framed by built form and vegetation. Breaks in the built form provide indirect glimpsed, distant views towards the tops of the Silos within the Site.

11.119 Whilst the general value of views from Knella Road and Peartree Lane for vehicle users, cyclists and pedestrian receptors is considered **low**, the residential receptors discussed above, along Knella Road and Peartree Lane, all have a proprietary interest in their views therefore a **high** value is attached to their view.

Viewpoint 5: Corals Mead, Broadwater Crescent

11.120 This viewpoint represents residential receptors on the northern end of Corals Mead, with the viewpoint approximately 230m, to the south west of the Site boundary.

11.121 Residential receptors currently experience oblique, foreground views of the Bio Park building, to the rear of a hedgerow boundary, which forms a dominant impermeable mass and visual detractor in the view. The Biopark and hedgerow vegetation currently encloses and screens views towards the existing built form within the Site. The upper extents of the offices at 29 Broadwater Road are visible, in the distant view, projecting into the skyline.

11.122 The residential receptors discussed above, on Coral Meads, have a proprietary interest in their view therefore the value attached to their view is **high**.

Viewpoint 6: Welwyn Garden City Rail Station

11.123 Receptors from this viewpoint are commuters standing on the station platform and train passengers, with the viewpoint approximately 50m, to the west of the Site boundary.

11.124 Commuters and train passengers currently experience views of the opposite platform, signage, overhead cables, plant and other furnishings, which make up the foreground view. Scattered trees, vegetation and security fencing are visible, in the middle ground, define the Site's western boundary. The Western elevation of the 1920s production hall, 1920s and 1930s silos and chimney, part of the former Shredded Wheat Factory (Grade II listed), lie directly



adjacent to the boundary within the Site and are visible along the skyline, in the middle ground view.

11.125 Passenger receptors experience both static and sequential views from this location. Views are experienced by receptors on the edge of a townscape of local importance designated a Conservation Area, therefore, the value attached to views for these receptors is **medium**.

Viewpoint 7: Parkway Looking East along Howardsgate

11.126 Receptors from this viewpoint include people utilising the public open space along Parkway and Howardsgate and users of the Welwyn Garden City Town Centre (Route 1) heritage trail, with the viewpoint approximately 400m, to the west of the Application Site boundary. This view is identified within WHBC's Conservation Area Appraisal as '*an important key view or vista*'.

11.127 The receptors' foreground view features a linear formal public open space and avenues of trees which, combined with the built form on its edges, channels and frames the view down the Eastern axis of Howardsgate, towards the Howard Shopping Centre, visible in the distance. Views towards the Site are limited to distant glimpsed views of the upper extents of the silos and chimney due to the intervening built form of the Howard Centre and vegetation within the public open spaces.

11.128 Parkway and Howardsgate within Welwyn Garden City town centre are key areas of public open spaces, experienced by the broader community, including visitors and tourists, located within Welwyn Garden City Conservation Area and from a recognised 'key view or vista'. The value attached to this view from these receptors is, therefore, **high**.

Viewpoint 8: The Campus, Parkway

11.129 Receptors from this viewpoint include people utilising the public open space within The Campus and users of the Welwyn Garden City Town Centre (Route 2) heritage trail, with the viewpoint approximately 400m to the north west of the Site. This view is identified within WHBC's Conservation Area Appraisal as '*an important key view or vista*'.

11.130 The receptors' foreground view comprises formal public open space featuring mature trees, planting and seating areas. This extends to the middle ground with filtered partial views of civic built form, which frames and encloses the Campus and the view. The clock tower of the



WHBC Offices is a notable feature, on the skyline in distant views, beyond which the upper extents of the 1920s and 1930s silos and chimney of the former Shredded Wheat Factory within the Site are visible.

11.131 The Campus within Welwyn Garden City town centre is a key area of public open space, experienced by the broader community including visitors and tourists, located within Welwyn Garden City Conservation Area and from a recognised 'key view or vista'. The value attached to this view from these receptors is, therefore, **high**.

Viewpoint 9: Pentley Park, Sherrards Park

11.132 Receptors from Pentley Park are occupiers of residential properties, vehicle users, pedestrians and cyclists, with the viewpoint approximately 830m, to the north west of the Site boundary.

11.133 The view for vehicle users, pedestrians and cyclists are constrained by intervening vegetation and built form framing and channelling views along the road and in the direction of travel, where in the distance there are glimpsed views towards the tops of the existing silos of the former Shredded Wheat Factory, within the Site.

11.134 Residential receptors include properties that directly front onto Pentley Park, where residents currently experience oblique, distant, glimpsed views of the top of the silos within the Site. The angle and orientation of these properties and the enclosure created by the surrounding built form and vegetation, is considered to limit views to the upper storeys, and, for the most part, views are screened. The residential receptors have a proprietary interest in their view therefore the value attached to their view is **high**.

11.135 Whilst there are limited, distant, glimpsed views towards the tops of the existing silos, within the Site, for the most part, the vegetation and built form within Sherrard Park prevents views by residential, vehicle users, pedestrian and cyclist receptors of the Site therefore this view is not being considered further as part of the assessment process.



Viewpoint 10: Network Rail Footbridge – 1

11.136 Receptors from this viewpoint are pedestrians using the Network Rail footbridge, which connects the Howard Shopping Centre in the west to Hyde Way in the east, with the viewpoint approximately 45m, to the West of the Site boundary.

11.137 Pedestrians experience elevated views from the footbridge across the East Coast Mainline railway towards industrial land featuring perimeter security fencing, warehouses and areas of hardstanding, visible in the foreground view. To the rear, pockets of mature trees and an area of scrub vegetation are visible across the middle ground, beyond which the former Shredded Wheat Factory, within the Site, is partially visible, through intervening vegetation. The listed Shredded Wheat Factory buildings visible from this view include the Western elevation of the listed 1920s production hall, 1920s grain house and the 1920s and 1930s silos and chimney which are visually prominent in the view, projecting above the factory hall.

11.138 From the Network Rail footbridge the value of views from pedestrian receptors is considered to be **low** as there is no evidence of any specific value attached to these views.

Viewpoint 11: Hyde Way

11.139 Receptors at the junction between Hyde Way and Broadwater Road (A1000) include vehicle users, pedestrians and cyclists, with the viewpoint approximately 20m, to the east of the Site boundary.

11.140 The view for vehicle users, pedestrians and cyclists is channelled and framed along Hyde Way by built form and vegetation towards the Site's eastern boundary. Scattered mature trees feature in the foreground view, to the rear of which, security fencing, hedgerow vegetation and built form are visible bordering Broadwater Road, defining the Site's eastern boundary.

11.141 The 1950s factory dispatch building and 1960s offices of the former Shredded Wheat Factory (Grade II Listed) are visible, framing the entrance to the Site on Hyde Way, channelling views along the length of Hyde Way, where the red brick built form of the Howard Centre is visible in distant views. The top of the 1930s silos are visible projecting into the skyline above the 1950s dispatch building.

11.142 The physically and visually enclosed nature of the Site's eastern boundary due to the 1950s and 1960s built form, fencing, signage and mature trees, restrict views into the Site from



this location. Views into the Site are limited to the existing pedestrian route along Hyde Way within the centre of the Site, albeit the visual legibility of this route is reduced due to the mature tree growth at the Broadwater Road junction.

11.143 From Hyde Way the value of views from vehicle users, cyclists and pedestrian receptors is considered **low** as there is no evidence of any specific value attached to these views.

Viewpoint 12: Osborn Way footbridge

11.144 Receptors on Osborn Way footbridge are pedestrians walking between the multi storey car park and the Howard Shopping Centre, with the viewpoint approximately 100m, to the west of the Site boundary.

11.145 The receptors' view is elevated and framed either side by built form which channels the view towards a line of vegetation and perimeter fencing visible in the foreground bordering the East Coast Mainline railway. The railway line, overhead lines and gantry structures are visible in the middle ground, between the intervening vegetation, forming visual detractors across the length of the view.

11.146 In the distance the built form within the Site and Mercury House along Broadwater Road are visible along the skyline. The Western elevation of the 1920s former Shredded Wheat Factory production hall within the Site, is partially visible, above and to the rear of existing vegetation either side of the railway whilst the top of the 1920s and 1930s silos and chimney are visible, above and to the rear of the production hall building.

11.147 From the Osborn Way footbridge views are experienced from a townscape of local importance, designated a Conservation Area, therefore the value attached to pedestrian receptors is **medium**.

Viewpoint 13: Bridge Road (B195) Looking South

11.148 Receptors on Bridge Road (B195) include vehicle users, cyclists and pedestrians, and users of the Peartree Trail, with the viewpoint approximately 20m, to the north of the Site boundary.

11.149 Perimeter fencing and vegetation are visible in the foreground, along the length of the view, bordering Bridge Road, defining the Site's northern boundary. Beyond, the 1950s



administration building and 1920s production hall of the former Shredded Wheat Factory are visible, adjacent to the Site boundary as a continuous building mass, preventing views further into the Site. The tops of the factory silos are visible, to the rear and above the 1950s administration buildings, whilst the Howard Centre is visible in the distance, to the right of view along the horizon.

11.150 While the view allows for some appreciation of the listed buildings on Site, the unkempt appearance of the building, its surroundings, the vegetation and fencing along Bridge Road, and enclosed nature of the Site all detract from the visual amenity and result in a neglected appearance.

11.151 Whilst the general value of views from Bridge Road for vehicle users, cyclists and pedestrian receptors is considered **low**, Bridge Road forms part of the Peartree Trail Heritage Trail and is used by a moderate proportion of visitors, to appreciate views of historic buildings and spaces within Welwyn Garden City. The value attached to the view from these heritage trail receptors is, therefore, **medium**.

Viewpoint 14: Broadwater Road / Mercury House / Albany Place

11.152 Receptors on Broadwater Road (A1000) include vehicle users, cyclists and pedestrians, office workers in Mercury and Albany House and users of the Peartree Trail, with the viewpoint approximately 15m, to the east of the Site boundary.

11.153 Tall security fencing and hedgerow vegetation is visible in the foreground view bordering Broadwater Road, defining the Site's eastern boundary. The 1950s factory dispatch, 1930s manufacturing hall and 1950s administration building, part of the former Shredded Wheat Factory (Grade II Listed), are visible to the rear of the fencing, as a continuous building mass, preventing views further into the Site. The top of the factory silos are partially visible, through intervening vegetation, projecting into the skyline, above the manufacturing hall.

11.154 Whilst the general value of views from Broadwater Road for vehicle users, cyclists and pedestrian receptors is considered **low**, Broadwater Road forms part of the Peartree Trail Heritage Trail and is used by a moderate proportion of visitors, to appreciate views of historic buildings and spaces within Welwyn Garden City. The value attached to the view from these heritage trail receptors is, therefore, **medium**.



Viewpoint 15: Otto Road / Southern Site Boundary

11.155 Otto Road is a private road which forms part of the recently completed Taylor Wimpey residential development, referred to as the 'Mirage', and receptors include residents of block 4, with the viewpoint approximately 20m, to the south of the Site boundary.

11.156 The large expanse of derelict land within the Site dominates the foreground and middle ground view and provides open expansive views across the Site towards the 1920s and 1930s silos and chimney of the former Shredded Wheat Factory (Grade II Listed). The silos are a prominent feature in the centre of the view, framed on either side by the 1960s brick factory / offices.

11.157 A line of existing mature trees are visible framing the left side of view defining the Site's western boundary, beyond which there are glimpsed views of the Pall Mall Site and the pedestrian footbridge over the East Coast Mainline railway, whilst the office block at 29 Broadwater Road is visible to the far right of the view.

11.158 The residential receptors discussed above, adjacent to the Site's southern boundary, have a proprietary interest in their view, therefore the value attached to their view is **high**.

Viewpoint 16: Network Rail footbridge – 2

11.159 Receptors from this viewpoint are pedestrians using the Network Rail footbridge, on the western boundary, where it enters the Site.

11.160 The pedestrian's elevated position on the bridge, provides direct, clear views of the 1920s and 1930s silos, grain house and chimney of the former Shredded Wheat Factory (Grade II Listed), in the foreground view. The Western elevation of the 1920s production hall is partially visible in the distance between intervening mature trees. The Howard Centre is visible in the distance, to the far left of the view, beyond the East Coast Mainline railway.

11.161 From the Network Rail footbridge the value of views from pedestrian receptors is considered **low** as there is no evidence of any specific value attached to these views.



Viewpoint 17: Wigsmore North

11.162 Receptors from Wigsmore North are vehicle users, pedestrians and cyclists travelling through the townscape, with the viewpoint approximately 230m to the west of the Site boundary.

11.163 The highway network and associated infrastructure dominates the foreground view featuring railings, lighting columns, traffic lights and the road itself. The view down Osborn Way is framed between the existing multi storey car park and the Howard Shopping Centre. The pedestrian bridge, connecting the two buildings is elevated above Osborn Way and is visible in the distance. Beyond the bridge, there are partial to glimpsed views of the western elevation of the 1920s former Shredded Wheat factory production hall through the intervening structure of the footbridge and over the East Coast Mainline railway.

11.164 From Wigsmore North, views are experienced from a townscape of local importance, designated a Conservation Area, therefore the value attached to pedestrian receptors is **medium**.

Viewpoint 18: Broadwater Road / Penn Way

11.165 Receptors from Broadwater Road and Penn Way include occupiers of residential properties (block 3 of The Mirage), vehicle users, pedestrians and cyclists, with the viewpoint approximately 120m, to the south of the Site boundary.

11.166 The view for vehicle users, pedestrians and cyclists is channelled and framed along the length of Broadwater Road by built form and vegetation. The 'Mirage' apartments are visible in the foreground, enclosing and framing the view, beyond which there are partial views towards the former Roche Products Factory Offices (Grade II listed), through intervening vegetation. The 1960s offices and factory of the former Shredded Wheat Factory within the Site are visible in the distance adjacent to Broadwater Road.

11.167 Residential receptors include properties within the 'Mirage' development (block 3) whose angle and orientation of view faces north towards the Site. These receptors experience partial views, through intervening vegetation, over the former Roche Products Factory Offices (Grade II listed) towards the tops of the 1920s and 1930s silos and chimney of the former Shredded Wheat factory (Grade II Listed). For the most part views are likely to be restricted to the upper storeys.



11.168 Whilst the general value of views from Broadwater Road and Penn Way for vehicle users, cyclists and pedestrian receptors is considered **low**, the residential receptors discussed above, within the Mirage development, all have a proprietary interest in their view therefore the value attached to their view is **high**.

Viewpoints 19a to 19c: Hatfield House (1st Floor, Roof and Southern Approach)

11.169 Receptors from Hatfield House include members of the public visiting the house and gardens. The house is also a private residence to Robert Gascoyne-Cecil, 7th Marquess of Salisbury and his family. Viewpoint 19a and 19b are taken from Hatfield House, with the viewpoint approximately 4.2km, to the south of the Site boundary. Viewpoint 19c is taken from the top of the 'Southern Approach' in the park and garden, with the viewpoint approximately 4.5km, to the south of the Site boundary.

11.170 Viewpoint 19a is taken from a first storey window on the west wing of Hatfield House, a 17th Century Jacobean Mansion, Grade I listed building set within a Grade I listed Registered Historic Park and Garden. Viewpoint 19b is taken from the roof of Hatfield House at the foot of the clock tower looking north. For both of these views, the receptors' foreground view is framed and channelled along the 'North Avenue' which consists of a lime and beech tree boulevard, towards the wider woodland parkland, visible in the middle ground. The land slopes away from the house before rising in the far distance providing long distance views towards Welwyn Garden City. The receptor experiences partial to glimpsed views, through intervening vegetation, in the far distance of the top half of the 1920s and 1930s silos of the former Shredded Wheat Factory within the Site and the Biopark building; their white facade and roofs contrast with the surrounding vegetation. As viewpoint 19b is taken from the roof of Hatfield House, the field of view is much wider and the receptor, albeit private, experiences visual detractors in their foreground view. The visual detractors include the roof and glazing associated with the Riding School Conference Centre and Hatfield Real Tennis Club.

11.171 Viewpoint 19c is taken from the 'Southern Approach' which forms a gateway vista to the house and was once the original entrance. Whilst further away, a greater proportion of the silos are visible in the far distance. The Biopark is screened from this position by the chimneys of Hatfield House.

11.172 Views are experienced by visitors and residential receptors from within a building and landscape of local and national importance designated a Grade I listed building set within a



Grade I listed Registered Historic Park and Garden, featuring prominent views along North Avenue. The value attached to these views for these receptors is, therefore, **high**.

Future Baseline (Without Development Scenario)

11.173 In the future, the likelihood of continued dereliction of the Site would have a progressively negative effect on the townscape character and visual environment on Broadwater Road, Bridge Road and the surrounding environs.

11.174 This brownfield site which currently accommodates a proportion of former industrial and manufacturing built form associated with the former Shredded Wheat factory in the northern parts, would continue to lie derelict. The Site would likely remain private, inaccessible to the public, fenced off and enclosed to ensure public safety. The do nothing scenario has the potential to perpetuate inactive frontages to Bridge Road, Broadwater Road and the Hyde Way streetscenes which would likely deteriorate with time, creating a sense of degeneration to the area. Whilst views towards the existing silos would be maintained and unobstructed, views to the 1920s production hall would remain hidden by the later 1930s and 1950s built form.

11.175 The east / west route through the Site along Hyde Way would remain as a pedestrian thoroughfare, however the likely long term disuse of the surrounding site would create an uninviting route through the backwaters of a former industrial Site. Over time the route along Hyde Way has the potential to become an uninviting one, which people are likely to avoid, severing the connection between Welwyn Garden City and the Peartree residential area.

11.176 With the Site's strategic location in the heart of Welwyn Garden City, adjacent to the railway and adjacent to the Eastern arrival gateway into the town from Bridge Road, the do nothing scenario would continue to negatively affect the town centre.



DESCRIPTION OF THE PROPOSED DEVELOPMENT IN TOWNSCAPE CONTEXT

Key Townscape Design Principles

11.177 The design objectives and principles that led the evolution of the design of the Proposed Development were:

- ensuring the prominence and monumentality of the original 1920s listed built form within the Site remains as part of the design;
- following early discussions with Historic England the initial Development proposals were further developed to allow for the retention of, in addition to the original listed 1920s production hall, silos and grain house buildings, the original 1920s listed boiler house, previously proposed for demolition;
- preserving identified key views of the retained listed buildings within the Site;
- making the listed buildings a strong and distinctive focal point within the scheme;
- ensuring that the listed buildings remain as a key focal point, giving them the prominence and importance that they demand;
- respecting the setting of the original 1920s silos;
- responding to the concerns raised by the Local Planning Authority and Historic England regarding the height and positioning of proposed buildings in relation to the existing 1920s silos;
- maximising accessibility and prominence of community facilities within the Proposed Development, through careful and considered positioning;
- maximising current and future connectivity to surrounding residential neighbourhoods;
- high quality design: architecture and landscaping working together; and
- appropriate car parking provision.

Building Heights

11.178 Buildings within the Proposed Development range from three to nine storeys in height and between a minimum of +94.850m and maximum +113.750m AOD in height. While this is higher than many other buildings in Welwyn Garden City, in the context of the silos, the nearby BioPark and the Howard Centre, these are in proportion. To reduce the effect of the buildings on the surrounding area, a range of design measures are proposed, from soft vertical landscapes to stepping the buildings to break up the building line.



Key Enhancement Measures

11.179 Enhancement measures were incorporated within the design of the Proposed Development that seek to improve the townscape attributes and visual amenity of the Proposed Development, over and above its baseline condition. These measures include:

- the redevelopment of the Site provides the opportunity to regenerate former industrial brownfield land by providing an inclusive, sustainable, mixed use development;
- retention, refurbishment and change of use to the Grade II Listed original 1920s silos, production hall, grain store and boiler house of the former Shredded Wheat Factory;
- the 1920s (Louis de Soissons designed) former Shredded Wheat Factory production hall would be revealed by providing an appropriate public realm setting for a more public appreciation of its architectural quality;
- the redevelopment of the Site acts as a catalyst in bridging the divide between the east and west of Welwyn Garden City as part of the public realm strategy;
- improvements to the legibility and quality of Hyde Way and the existing Network Rail footbridge which provides primary east / west connectivity;
- generous community gardens and community play spaces throughout the Proposed Development, including informal and equipped play spaces and skatepark;
- a community building located on the junction of the main thoroughfare of the existing footbridge with an entrance off a new public square;
- Highway works, to include the widening of footways and the provision of cycleways to Broadwater Road;
- the lack of built form along the Site's eastern boundary currently creates a weak, inactive urban edge. The redevelopment of the Site provides the opportunity to introduce new built form along Broadwater Road which upon occupation would create an active, positive frontage with buildings orientated out onto the road;
- the Proposed Development offers a net gain in both publicly accessible open space and green infrastructure across the Site. A considerable amount of planting is introduced to the Site together with several publicly accessible and communal green spaces;
- a series of urban squares at the heart of the Proposed Development creating a new social focal point in the town;
- the landscape proposals for Broadwater Road would introduce a rich mosaic and variety of green spaces as part of the planting strategy, delivering a high



quality landscape setting to support sustainable settlement growth and increase biodiversity; and

- a landscape focused sustainable drainage system through the use of green and brown roofs and the introduction of soft landscaping.

IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Demolition and Construction

Effects on Townscape Character

11.180 Those parts of the study area which have been scoped out following the baseline assessment (LTCA 1, LTCA 7, LTCA 9, LTCA10, LTCA 11 and LTCA 13) are areas where effects would be **neutral** due to distance and / or the presence of intervening built form.

Area 2: Shire Park Business Area and Area 5: Peartree Residential Area

11.181 During demolition and construction these LTCA's would experience temporary adverse effects that would be indirect in nature. The receptor would experience a perceptible deterioration, through the introduction of tall on-site machinery including cranes, piling rigs and scaffolding that would feature on the skyline as visual detractors, in distant views.

11.182 These LTCA are considered of **low** value and **medium** susceptibility as there is likely to be little reference within the LTCA to demolition and construction activities and the enclosure of the area means the receptors have a medium ability to accept the type of activities proposed, resulting in a **medium** sensitivity. Whilst there would be an effect to the perceptible qualities of the townscape character, at local level, these effects would be temporary in nature and unlikely to influence the key characteristics of the LTCA. The magnitude of change would therefore be **low / medium** resulting in an **adverse effect of minor significance**.

Area 3: Broadwater Road Industrial Area (includes the Site)

11.183 The Site is located within this LTCA, therefore, demolition and construction would result in the direct removal and change of approximately 40% of this LTCA from a brownfield, industrial, part derelict townscape area to a construction site. Whilst this LTCA is already industrial in nature, featuring visual, physical and noise detractors, demolition and construction works would further deteriorate the perceptual townscape quality, through the demolition and removal of the 1930s and 1950s Grade II Listed former Shredded Wheat Factory, including the 1930s silos. The demolition and construction phase also introduces tall onsite machinery including cranes, piling rigs and scaffolding that would form visual detractors in views, influencing the townscape at a local level.

11.184 This LTCA is considered of **low** value and **medium** susceptibility as there is little reference within the LTCA to demolition and construction activities and the enclosure of the area means the receptor has a medium ability to accept the type of activities proposed, resulting in a **medium** sensitivity. During demolition and construction, it is considered those parts of the LTCA within the Site and directly adjacent, would experience a magnitude of change categorised as **medium**, resulting in an **adverse effect of moderate significance**. In the wider parts of the LTCA, the enclosure created by the intervening built form would limit the effect, therefore the magnitude of change would be **low / medium**, resulting in an **adverse effect of minor / moderate significance**.

Area 4: Peartree Modern Business and Industrial Area and Area 6: Broadwater Crescent Residential Area

11.185 As the Site is directly adjacent to these LTCA's, during demolition and construction, they would experience temporary adverse effects that would be indirect in nature. These receptors would experience a deterioration in the townscape perceptual quality, due to the tall machinery located within the Site, the hoarding on the Site boundary and the activity of machinery on-site, all of which would form visual detractors in views out of the LTCA.

11.186 These LTCA are considered of **low** value and **medium** susceptibility as there is little reference within the LTCA to demolition and construction activities and the scale and enclosure of the area mean the receptors have a medium ability to accept the type of activities proposed, resulting in a **medium** sensitivity. Due to the receptors close proximity to the Site it is considered that demolition and construction would influence the townscape's perceptual qualities, at a local level, overall influencing some of the key characteristics. During demolition and construction, it is considered those parts of the LTCA directly adjacent to the Site, the magnitude of change would be **medium**, resulting in an **adverse effect of moderate significance**. In the wider parts of the LTCA, the enclosure created by the intervening built form and vegetation would limit the effect, therefore, the magnitude of change would be **low / medium**, resulting in an **adverse effect of minor / moderate significance**.

Area 8: Longcroft Lane Area

11.187 This LTCA is located in the near distance to the south-west of the Site separated by the East Coast Mainline Railway, within Welwyn Garden City Conservation Area. During demolition and construction this LTCA would experience temporary, adverse effects that would be indirect in nature. The receptor would experience a small perceptible deterioration, through the



introduction of tall onsite machinery including cranes, piling rigs and scaffolding that would feature in partial views between and above built form and vegetation on the skyline as visual detractors, in distant views.

11.188 This LTCA is considered to be of **medium** value and **medium** susceptibility as whilst there is little to no reference to demolition and construction activities the enclosure of the area created by the built form and vegetation means the receptor has a medium ability to accept the type of activities proposed, resulting in a **medium** sensitivity. There would be a perceptible deterioration of the townscape character's perceptible and aesthetical qualities, influencing limited areas of the LTCA and these effects would be temporary in nature, unlikely to influence the key characteristics of the LTCA's. The magnitude of change would be **low / medium**, resulting in an **adverse effect of minor significance**.

Area 12: Parkway Retail Area and Area 14: The Campus

11.189 These LTCA are located in close proximity to the west of the Site separated by the East Coast Mainline Railway, within Welwyn Garden City Conservation Area. During demolition and construction these receptors would experience temporary, adverse effects that would be indirect in nature. The receptor would experience a perceptible deterioration, through the introduction of tall on-site machinery including cranes, piling rigs and scaffolding that would feature above built form on the skyline as visual detractors, in distant views.

11.190 These LTCA are considered to be of **high** value and **medium** susceptibility as whilst there is little to no reference to demolition and construction activities within the LTCA, the enclosure of the area created by the built form and vegetation means the receptor has a medium ability to accept the type of activities proposed, resulting in a **high** sensitivity. There would be a perceptible deterioration of the townscape character's perceptible and aesthetical qualities, influencing the townscape at a local level and these effects would be temporary in nature, considered to influence some of the key characteristics of the LTCAs. The magnitude of change would be **medium**, resulting in an **adverse effect of moderate significance**.

Effect on Land Use

11.191 The Site was most recently used for industrial purposes, featuring derelict factory buildings in the north eastern part of the Site.



11.192 The demolition and construction works would result in a direct, short term, temporary change to the Site's industrial land use, replacing it with a construction site featuring on-site machinery, storage of materials and construction activities. The Site's land use is considered to be of **low** value and **medium** susceptibility as there is little reference within the LTCA to demolition and construction activities and the scale and enclosure of the area mean the receptor has a medium ability to accept the type of activities proposed, resulting in a **medium** sensitivity.

11.193 During demolition and construction, the Site's land use would enter a transitional phase from its former industrial dereliction to the positive land use resulting from the Proposed Development. This beneficial change during the construction phase is considered to be barely perceptible in land use terms i.e. **negligible** magnitude of change, resulting in an **insignificant beneficial effect**.

Effect on Open Space and Landscape

11.194 During demolition and construction a small proportion of the existing trees and vegetation of low to moderate amenity value would be permanently removed, whilst trees to be retained would be protected through the establishment of tree and hedgerow protection measures in accordance with British Standard (BS) 5837: 2012: '*Trees in relation to design, demolition and construction. Recommendations*' as described in the Arboricultural Implications Assessment and Arboricultural Method Statement (accompanying this planning application). The extent of vegetation loss on Site would be limited but would constitute an adverse effect.

11.195 The Site's landscape and vegetation is considered to be of **low** value and **medium** susceptibility as there are few landscape elements located on this brownfield site, which can be easily be replaced in the medium term, resulting in a **medium** sensitivity. During demolition and construction, it is considered the magnitude of change would be **low**, resulting in an **adverse effect of minor significance**.

11.196 During demolition and construction the public access along Hyde Way through the centre of the Site would experience disruption through possible diversions, site hoarding and movement of traffic and plant. These changes would be short term and temporary in nature, directly affecting public access within the Site and indirectly the access in the immediate setting.

11.197 The Site's public access is considered to be of **low** value and **medium** susceptibility as there is potential for change in the setting of this route, resulting in a **medium** sensitivity. During



demolition and construction, it is considered the magnitude of change would be **low**, resulting in an **adverse effect of minor significance**.

Visual Effects

Viewpoints 1, 2, 6, 10, 11, 12, 13, 14 and 16

11.198 During demolition and construction visual receptors directly adjacent to or in close proximity to the Site on Broadwater Road, Bridgewater Road and Hyde Way, including vehicle users, cyclists, pedestrians, users of the Peartree Heritage Trail and receptors at Welwyn Garden City railway station would experience full, direct, foreground to middle ground views of the construction activities within the Site. During demolition and construction a visually enclosed and negative edge would be introduced, as a result of the Site hoarding along Broadwater Road, Bridge Road and the East Coast Mainline Railway. Visually detracting features including tower cranes, piling rigs and scaffolding that would be visually prominent in close range views would also be present on the Application Site.

11.199 For transient receptors (vehicle users and cyclists), views are considered of **low** value and **low** susceptibility, as appreciation of the view is not an important part of their journey, leading to a **low** sensitivity. Demolition and construction would result in a limited deterioration to the sequential view. The magnitude of change is considered **medium**, resulting in an **adverse effect of minor significance**.

11.200 Pedestrians on Broadwater Road and Bridge Road adjacent to the Site (Viewpoints 1, 2, 12, 13 & 14) and pedestrians on the network rail footbridge entering and travelling through the Site (Viewpoints 10, 11 & 16) experience views considered of **low** value. They are considered to have **medium** susceptibility, as they are travelling through the townscape, at a pace that allows for some appreciation of their surroundings, resulting in a **medium** sensitivity. Demolition and construction would result in an obvious deterioration to the sequential view, introducing discordant elements. The magnitude of change is considered **medium**, resulting in an **adverse effect of moderate significance**.

11.201 Commuters and passengers views at Welwyn Garden City railway station are considered of **medium** value and **medium** susceptibility, as they are either waiting for or travelling through on a train and are likely to take time to experience views of their surroundings as part of the journey experience, resulting in a **medium** sensitivity. Demolition and construction would result in an obvious deterioration to the stationary view, introducing discordant elements.



The magnitude of change is considered **medium**, resulting in an **adverse effect** of **moderate significance**.

11.202 For users of the Peartree Heritage Trail, views are of **medium** value and are of **high** susceptibility (as the view of heritage assets are an important part of the experience), resulting in a **high** sensitivity. Demolition and construction would result in a major deterioration of their foreground and middle ground sequential views from Broadwater Road and Bridge Road. The magnitude of change is considered **medium**, resulting in an **adverse effect** of **moderate / substantial significance**.

Viewpoints 3, 4, 5 and 18

11.203 During demolition and construction, visual receptors in the near distance to the east and south of the Site boundary, within the Peartree and Broadwater Crescent residential area (including vehicle users, cyclists, pedestrians and residential receptors), would experience distant full to partial views of construction activity. Due to the distance of the receptor from the Site and the intervening built form and vegetation, receptors would experience distant framed and channelled views of the taller onsite machinery including tower cranes, piling rigs and scaffolding that would feature on the skyline as uncharacteristic visual detractors in distant views.

11.204 For transient receptors including vehicle users and cyclists (Viewpoints 3 and 4) views are considered of **low** value and **low** susceptibility, resulting in a **low** sensitivity. The appreciation of the view is not considered an important part of their journey, and demolition and construction would for the most part result in a perceptible deterioration to a small proportion of their distant sequential view. The magnitude of change is considered **low**, resulting in an **insignificant effect**.

11.205 For pedestrians views considered of **low** value and **medium** susceptibility (Viewpoints 3 and 4) travelling at a pace that allows for some appreciation of their surroundings, sensitivity would be **medium**. Demolition and construction would result in a limited deterioration to their distant sequential view. The magnitude of change is considered **low**, resulting in an **adverse effect** of **minor significance**.

11.206 Residential receptors (Viewpoints 3, 4 and 5), have a proprietary interest in their views, the value is considered **high** and the susceptibility **high**, resulting in a **high** sensitivity. Demolition and construction would result in distant, glimpsed, oblique views from their upper



floors, introducing discordant, uncharacteristic visual detractors on the skyline. The magnitude of change is considered **low**, resulting in an **adverse effect** of **minor / moderate significance**.

Viewpoints 7 and 8

11.207 Visual receptors in the near distance to the West of the Site, within Welwyn Garden Conservation Area, include people utilising the public open space and users of the Town Centre Heritage Trail (Route 1 and 2) along Parkway, Howardsgate and the Campus. These views are experienced by a broader community, including visitors and tourists, located within Welwyn Garden City Conservation Area and are recognised as a 'key view or vista'. During demolition and construction receptors would experience distant views of the taller onsite machinery including crane towers, piling rigs and scaffolding that would feature on the skyline, above existing built form within the Conservation Area, as uncharacteristic visual detractors in distant views.

11.208 For pedestrians and users of the Welwyn Garden City Town Centre Heritage Trail, the value of the views is considered **high** and the susceptibility **high** as these receptors have an appreciation for their view and it is an important part of their experience, resulting in a **high** sensitivity. Demolition and construction results in a perceptible deterioration in the distant view, the magnitude of change is considered **medium**, resulting in an **adverse effect** of **moderate significance**.

Viewpoint 15

11.209 Visual receptors in close proximity to the Site, include residential receptors of the Mirage who face north, directly overlooking the Site.

11.210 During demolition and construction receptors would experience full, direct views of the Site hoarding and the construction activities within the Site. The construction phase would introduce visually detracting uncharacteristic features into the receptors foreground, middle ground and distant views through the introduction of onsite machinery including tower cranes, piling rigs, scaffolding and haulage vehicles.

11.211 Residential receptors have a proprietary interest in their views, the value is considered **high** and the susceptibility **high**, resulting in a **high** sensitivity. Demolition and construction would result in direct, temporary changes in the foreground, middle ground and distant views,



introducing discordant, uncharacteristic visual detractors on the skyline, the magnitude of change is considered **high**, resulting in an **adverse** effect of **substantial significance**.

Viewpoints 19a to 19c

11.212 Visual receptors from Hatfield House comprise visitors and tourists, with long distance views over approximately 4.2 to 4.5km to the south of the Site boundary.

11.213 During demolition and construction receptors would experience a small perceptible deterioration, through the introduction of tall onsite machinery including tower cranes, piling rigs and scaffolding that would feature above existing built form and vegetation on the skyline as visual detractors, in long distance views.

11.214 Receptors of Hatfield House, are considered of **high** value and **high** susceptibility as the receptors have an appreciation of the view which is an important part of their experience, resulting in a **high** sensitivity. Demolition and construction introduces barely perceptible detracting visual elements in long distance views, the magnitude of change is considered **low**, resulting in an **adverse effect** of **minor significance**.

Completed Development

Effects on Townscape Areas

11.215 Those parts of the wider study area which have been scoped out following the baseline assessment (LTCA 1, LTCA 7, LTCA 9, LTCA 10, LTCA 11 and LTCA 13) are areas where effects would be **neutral** due to distance and/or the presence of intervening built form.

Area 2: Shire Park Business Area

11.216 The Proposed Development would result in an indirect, barely perceptual change in distant views from the southern part of the LTCA, limited to the upper extents of the retained 1920s silos and proposed residential apartments. Whilst the Proposed Development would slightly improve the perceptual qualities of townscape character within the immediate setting of the Site, it is not considered to influence the key characteristics of the area, the magnitude of change would be **negligible**, resulting in a **neutral** effect.



Area 3: Broadwater Road Industrial Area (includes the Site)

11.217 The Proposed Development would result in the direct removal of approximately 40% of this LTCA, changing it permanently from brownfield, industrial, part derelict townscape to a new, mixed use development, which retains and refurbishes the 1920s part of the Grade II Listed former Shredded Wheat Factory built form, within the Site, as an integral element of the scheme. The introduction of the mixed use development would continue to enhance the local townscape character, permanently changing the land use from its current industrial form, which overall is considered to alter the physical and perceptual townscape quality.

11.218 The Proposed Development is considered to make a positive contribution within the immediate setting of the LTCA, streetscene and former industrial area, creating a new character area within Welwyn Garden City, in line with WHBC aspiration as part of the SPD for the Site. Therefore it is considered at local level the magnitude of change is **low**, resulting in a **beneficial effect of minor significance**.

Area 4: Peartree Modern Business and Industrial Area

11.219 The Proposed Development would result in an indirect perceptual change to those parts of the LTCA directly adjacent to the Site's eastern boundary, through the introduction of a new mixed use development, featuring residential built form of five to nine storeys in height along Broadwater Road. Whilst the scale of the proposed built form along Broadwater Road would be higher than that previously occupying the land and within the surrounding context, the overall improvements to the existing industrial townscape and streetscene as a result of the Proposed Development are considered positive.

11.220 The Proposed Development would introduce a new scale of built form, use and activity along Broadwater Road, directly adjacent to the LTCA western boundary, affecting its immediate setting, which at local level is considered to result in a **low** magnitude of change, resulting in a **beneficial effect of minor significance**.

Area 5: Peartree Residential Area

11.221 The Proposed Development would result in an indirect, barely perceptual change in distant views, from the northern part of the LTCA, limited to glimpsed views of the upper extent of the retained 1920s silos and proposed residential apartments, due to the intervening built form and vegetation within and surrounding the LTCA. Whilst there would be a barely



perceptible deterioration of townscape character within the immediate setting of the Site, following the reduction in the number of silos and addition of built form on the skyline, it is not considered to influence the key characteristics of the area. Therefore, the magnitude of change would be **negligible**, resulting in a **neutral** effect.

Area 6: Broadwater Crescent Residential Area

11.222 For the most part, the Proposed Development would result in an indirect, barely perceptual change in distant views, from the wider LTCA, limited to partial to glimpsed views of the upper extent of the retained 1920s silos. The proposed residential apartments would introduce additional built form on the skyline, in distant views, however it is not considered to influence the key characteristics of the townscape area.

11.223 The Proposed Development would introduce new residential built form, directly adjacent to the LTCA's northern boundary. Whilst the scale of the proposed built form would be higher than that previously occupying the land and within the surrounding context, the overall improvements to the existing industrial townscape and streetscene as a result of the Proposed Development are considered positive.

11.224 For the most part, the Proposed Development would result in a barely perceptible change within the wider LTCA, which is considered a **negligible** magnitude of change, resulting in a **neutral** effect.

11.225 For those northern parts of the LTCA along Otto Road, directly adjacent to the Site's southern boundary, the Proposed Development would introduce a new scale of built form, use and activity, complementing the 'Mirage' residential development, considered a **low** magnitude of change, resulting in a **beneficial effect** of **minor significance**.

Area 8: Longcroft Lane Area

11.226 The Proposed Development would result in an indirect change in distant views from the eastern parts of the LTCA, with views of the upper extent of the retained 1920s silos retained and glimpsed views of the upper extents of proposed residential apartments (due to the extent of intervening built form and vegetation within and surrounding the LTCA). Whilst there would be a slight influence on townscape character, through the reduction of the number of silos and addition of built form on the skyline, it is not considered to influence the key characteristics of the area and the magnitude of change would be **negligible**, resulting in a **neutral** effect.

Area 12: Parkway Retail Area

11.227 The Proposed Development would result in an indirect, barely perceptual change in distant views, limited to partial glimpses above existing built form beyond the LTCA, including the upper extent of the retained 1920s silos and residential blocks. This limited interface between the LCTA and the Proposed Development would result in a barely perceptible influence on townscape character, limited to a reduction in the number of silos and introduction of contemporary built form on the skyline, barely effecting the LTCA's sense of place. It is considered at local level the magnitude of change would be **low**, resulting in an **insignificant adverse** effect.

Area 14: The Campus

11.228 At completion there will be no direct physical change to the townscape character area itself as a result of the Proposed Development. It is likely there will be limited intervisibility along the character area's south eastern boundary towards the upper limits of the retained 1920s silos and perimeter apartment blocks located on the site's northern and western boundary. As the Proposed Development results in a small perceptual change to a limited part of the character area, seen in the context of a town centre and civic setting, the magnitude of change is considered **low/medium**, resulting in an **insignificant adverse** effect.

Effect on Land Use

11.229 As the Proposed Development would result in a direct, permanent, beneficial change to the Site's industrial land use, replacing it with a new mixed use development, featuring residential use, the magnitude of change is considered **medium**, resulting in a **beneficial effect** of **minor / moderate significance**.

Effect on Open Space and Landscape

11.230 The Proposed Development would introduce a matrix of planting typologies, including trees, hedgerow, native shrub planting, ornamental planting of benefit to wildlife, green roofs and soft vertical features, improving the overall landscape attributes within the Site over and above the baseline condition.

11.231 On completion, the route along Hyde Way through the Site would be retained and incorporated as part of the Proposed Development. The Proposed Development would



introduce areas of public open space, gardens, hardscape civic spaces and both formal and informal play spaces, improving the overall public access within the Site over and above the baseline condition.

11.232 The magnitude of change on open space and vegetation within the Site would be **medium**, resulting in a **beneficial effect** of **moderate significance**.

Visual Effects

Viewpoint 1: Bridge Road (B195) Looking South East from the Railway Bridge

11.233 Receptors from this viewpoint comprise vehicle users, cyclists, pedestrians and users of the Peartree Heritage Trail located in close proximity, approximately 20m to the northwest of the Site boundary.

11.234 On completion, receptors would experience direct full views of the Proposed Development, particularly the residential apartment Blocks 2 & 3 adjacent to the Site's western boundary on land currently colonised by scrub vegetation. Views towards the retained listed 1920s former Shredded Wheat Factory buildings, production hall, silos, grain house and chimney would be maintained and framed through deliberate breaks in the built form (Block 2 and Block 3), when viewed from various locations along this kinetic route (see alternative viewpoint 1a) however, the proportion of the production hall visible would reduce, due to the intervening built form of these proposed blocks.

11.235 The Proposed Development introduces new built form on previously overgrown and part derelict industrial land, which would positively alter the skyline and view composition. Whilst the proportion of views towards the former Shredded Wheat Factory 1920s production hall, chimney and silos would be reduced, the appearance of the 1920s Grade II Listed built form would improve overall as part of the proposed restoration works.

11.236 For transient receptors including vehicle users and cyclists, the Proposed Development would result in a limited improvement to their sequential view as they are more focussed on the route ahead rather than oblique views in the direction of the Site. The magnitude of change is considered **low / medium**, resulting in a **beneficial effect** of **minor significance**.



11.237 For pedestrian receptors, the Proposed Development would result in an obvious aesthetic improvement, long term, to their sequential townscape view. The magnitude of change is considered **medium**, resulting in a **beneficial effect of minor significance**.

11.238 For users of the Peartree Heritage Trail, the visual change would result in a removal of their sequential view of current heritage features, replaced with framed views at key points of the 1920s listed buildings. Views of these retained heritage features would be opened up in some locations, due to removal of later sections of the factory. Therefore on balance the magnitude of change is considered **neutral**, resulting in a **neutral effect**.

Viewpoint 2: Broadwater Road (A1000) at the junction with Bridge Road (B195)

11.239 Receptors from this viewpoint comprise vehicle users, cyclists, pedestrians and users of the Peartree Heritage Trail located in close proximity, approximately 40m to the northeast of the Site boundary.

11.240 At completion, receptors at the Broadwater Road junction would experience views of Block 6, Block 7 and Block 3 residential apartments on the perimeter of the Proposed Development, replacing views of the derelict former Shredded Wheat Factory's 1950s administration building, manufacturing hall and factory. The perimeter apartments would create a positive, active, urban edge, replacing the existing hedgerow and security fencing which physically and visually encloses the Site. The scale of the perimeter apartments on the junction corner is proposed at 9 storeys high, stepping down to 7 storeys either side, introducing significantly taller built form than the baseline which would result in the loss of views of the silos from this location. The Proposed Development would replace the unkempt, derelict, highway dominated view with a positive streetscene, forming an attractive, welcoming gateway on the approach into Welwyn Garden City.

11.241 For transient receptors including vehicle users and cyclists, of **low** sensitivity, the Proposed Development would result in a limited improvement to their sequential view. The magnitude of change is considered **low / medium**, resulting in a **beneficial effect of minor significance**.

11.242 For pedestrian receptors, of **medium** sensitivity, the Proposed Development would result in an obvious long term, aesthetic improvement to their sequential townscape view. The magnitude of change is considered **medium**, resulting in a **beneficial effect of minor / moderate significance**.



11.243 For users of the Peartree Heritage Trail, the visual change would result in a removal of their sequential view of heritage features, replaced with framed views at key points. Views of the 1920s listed buildings would be opened up in some locations, due to removal of later sections of the factory. Therefore on balance the magnitude of change is considered **neutral**, resulting in a **neutral effect**.

Viewpoint 3: Hyde Way Looking West

11.244 Receptors from this viewpoint comprise occupiers of residential properties, vehicle users, cyclists and pedestrians in the near distance, approximately 250m to the east of the Site boundary.

11.245 On completion of the Proposed Development, vehicle users, cyclists and pedestrian receptors on Hyde Way would experience direct, glimpsed to partial views of the perimeter apartment blocks along Broadwater Road, through intervening vegetation. Existing views towards the former Shredded Wheat Factory silos would be restricted to the upper limits due to the intervening perimeter blocks, with glimpses retained towards the chimney. Due to the oblique angle of view, residential receptors are likely to experience glimpsed views from upper floors of the perimeter apartment blocks, through intervening vegetation.

11.246 For transient receptors including vehicle users and cyclists of **low** sensitivity and pedestrians of **medium** sensitivity, the Proposed Development would positively enhance a small proportion of their sequential view. The magnitude of change is considered **low**, resulting in an **insignificant beneficial effect**.

11.247 For residential receptors of **high** sensitivity, the Proposed Development would positively enhance a small proportion of their oblique view, the magnitude of change is considered **low**, resulting in a **beneficial effect of minor significance**.

Viewpoint 4: Knella Road / Peartree Lane, Peartree

11.248 Receptors from this viewpoint comprise occupiers of residential properties, vehicle users, cyclists and pedestrians in the near distance, approximately 300m to the southeast of the Site boundary.

11.249 At completion, these receptors would experience distant, partial glimpsed oblique views of the upper extents of the perimeter apartment blocks, above existing intervening residential



built form and vegetation. Views towards the existing retained former Shredded Wheat Factory 1920s silos are likely to be restricted to the upper limits, projecting above the perimeter apartment blocks adjacent to Broadwater Road. The Proposed Development would reduce the extent of silos visible, introduce additional residential built form to a small proportion of the existing distant view and be integrated with existing large scale built form (offices at 29 Broadwater Road) and vegetation along the skyline.

11.250 For transient receptors including vehicle users and cyclists of **low** sensitivity and pedestrians of **medium** sensitivity, the Proposed Development would result in a barely perceptible change in their indirect, oblique, distant sequential view. The magnitude of change is considered **negligible**, resulting in an **insignificant beneficial effect**.

11.251 For residential receptors of **high** sensitivity, the Proposed Development would positively enhance a small proportion of their distant oblique view, the magnitude of change is considered **negligible** resulting in an **insignificant beneficial effect**.

Viewpoint 5: Corals Mead, Broadwater Road

11.252 Receptors from this viewpoint comprise occupiers of residential properties in the near distance, approximately 230m to the southwest of the Site boundary.

11.253 On completion of the Proposed Development, the upper limits of perimeter apartments on Broadwater Road and the perimeter and pavilion residential blocks to the South of the Site would be visible to a limited degree, although views from upper storey windows would be indirect and oblique, resulting in a barely perceptible degree of change. The scale and proximity of the Biopark to Corals Mead would continue to screen the majority of the Proposed Development Site. The Proposed Development would introduce residential built form to a small proportion of distant oblique views in areas of the view currently absent of built form.

11.254 For residential receptors of **high** sensitivity, the magnitude of change is considered **negligible** resulting in an **insignificant adverse effect**.

Viewpoint 6: Welwyn Garden City Railway Station

11.255 Receptors from this viewpoint comprise commuters standing on the station platform and train passengers in close proximity, approximately 50m to the west of the Site boundary.



11.256 On completion, receptors from Welwyn Garden City railway station would continue to experience framed views from some parts of the platform, through proposed built form, towards the retained and refurbished 1920s parts of the Grade II Listed former Shredded Wheat Factory including the production hall, silos, grain house and chimney. The Proposed Development would introduce additional residential apartment built form, adjacent and facing out to the railway, visible in the middle ground, along the skyline. Whilst views towards the retained 1920s built form of the former Shredded Wheat factory would be maintained, the visible extent of the 1920s production hall would reduce, due to the proposed intervening built form (Blocks 2 & 3). Whilst the Proposed Development results in the limited loss of views towards the listed buildings, the introduction of high quality built form, landscaping and the refurbishment of the listed built form represents an obvious positive visual change to the existing townscape view.

11.257 For commuters and passengers of **medium** sensitivity, as the Proposed Development would result in an obvious aesthetic improvement to the view, the magnitude of change is considered **medium**, resulting in a **beneficial effect of moderate significance**.

Viewpoint 7: Parkway Looking East along Howardsgate

11.258 Receptors from this viewpoint comprise people utilising the public open space along Parkway and Howardsgate and users of the Welwyn Garden City Town Centre heritage trail (Route 1) in the near distance, approximately 400m to the west of the Site boundary.

11.259 On completion, receptors on Parkway looking east along Howardsgate would experience glimpsed, distant views of the tops of the perimeter apartment blocks, projecting slightly above the Howard shopping centre, whilst views towards the former Shredded Wheat Factory chimney and silos would be retained. The majority of the Proposed Development would be screened by existing intervening built form (Howard Centre) and vegetation. The Proposed Development would introduce additional built form to a small proportion of the distant view, integrated with the Howard Centre along the skyline.

11.260 For pedestrians and users of the Welwyn Garden City Heritage Trail of **high** sensitivity, as the Proposed Development results in a barely perceptible change in the distant view, the magnitude of change is considered **negligible**, resulting in an **insignificant adverse effect**.



Viewpoint 8: The Campus, Parkway

11.261 Receptors from this viewpoint comprise people utilising the public open space within The Campus and users of Welwyn Garden City Town Centre heritage trail (Route 2) in the near distance, approximately 400m to the northwest of the Site boundary.

11.262 On completion, receptors would experience a reduction in the extent of former Shredded Wheat Factory silos visible on the skyline and the introduction of the tops of the perimeter apartment blocks, projecting above the existing civic built form and through intervening vegetation, in distant glimpsed views. The size and scale of the visual change is considered to be very low; the visual changes would form a minor component of distant views and would be seen in the context of existing civic built form in the foreground.

11.263 For pedestrians and users of the Welwyn Garden City Heritage Trail of **high** sensitivity, as the Proposed Development results in a barely perceptible change in their distant view, the magnitude of change is considered **negligible**, resulting in an **insignificant adverse effect**.

Viewpoint 10: Network Rail Footbridge – 1

11.264 Receptors from this viewpoint comprise pedestrians using the Network Rail footbridge in close proximity to the Proposed Development, approximately 45m to the west of the Site boundary.

11.265 On completion, receptors would experience framed views towards the podium level of the public podium gardens in the foreground, to the southwest corner of Blocks 2 & 3. Views towards the retained Grade II Listed former Shredded Wheat factory 1920s production hall, silos and chimney would be maintained, however the visible extent of the silos and chimney would reduce from the baseline condition due to the intervening built form in the foreground. The Proposed Development would introduce high quality, mixed used development and visible public realm replacing the currently unkempt, derelict, industrial land visible in the foreground. Whilst the extent of view towards the 1920s silos and chimney would reduce, the appearance of the listed built form would improve as part of the proposed restoration works.

11.266 For pedestrians on the footbridge entering and travelling through the Site, of **medium** sensitivity, as the Proposed Development would positively enhance the visual quality, experience and approach creating a welcoming, safe and visually inviting townscape, the



magnitude of change is considered **medium**, resulting in a **beneficial effect** of **moderate significance**.

Viewpoint 11: Hyde Way / Broadwater Road junction

11.267 Receptors from this viewpoint comprise vehicle users, cyclists and pedestrians in close proximity, approximately 20m to the east of the Site boundary.

11.268 On completion, receptors would experience views along Hyde Way into the Proposed Development and of the proposed perimeter apartment blocks along Broadwater Road and Hyde Way. Broadwater Road and Hyde Way would feature an improved streetscene with street trees, ornamental planting, vertical planting on the building facades and new surface treatments. The Proposed Development would include the replacement of the part derelict, unkempt buildings, including the 1930s and 1950s elements of the Grade II Listed former Shredded Wheat Factory with taller residential apartment blocks and add an active and positive urban edge and street scene along Broadwater Road and Hyde Way. The view along Hyde Way would be terminated by tree planting and artwork within Goodman Square and the perimeter apartments of Block 2 framing this space, resulting in the loss of distant views towards the Howard Centre.

11.269 For transient receptors including vehicle users and cyclists, of **low** sensitivity, the Proposed Development would result in a limited improvement to their sequential view. The magnitude of change is considered **low / medium**, resulting in a **beneficial effect** of **minor significance**.

11.270 For pedestrian receptors, of **medium** sensitivity, the Proposed Development would positively enhance the townscape visual quality, experience and approach along Hyde Way, through the Site, creating a welcoming, safe and visually inviting townscape on a popular, well used, pedestrian route. The magnitude of change is considered **medium** resulting in a **beneficial effect** of **moderate significance**.

Viewpoint 12: Osborn Way footbridge

11.271 Receptors from this viewpoint comprise pedestrians walking between the multi storey car park and the Howard Shopping Centre in the near distance, approximately 100m to the west of the Site boundary.



11.272 On completion, receptors are likely to experience indirect, partial distant views of the Proposed Development beyond the railway line and through intervening existing vegetation. Blocks 2 & 3 would be visible, framing the semi-private gardens on the northern part of the podium. Views towards the retained and refurbished Grade II Listed 1920s built form of the former Shredded Wheat Factory are likely to reduce in extent; however breaks in the proposed built form would provide glimpsed views to the 1920s production hall, silos and chimneys.

11.273 For pedestrians on Osborn Way, of **medium** sensitivity, as the Proposed Development would result in a limited loss of near distant partial views towards the listed built form from this viewpoint, through the introduction of new built form; when balanced with the positive improvements the Proposed Development would make to the visual amenity of the townscape in this view, the magnitude of change is considered **low**, resulting in a **beneficial effect of minor significance**.

Viewpoint 13: Bridge Road (B195) Looking South

11.274 Receptors from this viewpoint comprise vehicle users, cyclists, pedestrians and users of the Peartree Heritage Trail located in close proximity, approximately 20m to the North of the Site boundary.

11.275 On completion, receptors would to experience direct views of the Proposed Development, particularly the residential apartment Blocks 3, 6 & 7, facing onto Bridge Road, replacing views of the current degraded factory buildings. Views towards the retained listed 1920s former Shredded Wheat Factory Buildings, production hall, silos, grain house and chimney would be opened up through deliberate breaks in the built form between perimeter Blocks 2 & 6 and between Blocks 6 & 7, when viewed from various locations along this kinetic route (see alternative viewpoint 13a).

11.276 For transient receptors including vehicle users and cyclists, of **low** sensitivity, the Proposed Development would result in a limited improvement to their sequential view as they are more focussed on the route ahead rather than oblique views in the direction of the Site. The magnitude of change is considered **low / medium** resulting in a **beneficial effect of minor significance**.

11.277 For pedestrians of **medium** sensitivity, the proposed built form, existing retained and refurbished listed buildings and public realm improvements would create a visually inviting townscape along Bridge Road, resulting in an obvious aesthetic improvement to their townscape



view. The magnitude of change is considered **medium**, resulting in a **beneficial effect** of **minor / moderate significance**.

11.278 For users of the Peartree Heritage Trail, the visual change would result in a removal of their sequential view of current heritage features, replaced with framed views at key points of the 1920s listed buildings. Views of these retained heritage features would be opened up in some locations, due to removal of later sections of the factory. Therefore on balance the magnitude of change is considered **neutral**, resulting in a **neutral effect**.

Viewpoint 14: Broadwater Road / Mercury House / Albany Place

11.279 Receptors from this viewpoint comprise vehicle users, cyclists, pedestrians, office workers in Mercury and Albany House and users of the Peartree Heritage Trail located in close proximity, approximately 15m to the east of the Site boundary.

11.280 On completion, receptors would experience framed views into the Proposed Development along Lind Grove, a residential mews street. Through the removal of the existing 1930s manufacturing hall, fencing and vegetation along Broadwater Road, which currently form a visual and physical barrier, receptors would be able to experience views into the Site towards the retained and refurbished 1920s Louis de Soissons production hall (Block 4) of the former Shredded Wheat Factory. The Proposed Development includes the removal of the existing 1950s and 1930s built form of the Grade II Listed former Shredded Wheat factory adjacent to Broadwater Road and replaces with taller residential apartment blocks, which change the composition of the foreground view and screen views towards the retained 1920s silos. The proposed built form, existing retained and refurbished listed buildings and public realm improvements would introduce an active, permeated, positive streetscene and urban edge along Broadwater Road.

11.281 For transient receptors including vehicle users and cyclists, of **low** sensitivity, the Proposed Development would result in a limited improvement to their indirect sequential view. The magnitude of change is considered **low / medium**, resulting in a **beneficial effect** of **minor significance**.

11.282 For pedestrian receptors of **medium** sensitivity, the proposed built form, existing retained and refurbished listed buildings and public realm improvements would create a visually inviting townscape along Broadwater Road, resulting in an obvious aesthetic improvement to



their townscape view. The magnitude of change is considered **medium**, resulting in a **beneficial effect of minor /moderate significance**.

11.283 For users of the Peartree Heritage Trail, the visual change would result in a removal of their sequential view of some current heritage features (silos) and opening up of others (frontage to the 1920s production hall) due to removal of later sections of the factory. Therefore on balance the magnitude of change is considered **neutral**, resulting in a **neutral effect**.

Viewpoint 15: Otto Road / Southern Site Boundary

11.284 Receptors from this viewpoint comprise occupiers of residential apartments within the 'Mirage' development located adjacent to Otto Road, in close proximity, approximately 20m to the south of the Site boundary.

11.285 Those residential receptors in the Mirage, directly adjacent to Blocks 10 & 11 on the southern boundary of the Site, would experience framed views into the Proposed Development between the proposed built form. Views towards the former Shredded Wheat Factory 1920s silos and chimney would be maintained in the distance along the central park space, including views of new green infrastructure in the foreground; however the visible extent of the silos would reduce from the baseline due to the proposed removal of the 1930s silos.

11.286 For a small proportion of the residential receptors in the 'Mirage', the introduction of the proposed residential built form of Block 11, directly adjacent, would screen a proportion of their middle ground and distant views into the Site. However, these views would be changed, from the current view of a derelict, industrial townscape, to a modern mixed use Development including residential built form similar in nature to Mirage.

11.287 For the small proportion of residential receptors of **high** sensitivity, directly adjacent to Block 11, the magnitude of change is considered **medium**, due to the addition of the proposed built form restricting a proportion of their middle ground and distant views, resulting in an **adverse effect of moderate significance**.

Viewpoint 16: Network Rail Footbridge – 2

11.288 Receptors from this viewpoint comprise pedestrians using the Network Rail footbridge, on the western boundary where it enters the Site.



11.289 On completion, receptors would experience framed direct full views into the Proposed Development between Blocks 1 & 2 towards Goodman Square, a new public open space which would include the backdrop of the retained 1920s silos, boiler house, chimney and production hall of the Grade II Listed former Shredded Wheat Factory. The Proposed Development would introduce new, high quality, mixed used development and an area of public realm replacing the current, part derelict industrial land. The visible extent of views towards the 1920s production hall, silos, grain house and chimney would be retained as prominent features within the view, however the number of silos visible would reduce following removal of the 1930s section.

11.290 For pedestrians on the footbridge entering and travelling through the Site, of **medium** sensitivity, as the Proposed Development would positively enhance their visual quality, experience and approach creating a welcoming and visually inviting townscape, the magnitude of change is considered **medium**, resulting in a **beneficial effect** of **moderate significance**.

Viewpoint 17: Wigsmore North

11.291 Receptors from this viewpoint comprise vehicle users, cyclists and pedestrians in the near distance, approximately 230m to the west of the Site boundary.

11.292 On completion, receptors would experience limited glimpsed distant sequential views of the perimeter apartment Blocks 2 & 3 above and through the intervening Osborn Way pedestrian footbridge. Existing glimpsed distant views towards the former Shredded Wheat Factory 1920s production hall are likely to reduce due to the introduction of the perimeter apartment blocks. The small proportion of the Proposed Development visible would positively improve the townscape quality of the built form in distant views and be integrated with existing large scale built form (Multi Storey Car Park and the Howard Centre) along the skyline.

11.293 For transient receptors including vehicle users and cyclists of **low** sensitivity and pedestrians of **medium** sensitivity, as the Proposed Development results in a barely perceptible change in their distant view, the magnitude of change is considered **negligible**, resulting in an **insignificant beneficial effect**.

Viewpoint 18: Broadwater Road / Penn Way

11.294 Receptors from this viewpoint comprise occupiers of residential apartments within the 'Mirage' development and vehicle users, cyclists and pedestrians, approximately 120m to the South of the site boundary.



11.295 On completion, distant views of transient receptors along Broadwater Road towards the 1960s offices within the Site would be replaced with views towards the Southern residential perimeter buildings. The new residential built form would be taller than existing and be visible in the distance to the rear and above the former Roche products factory Office (Grade II listed). Views from the 'Mirage' residential apartments are considered to be restricted to the upper floors, on those apartments facing north, who would experience distant partial views, between intervening built form and vegetation towards the upper limits of the proposed residential apartment blocks. The resident's views towards the former Shredded Wheat Factory 1920s silos and chimney would be maintained in the distance above and to the rear of the proposed residential built form and vegetation; however the visible extent of the silos would reduce from the baseline due to the proposed removal of the 1930s silos.

11.296 For transient receptors including vehicle users and cyclists of **low** sensitivity and pedestrians of **medium** sensitivity, the Proposed Development would positively enhance a small proportion of a distant sequential view along Broadwater Road. The magnitude of change is considered **low**, resulting in an **insignificant beneficial effect**.

11.297 For residential receptors of **high** sensitivity, as the Proposed Development would introduce additional residential built form to a small proportion of their distant view and to areas of the view currently absent of built form, the magnitude of change is considered **low**, resulting in an **adverse effect of minor significance**.

Viewpoint 19a to 19c: Hatfield House (1st Floor, Roof and Southern Approach)

11.298 Receptors from these viewpoints comprise of members of the public visiting Hatfield House and Gardens in the long distance, approximately 4.2km to 4.5km to the south of the Site boundary. Depending on their location receptors currently experience partial to distant glimpsed views of the top of the former Shredded Wheat Factory silos within the Site, through intervening vegetation.

11.299 On completion, receptors are likely to experience long distance glimpsed views of the proposed residential built form within the Proposed Development, which would be largely screened by intervening vegetation. The Proposed Development also results in the reduction in the number of silos within the Site, thus reducing the visible extent of the silos, and their white façade, which contrasts with the surrounding vegetation and skyline.



11.300 For receptors of Hatfield House, of **high** sensitivity, as the Proposed Development reduces the visible extent of the white silos and introduces barely perceptible elements of residential built form within a long distance view towards Welwyn Garden City, the magnitude of change is considered **negligible**, resulting in an **insignificant beneficial effect**.

ASSESSMENT OF CUMULATIVE EFFECTS

Approach to Cumulative Assessment

11.301 Cumulative effects are the additional changes caused by the Proposed Development in conjunction with other similar developments, or the combined effect of developments taken together. GLVIA3 addresses cumulative landscape and visual effects separately.

11.302 Cumulative landscape effects are defined as:

“...effects that can impact on either the physical fabric or character of the landscape, or any special values attached to it”

11.303 A significant cumulative effect on landscape character usually occurs when the addition of the Proposed Development results in significant landscape character effects that overlap with the significant landscape character effects generated from another development.

11.304 Cumulative visual effects are defined as:

“...effects that can be caused by combined visibility, which ‘occurs where the observer is able to see two or more developments from one viewpoint’ and/or sequential effects which ‘occur when the observer has to move to another viewpoint to see different developments’”

11.305 A significant cumulative visual effect usually occurs where the addition of the Proposed Development results in a significant visual effect that coincides in combination with significant visual effects from another development in the view. In some cases, the new development itself may not be visually significant but may raise the overall magnitude of impact from built development, when combined with other schemes, to a significant level of effect.

11.306 With sequential views, the distance between significant views of different schemes and the mode of transport will affect the professional judgment on whether these effects are cumulatively significant or not.



11.307 In this TVIA, the assessment of cumulative effects focuses primarily on the **additional** effects of the Proposed Development under consideration.

11.308 It should be noted that the cumulative effect reported is not the sum of the effects for each project. A potential cumulative effect arises when the effect of the whole may be considered to be greater than the sum of the two parts, where the two developments in combination may result in an effect of greater significance. The cumulative assessment defines this additional effect.

11.309 Table 3.1 of Chapter 3 of this ES indicate projects that have been considered in relation to potential cumulative effects. For the purposes of this assessment the schemes are referred to as the Rank Xerox site, Pall Mall Distribution Site, Mercury House, Former Argos Depot and Land East of Bessemer Road.

Cumulative Effects on Townscape Character

11.310 There would be no cumulative effects on the following LTCA's: 1, 5, 6, 7, 8, 9, 10, 11, 12 as effects would be **neutral** due to distance and the presence of intervening built form.

11.311 Land East of Bessemer Road (new Aldi foodstore) and the Former Argos depot would introduce new commercial elements into LTCA 3 comprising a new trade park with storage yards, distribution buildings and parking on derelict and brownfield land.

11.312 If works were to proceed on the cumulative schemes in LTCA 3 at the same time as the Proposed Development, there would be the potential for these construction activities to combine and increase their influence on LTCA 3, with the potential to result in a **negligible to minor adverse** cumulative effect.

11.313 The overall improvement to LTCA 3 as a result of the Proposed Development and the positive effects on the Broadwater Road Industrial Area has the potential to effect the character of this LTCA combining with the **minor beneficial** effects of the Proposed Development at Year 0 to result in a **minor adverse** cumulative effect. This cumulative effect would reduce to **negligible beneficial to neutral** at Year 15.

11.314 The Rank Xerox site and Pall Mall Distribution site are located within LTCA 2 and would introduce low scale mix use development on former commercial property sites. The Proposed Development would result in a barely perceptible change to the LTCA and there would be a



negligible magnitude of change on the immediate setting of the LCTA. Construction activities would result in a **negligible adverse** cumulative effect should all developments be constructed at the same time. At completion the Proposed Development would have a **minor beneficial** significance of effect on the setting of LTCA 2 and cumulatively effects at completion would be **negligible beneficial** due to the overall improvement of LTCA's 2 and 3 and at Year 15.

11.315 Adjoining LCTA 3 the existing Mercury House Building in LTCA 4 is proposed to be extended to provide a 3-storey side extension and creation of a fourth floor roof extension and roof garden which will directly overlook the Site. If works were to proceed on the cumulative scheme in LTCA 4 at the same time as the Proposed Development, there would be the potential for these construction activities to combine and increase their influence on LTCA 4, with the potential to result in a **negligible to minor adverse** cumulative effect.

11.316 The proposed works to Mercury House would be complementary to the Proposed Development and a beneficial improvement in the immediate setting of LTCA's 3 and 4. On completion the Proposed Development would result in a **beneficial** effect of **minor** significance on LTCA 4 and cumulatively result in a **minor beneficial** effect at Year 0 and Year 15.

Cumulative Effects on Visual Amenity

11.317 There would be no views of any cumulative schemes from **Viewpoints 3 – 18 and 19a – 19c**, therefore there would be no cumulative effects from these locations.

11.318 From **Viewpoint 2**, views of the Proposed Development during construction would have the potential to combine with construction activities from Mercury House if they are carried out at the same time. This would result in a cumulative effect of **negligible to minor adverse**. At completion views of the full extent of the proposed extension to Mercury House would be limited from this viewpoint. Therefore on completion there would be a **negligible** or no cumulative effect for Viewpoint 2.

11.319 It is therefore considered that the cumulative schemes will have no significant cumulative adverse effects on townscape character or views associated with the Proposed Development upon completion.



ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Demolition and Construction

11.320 Site hoarding would be erected around the Site during demolition and construction. The Arboricultural Implications Assessment and Arboricultural Method Statement that accompanies this application sets out the measures that would be undertaken to protect the retained trees on-site from damage during demolition and construction, in accordance with BS5837:2012. These could be secured through an appropriately worded planning condition. However, the likely residual effects of the Proposed Development during demolition and construction remain as detailed earlier in this Chapter.

Completed Development

11.321 The likely effects of the Proposed Development have been considered and adjusted throughout the design process, through design evolution, as part of an iterative process to reduce the potential for significant adverse effects and maximise beneficial enhancements. The principles of the architectural and landscape layout, height, extent and massing, along with the detailed aspects of the Proposed Development have also been considered during the design process and therefore no further mitigation is considered necessary. The likely residual effects of the Proposed Development, once completed, therefore, remain as detailed earlier in this Chapter.

SUMMARY

11.322 The Site is located on the eastern edge of Welwyn Garden City town centre, separated by the East Coast Mainline railway. The Site is located within the industrial zone of Welwyn Garden City on the grounds of the former Shredded Wheat factory. It contains Grade II Listed buildings of the former Shredded Wheat factory, of which the silos and production hall form a visual landmark and contribute to within the surrounding townscape character, provide a sense of place and form some of the oldest industrial development within Welwyn Garden City.

11.323 The Site features an existing pedestrian connection running east/west through the Site along Hyde Way, which connects over the railway via a pedestrian footbridge towards Welwyn Garden City town centre. Due to the decline in industry and manufacturing over the last century the Site has fallen into disrepair and dereliction, affecting the quality of the Site and immediate townscape setting.

11.324 The majority of views into the Site are from roads, railway station and pedestrian routes adjacent to, or in very close proximity to the Site. Opportunities for views of the Site from a distance of greater than a few hundred metres are limited to the tops of the silos, as for the most part the Site is visually screened by layers of existing intervening built form and vegetation. A long distance view, through intervening vegetation towards the tops of the silos and chimney, is currently experienced by receptors visiting Hatfield House and Gardens (a Registered Historic Park and Garden and Grade I listed building).

11.325 During demolition and construction, there would inevitably be a visual intrusion to the local townscape and views from locations close to the Site as a result primarily of large construction plant and machinery, including tower cranes, and the presence of partially completed built form of the Proposed Development. There would be also temporary disruption to the public access along Hyde Way. However, this situation is unavoidable for the redevelopment of the Site and would only be temporary in nature.

11.326 A small proportion of existing trees and vegetation would be removed during demolition and construction but this would also be offset by the significant amount landscaping incorporated as part of the Proposed Development. Once new planting has established, the landscape proposals would increase the vegetation coverage, diversity and amenity value within the Site.

11.327 The design of the Proposed Development is a culmination of an extensive consultation process with WHBC, Historic England and many other statutory and non-statutory stakeholders as part of an iterative design process. The Proposed Development would regenerate a parcel



of former industrial, brownfield, derelict land of low townscape quality that contains valued Grade II Listed buildings. The Proposed Development would introduce new high quality built form and enhance the sense of place.

11.328 The Proposed Development would ensure the long term prominence and monumentality of the original 1920s elements of the Grade II Listed former Shredded Wheat Factory through their retention and refurbishment. The Proposed Development would introduce a number of community uses, including play provision, and would deliver new public realm, green open space and highway improvements. These result in the integration of the Proposed Development in the wider setting of Welwyn Garden City.

11.329 The design of the Proposed Development in its wider context was assessed using 21 different viewpoints, which were selected in consultation with WHBC and Historic England.

11.330 For pedestrians in the immediate area of the Site, on Broadwater Road, Bridge Road and on the Network Rail footbridge into the Site, the Proposed Development would positively enhance the visual quality, experience and approach creating a welcoming, safe and visually inviting townscape. People using Welwyn Garden City railway station would also experience an improvement to their views towards the Site.

11.331 For users of the Peartree Heritage Trail in close proximity to the Site the Proposed Development would result in the removal of their permanent sequential view of the extensive Listed Buildings within the Site as they travel along the trail (following removal of all but the 1920s listed buildings). However, framed views of the retained 1920s Listed Buildings would be opened up at key points.

11.332 For a small proportion of residential receptors, directly adjacent to the Site's southern boundary, the Proposed Development would introduce built form that would be an improvement on the existing view of the derelict Site but that would restrict a proportion of their middle ground and distant views.

11.333 Views in the near distance would include glimpses of the additional built form of the Proposed Development but generally these would not result in a significant change to these views. Similarly, visitors and tourists to Hatfield House with long distance views towards the Site would experience a reduction in the visible extent of the silos at the Site following the demolition of those added in the 1930s and later. However, this would not be a significant



change to the view of Welwyn Garden City from this location as only glimpsed views of the silos through existing vegetation currently exist.



Table 11.13: Townscape and Visual Effects Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Views of construction activities influencing townscape character and visual amenity, predominantly affecting LCTA and people in close proximity to the Application Site.	Temporary	Insignificant Adverse to Minor Adverse for most receptors. Minor Adverse to Moderate / Substantial Adverse for the closest receptors to the Proposed Development	Protect vegetation to be retained in accordance with BS5837:2012. Manage lighting.	Insignificant Adverse to Minor Adverse for most receptors. Minor Adverse to Moderate Adverse for the closest receptors to the Proposed Development
Views of the Proposed Development on completion	Permanent	Neutral to Moderate Beneficial for most receptors. Insignificant for views from The Campus LTCA Moderate Adverse for directly adjacent residential receptors to south.	None	No Change



REFERENCES

Ref 11.1: Guidelines for Landscape and Visual Impact Assessment, Third Edition. 2013. Landscape Institute and the Institute of Environmental Management & Assessment.

Ref 11.2 Guidelines for Landscape and Visual Impact Assessment, Third Edition. 2013. Statement of Clarification 1/13. Landscape Institute.

Ref 11.3 Landscape Institute Advice Note 01/11, Photography and Photomontage in Landscape and Visual Impact Assessment. 2011. Landscape Institute.

Ref 11.4 Seeing the History in the View. 2011. English Heritage.

Ref 11.5 National Planning Policy Framework. 2012.

Ref 11.6 Welwyn Hatfield District Local Plan. 2005.

Ref 11.7 Broadwater Road West, Supplementary Planning Guidance. 2008. Welwyn Hatfield Borough Council.

Ref 11.8 Welwyn Garden City Conservation Area Appraisal. 2007. Welwyn Hatfield Borough Council.

Ref 11.9 Landscape and Seascape Character Assessments. 2014. Natural England and Department for Environment, Food and Rural Affairs.

Ref 11.10 British Standard 5837: 2012: Trees in relation to design, demolition and construction. Recommendations



12 ECOLOGY AND NATURE CONSERVATION

INTRODUCTION

12.1 This Chapter presents an assessment of the likely significant effects of the Proposed Development on ecology resources at the Site.

12.2 A description of the methods used for the assessment and a description of the relevant baseline conditions of the Site is provided. An assessment of the likely significant effects of the Proposed Development during the demolition and construction works and once the Proposed Development is completed and operational is then presented.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Assessment methodology

12.3 The ecological assessment was undertaken in accordance with the 'Guidelines for Ecological Impact Assessment in the United Kingdom (Ref. 12.1) published by the Chartered Institute of Ecology and Environmental management (CIEEM) (hereafter referred to as the CIEEM Guidelines). The guidelines present an approach to valuing features that includes professional judgement based on current best practice, available guidance and information together with advice from other experts.

12.4 An Ecological Assessment Report was prepared by Bradley Murphy Design Limited (BMD) in February 2015 (Ref. 12.2) and subsequently updated in September 2017 (Ref. 12.3). The findings of the Ecological Assessment Reports have been used to inform the assessment of the likely significant effects of the Proposed Development presented within this Chapter. The original and updated Ecological Assessment Reports can be found in **Appendix 12.1** and **12.2** respectively.

Evaluation of the Ecological value of the Application Site

12.5 The CIEEM Guidelines recommend that the values of ecological resources or features are defined within a geographical context with the following frames of reference recommended:

- international and European;
- national;
- regional;

- local authority-wide area (e.g. county, district); and
- local.

12.6 Consideration of impacts at all scales was undertaken and ecological features were assessed as 'of ecological value' within the above frames of reference. Any features deemed to be of lower than local value were assigned a value of 'Site only' or, if minimal / very limited ecological value: 'negligible' value. The determination of value for each ecological feature was assessed with reference to the CIEEM guidance as detailed below.

Designated Sites

12.7 Certain sites are assigned a geographic frame of reference through designations such as:

- internationally important sites such as Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar Sites;
- nationally important sites such as SSSIs and National Nature Reserves (NNRs); and
- regional / county designated sites such as Local Nature Reserves (LNRs) and non-statutory designated sites.

12.8 Where a specific site has multiple designations, it is the designation of highest value that is considered with regard to the assessment.

Habitats

12.9 Habitat evaluation was measured against known criteria where available, e.g. The Hedgerows Regulations 1997. However, the majority of habitats and features were assessed on an individual basis against factors such as extent, species composition, biodiversity, naturalness, age, rarity and quality. The necessary effort / time required to restore habitats or features in question was also an important consideration, for example in the case of mature trees and woodlands.

12.10 Where appropriate, potential habitat value contributed to the valuation of habitats, for example: if an important habitat type was currently in a degraded condition. Special regard was given to 'Priority Habitats' which are listed as priorities for conservation in accordance with Section 41 of the Natural Environment and Rural Communities (NERC) Act 2006 and habitats included within local Biodiversity Action Plans.

Species

12.11 Species value assessment was based on distribution, status, historical trends, rarity, and population sizes. Rarity may apply across a specific geographic frame of reference and particular regard was given to species for which the population in question represented a large proportion of the total within a wide geographical context. Special consideration was also given to UK Priority Species (listed in accordance with Section 41 of the NERC Act 2006) and species included within local Biodiversity Action Plans.

Other Considerations

12.12 Some habitats, features, or species of otherwise intrinsically negligible biodiversity value may perform an ecologically important function nonetheless. For example, habitats acting as buffers to more valuable areas and linear features functioning as navigation aids to the migration and dispersal of valuable species.

Identification and Assessment of Impacts

12.13 The CIEEM guidelines state that the assessment of impacts should be undertaken in relation to the collated baseline conditions within the zone of influence that they are anticipated to occur. As recommended good practice by the CIEEM guidelines, impacts (direct results of the Proposed Development, e.g. habitat loss) and effects (results of impacts, e.g. less nesting opportunities for birds as a result of habitat loss) were assessed both with and without mitigation measures. The identification and assessment of impacts included potential impacts on each ecological feature determined as important (i.e. of greater than negligible ecological value). Potential impacts were considered from all phases of the Proposed Development: demolition / site clearance, construction and operation. Direct, indirect, secondary and cumulative impacts were considered against whether or not impacts and their effects are permanent, temporary, reversible, irreversible, beneficial or adverse.

Determining Significance

12.14 Significant impacts / effects were determined, in accordance with the CIEEM guidelines, as: any impacts / effects which *“either support or undermine biodiversity conservation objectives for ‘important ecological features’ or for biodiversity in general”*. Impacts / effects can therefore be considered significant at varying geographical scales of relevance. For example, a loss of one tree may not be significant at the national level, but could be considered significant at a

local level in view of local policies for no net loss of trees. It also should be noted that a significant effect for an ecological feature may not necessarily coincide with the geographical context at which that feature is valued; for example, an effect on a species of national importance, such as the loss of breeding habitat for one pair of house sparrow, may not be of national significance.

12.15 Significant impacts and effects were assessed in the context of the predicted baseline conditions within the relevant zones of influence during the lifetime of the Proposed Development.

Summary

12.16 In summary, potential impacts and effects were assessed for all important ecological features with reference to the following characteristics on a case-by-case basis:

- significance
- adverse, beneficial or neutral;
- extent;
- magnitude;
- duration;
- timing;
- frequency; and
- reversibility.

Assumptions and Limitations

12.17 Internal access was not gained for building B1c during the bat building inspections completed in 2013 (to inform the 2015 report: Ref. 12.2). Additionally, a number of sections of the accessible buildings contained rubbish / debris which made these floor spaces difficult to inspect for evidence of bat droppings and feeding remains. Nonetheless, the majority of the buildings could be adequately inspected, such that this element of the bat survey work is considered sufficiently robust.

12.18 Internal bat inspections of the buildings were not undertaken as part of the 2017 update survey; however, the internal condition is not anticipated to have changed significantly. Sufficiently robust conclusions could be drawn from the data available and a detailed external inspection.



12.19 Access during the 2017 update Phase 1 Habitat Survey was restricted to the northern portion of the site (beyond the fence south of building B2 was not accessible). However, it was possible to see much of the southern portion through the fence. Given the nature of the habitat types present and the data obtained during the original surveys, this restriction to access is not considered to have had any significant implications on the overall conclusions drawn.

12.20 The trees within the southern portion of the site identified as having potential to support roosting bats during the original surveys were not resurveyed in 2017 from close proximity due to restricted access. Nevertheless, these trees were visible from the boundary fence with the use of binoculars. The continued presence of the trees was confirmed and no significant changes were noted to their condition. As such, it is considered that the lack of direct access to these trees does not represent a significant limitation to their classification and that the conclusions drawn from this element of the bat survey work are sufficiently robust.

Scope of the Assessment

12.21 Ecological input has been provided into the Environmental Impact Assessment Scoping Report (Ref. 12.4) which was presented to the LPA for scoping opinion. A summary of the ecological input to this Scoping Report is provided below.

12.22 No statutory or non-statutory sites of nature conservation importance are contained within the Site. All such sites within the surrounding area are removed from the Site and sufficiently separated by existing urban development so as to preclude direct or indirect impacts from the Proposed Development.

12.23 The Site is dominated by habitats of typically negligible inherent ecological value such as buildings and hardstanding. However, a number of semi-mature trees and a mosaic of habitats such as ephemeral / short-perennial, scrub and grassland are present which are considered to be of up to limited local value.

12.24 In terms of fauna, the Site is of generally limited value; nonetheless a single pair of peregrine falcon *Falco peregrinus* has been recorded nesting at the site in spring 2014 (not re-recorded in 2017). Additionally, limited suitability for roosting bats is present within the buildings and a small number of trees within the Site. A small population of slow-worm *Anguis fragilis* was translocated in 2014 in connection with the site access road and habitats within the Site are suitable for nesting birds and mammals such as hedgehog *Erinaceus europaeus* and fox *Vulpes vulpes*.

12.25 Consequently, the following ecological features will be addressed within this section, with all other ecological features having been scoped out:

- long-term change in habitat value at the Site once the Proposed Development is completed and operational;
- roosting bats;
- peregrine falcon;
- other nesting birds;
- other mammals;
- slow-worms; and
- non-native invasive plants.

Zone of Influence

12.26 Zones of influence are designed to aid in the assessment of impacts. For the Site, and in line with CIEEM Guidelines, the zones of influence have been determined on a case-by case basis for each ecological feature included within the ecological assessments. Zones of influence and their justifications are outlined in **Table 12.1**.

Table 12.1 – Zones of Influence

Ecological Feature	Zone of Influence	Justification
Habitats	Site Boundary	The habitats within the site are largely of negligible ecological value with discrete habitats / features being of value at the site and of limited value at the local level.
Roosting Bats	3 km	The core sustenance zone for UK bats (averaged across all UK species) is 3 km (Ref. 11.5). This is also the core sustenance zone for the bat species which is most likely to utilise roosting features within the Application Site: common pipistrelle <i>Pipistrellus pipistrellus</i> .
Peregrine Falcon	4.1 km with a core sensitive zone of 1 km	The Nearest Neighbour Distance (NND), which can be approximated as breeding territory size, of nesting peregrine falcons in England is estimated to be between 3.6 – 4.1 km in various habitats types (Ref. 11.6). Most territories are at least 1 km apart, even in high density areas (Ref. 11.7). Peregrines tend to keep their territory each year and offspring will often inherit territories (Ref. 11.8).
Other Nesting Birds	Site boundary	The Application Site is not known or likely to support any notable assemblages of nesting birds (with the exception of peregrine falcon).



Hedgehog	150 m	Hedgehog is a UK Priority Species which is susceptible to habitat fragmentation and shows a tendency to remain within a consistent home range of up to 32 ha (Ref. 11.9) at relatively high densities within urban areas of approximately 36.5 ha ⁻¹ (Ref. 11.10). A 32 ha area is more than sufficiently covered by considering the hedgehog zone of influence as a 150 m radius around the site.
Other Mammals	Site boundary	Other mammals for which the site presents opportunities include common, wide-ranging species such as fox and small rodents. These are of negligible ecological value and readily exist within and disperse throughout urban landscapes.
Slow-worm	Suitable habitat within the site and 267 m beyond	Slow-worm do not form territories and populations sizes / distribution is driven by available resources. Therefore, the zone of influence has been determined based on professional judgement pertaining to the species taking account of estimated dispersal distances. Research (e.g. Ref. 11.11; Ref. 11.12) has shown slow-worms to disperse up to 267 m within a year and have home ranges of up to 1000 m ² .
Invasive Plants	Site boundary	Invasive plants within the site do not lie adjacent to the site boundaries. As such, it is highly unlikely that they would colonise beyond the site boundary in the near future without human interference. Nonetheless, extant permissions within the Application Site involve the use of machinery which has potential to spread vegetative fragments and thus potentially aid in dispersal throughout the site. Consequently, the zone of influence for invasive species is considered to be the site boundary.



LEGISLATION, PLANNING POLICY AND GUIDANCE

Legislation

The Conservation of Habitats and Species regulations 2010 (as amended)

12.27 This legislation consolidates all the amendments made to the Conservation (Natural Habitats, &c.) Regulations 1994 in respect of England and Wales. The 1994 Regulations transposed Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (EC Habitats Directive) into national law. The 2010 Regulations provide for the designation and protection of 'European sites', the protection of 'European protected species' and the adaptation of planning and other controls for the protection of European sites.

Wildlife and Countryside Act 1981 (as amended)

12.28 This is the primary legislation in the UK which protects animals, plants and certain habitats. It has numerous parts and supplementary lists and schedules, many of which have been amended since publication. As well as affording protection to certain species and habitats, the Wildlife and Countryside Act 1981 (as amended) also prohibits the release or allowed escape of non-native or invasive species (listed in Part I of Schedule 9 of the Act) of animal. The planting or induced spread in the wild of invasive plant species (listed in Part II of Schedule 9 of the Act) is also prohibited under the Wildlife and Countryside Act 1981 (as amended).

The Natural Environment and Rural Communities Act (2006)

12.29 Section 40 of this Act places a duty to conserve biodiversity on public authorities to have regard to conserving biodiversity when carrying out their normal functions (including making planning decisions) with particular regard to the Convention on Biological Diversity (CBD) 1992. This includes restoring or enhancing habitats and populations. Under this Act, the local planning authority can seek to minimise impacts on biodiversity and provide net gains.

12.30 Section 41 of the Act details the requirements of identifying habitats and species of principal importance. The Priority Habitats and Priority Species (over 900 species) listed in accordance with Section 41 are derived from the species and habitats initially listed in the UK Biodiversity Action Plan (BAP) in response to the UK government signing the 1992 Convention on Biological Diversity (CBD) in Rio de Janeiro. The lists were subsequently revised in 2007. In 2012 the UK BAP was succeeded by the 'UK Post-2010 Biodiversity Framework' in response

to the CBDs 'Strategic Plan for Biodiversity 2011-2020' (2010) and the launch of the 'EU Biodiversity Strategy, (EUBS)' (2011).

12.31 Priority Habitats and Priority Species are those considered to be of principal importance for the purpose of conserving biodiversity. Steps must be taken (and promoted to others) that are reasonably practicable to further the conservation of the listed species and habitats. A number of species included on the list have greater protection under other legislation such as that Wildlife and Countryside Act 1981 (as amended). Other species, such as the hedgehog *Erinaceus europaeus* and common toad *Bufo bufo*, do not have this extra level of protection. Therefore, these species are a material consideration during planning applications but not legally protected in the same way as those listed in other legislatures, such as the Wildlife and Countryside Act 1981 (as amended) or European legislation.

The Countryside and Rights of Way Act (2000)

12.32 This Act provides for public access on foot to certain types of land, amends the law relating to public rights of way, increases measures for the management and protection of Sites of Special Scientific Interest (SSSIs), strengthens wildlife enforcement legislation and provides for management of Areas of Outstanding Natural Beauty (AONB).

The Protection of Badgers Act (1992)

12.33 This legislation protects badgers *Meles meles* and their setts and makes it illegal to kill, injure or take badgers or to interfere with a badger sett.

The Wild Mammals (Protection) Act (1996)

12.34 This Act makes provision for the protection of wild mammals from certain cruel acts and unnecessary suffering.

National Policies

12.35 The National Planning Policy Framework (NPPF) takes forward the Government's strategic objective to halt overall biodiversity loss, as shown at Paragraph 109, which states the planning system should contribute to and enhance the natural and local environment by: "*minimising impacts on biodiversity and providing net gains in biodiversity where possible, contributing to the Government's commitment to halt the overall decline in biodiversity, including*

by establishing coherent ecological networks that are more resilient to current and future pressures”.

12.36 Section 11 (Conserving and Enhancing the Natural Environment) advises that the planning system should contribute to and enhance the natural and local environment through a number of means, including, *“recognising the wider benefits of ecosystem services”*.

12.37 Paragraph 118 sets out that when determining planning applications, local planning authorities should aim to conserve and enhance biodiversity. A number of principles are listed in the NPPF; the following are of relevance to the current application:

- *“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 planning permission should be refused”;*
- *“development proposals where the primary objective is to conserve or enhance biodiversity should be permitted”;* and
- *“opportunities to incorporate biodiversity in and around developments should be encouraged”.*

12.38 The above approach encapsulates the ‘mitigation hierarchy’ described in British Standard 42020:2013 (Ref. 12.13), which involves the following step-wise process:

- **Avoidance** – avoiding adverse effects through good design;
- **Mitigation** – where is it unavoidable, mitigation measures should be employed to minimise adverse effects;
- **Compensation** – where residual effects remain after mitigation it may be necessary to provide compensation to offset any harm; and
- **Enhancement** – planning decisions often present the opportunity to deliver benefits for biodiversity, which can also be explored alongside the above measures to resolve potential adverse effects.

12.39 The measures for avoidance, mitigation, compensation and enhancement should be proportionate to the predicted degree of risk to biodiversity and to the nature and scale of the proposed development (Ref. 12.13).



Local Policies

Welwyn Hatfield District Plan (2005)

12.40 The Welwyn Hatfield District Plan was adopted in 2005. A number of policies contained within it have been 'saved' until it is replaced by a Local Development Framework. Of these saved policies, a number are of relevance to ecological considerations of the Proposed Development, these are outlined below.

12.41 **R1 – Maximising the Use of Previously Developed Land.** Saved Policy R1 reads: *"in order to make the best use of land in the district, the council will require development to take place on land which has previously been used for developed"*.

12.42 **R11 - Biodiversity and Development.** Saved Policy R11 reads: *"All new development will be required to demonstrate how it would contribute positively to the biodiversity of the site by;*

- i) the retention and enhancement of the natural features of the site;*
- ii) the promotion of natural areas and wildlife corridors where appropriate as part of the design;*
- iii) the translocation of habitats where necessary, where it can be demonstrated that the habitat or species concerned cannot be successfully accommodated within the development;*
- iv) the use of local native species in planting in accordance with Policy D8 Landscaping;*
- v) helping meet priorities / targets set out in the Local Biodiversity Action Plan".*

12.43 **R17 – Trees, Woodlands and Hedgerows.** Saved Policy R17 reads: *"The council will seek the protection and retention of existing trees, hedgerows and woodland by the use of planning conditions, section 106 agreements, hedgerow retention notices and tree preservation orders where applicable. New development will be required to incorporate wherever appropriate new planting with locally native species and should be in accordance with Policy D8 Landscaping."*

12.44 **R20 – Light Pollution** Saved Policy R20 reads: *"In order to minimise light pollution, external lighting scheme proposals, including floodlighting, will only be approved where it can be demonstrated that all of the following criteria can be satisfied:*



- vi) *the scheme proposed is the minimum needed for security and operational purposes or to enhance the external appearance of the building to be illuminated;*
- vii) *glare and light spillage are minimised;*
- viii) *the amenity of residential areas is not adversely affected;*
- ix) *the visual character of historic buildings and conservation areas are not adversely affected;*
- x) *there would be no adverse impact on the character or openness of the countryside and green belt;*
- xi) *there would be no adverse effects on ecology and the natural environment including wildlife; and*
- xii) *There would be no dazzling or distraction of drivers using nearby roads.”*

12.45 **PD8 – Landscaping.** Saved Policy D8 is of primary relevance to landscaping but is also of some relevance to ecology with regards to the following: *“The retention and enhancement of existing key landscape features such as trees and shrubs, ponds and watercourses will be expected where feasible; where this is not possible, replacement planting should be carried out.”*

12.46 Other biodiversity-focused policies pertain to designated sites of nature conservation importance and as such are not relevant to the current application (see Sections 11.22 and 11.25).

Welwyn Hatfield Draft Local Plan (2017)

12.47 The Welwyn Hatfield Local Plan will *“shape the future of development”* in the towns and villages of Welwyn Hatfield District up to 2032. The plan was submitted for examination on the 15th May 2017. A number of policies within the submitted plan are of relevance to ecological considerations for Ecological Impact Assessment of the Proposed Development, these are outlined below. The local plan is also combined with the Welwyn Hatfield Emerging Core Strategy (2012).

12.48 **SP1 – Delivering Sustainable Development.** This over-arching policy contains a number of principles of sustainable development, of which the following is of relevance to ecology: *“...the provision of green infrastructure and sustainable drainage systems (SUDs) [are incorporated into the design and construction of new development]”*.



12.49 **SP11 – Protection and Enhancement of Critical Environmental Assets.** This policy sets out the strategic approach to protecting and enhancing critical environmental assets within the borough through the planning process. SP11 promotes *“development that would secure positive improvements to and ensure the long-term conservation of ecological and heritage assets”*. The policy then outlines a similar hierarchical system to that of BS42020:2013 (Ref. 12.13) of limiting adverse ecological impacts of development proposals: *Avoid, Reduce, Remediate, Compensate*.

12.50 **SP12 – Green Infrastructure.** This policy encourages the creation of high quality, multi-functional green space within development proposals; ensuring beneficial results for biodiversity is one of the positive aims of such green space.

12.51 **SADM16 – Ecology and Landscape.** SADM16 reads: *“proposals will be expected to maintain, protect and wherever possible enhance biodiversity, the structure and function of ecological networks and the status of water bodies”... “[proposals that would result in the loss of]...habitats, species and ecological assets of local importance...will be refused unless the mitigation hierarchy has been fully implemented to avoid, reduce and remediate and compensate direct and indirect adverse impacts”*.

12.52 **SP17 - SDS3 and SDS4: Broadwater Road West.** SP17 relates to mixed use developments at Broadwater Road West which include the land contained within the Site. SP17 states that the development within this land will incorporate open space in accordance with the Broadwater Road West Supplementary Planning Document. The Policy gives no specific detail for green space provision but does provide rough spatial locations, including a weaving section bisecting the southern half of the site.

Broadwater Road West Supplementary Planning Document 2008

12.53 The Supplementary Planning Documents (SPDs) are a suite of planning guidance produced by Welwyn Hatfield Council to support and expand upon policies contained within the district plan. The Broadwater Road West SPD was adopted in December 2008, contains the parcel of land that the Site comprises and outlines a number of factors with key relevance to ecology. The SPD outlines the council’s vision for the land which includes the vision *“to enhance biodiversity”*, it further notes that the north-western portion of the site comprises largely undisturbed habitat which is unusual for a town centre. The SPD also recommends that landscaping incorporates native trees species and that multi-functional green space could incorporate sustainable drainage methods which will benefit biodiversity.



Hertfordshire Biodiversity Action Plan (BAP) (2006)

12.54 Produced in 1998 and updated and relaunched in 2006, the Hertfordshire Biodiversity Action Plan (BAP) sets out a 50 year vision for the wildlife and natural habitats of Hertfordshire.

12.55 Of the Hertfordshire Local BAP Habitats listed within the plan, only one (Urban) is considered present within the site. The Habitat Action Plan (HAP) for urban habitats is detailed below.

12.56 **Urban Habitats – Objective 2, Action UR/A/2.7:** increasing the biodiversity of urban greenspaces and promoting biodiversity gain in all appropriate developments. To be achieved through the planning process, seeking to integrate biodiversity or green gain (e.g. through green roofs, green walls, appropriate landscaping, nest boxes and roost boxes) within proposals.

12.57 The Site also supports the Local BAP species slow-worm and has the potential to support a number of Local BAP species, including: pipistrelle *Pipistrellus* sp., hedgehog and a number of bird species. A number of Local BAP species have specific Species Action Plans (SAPs); however, none of the species known to be present within the site have a detailed SAP within the Hertfordshire BAP. Ecological enhancements in respect of stag beetle *Lucanus cervus* (Local BAP species) are included within the Proposed Development. The SAP for stag beetle is detailed below.

12.58 **Stag Beetle – Objective 22.6.2/SB4:** *“seek to maintain and enhance conditions [for stag beetle *Lucanus cervus*] through positive management, including the retention of dead wood”.*



BASELINE CONDITIONS

Habitats

12.59 A detailed description of the habitats present at the Site is presented within the Phase 1 Habitat Verification Report at **Appendix 12.2**. **Table 12.2** presents a summary of these habitat types identified, with locations of habitats shown in the Phase 1 Habitat Verification Report (**Appendix 12.2**).

Table 12.2 – Summary of Ecological Value of Habitat Types on the Site.

Habitat	Summary Description	Habitat Value
Buildings	There are two main complex building structures at the Application Site.	Negligible
Hardstanding	The dominant habitat type present at the Application Site. Largely devoid of vegetation except for colonising scrub and tall ruderal species in cracks.	Negligible
Ephemeral / Short Perennial	Former grassland / ruderal / scrub mosaic over shallow soil which has been strimmed and cleared and now comprises colonising plants with a limited number of tall ruderal species.	Local
Shrub / Tree / Ruderal Mosaic	Situated in an 8 m wide strip on an embankment within the north-west of the Application Site.	Local
Scattered and Continuous Scrub	Areas of dense scrub are present to the west of the access road and scattered scrub is present throughout the Application Site with bramble scrub encroachment around the boundaries.	Negligible
Bare / Re-colonising Ground	Small areas of bare re-colonising ground are present across the Application Site, which are largely situated at the margins of other habitat types. The greatest area is present within the southern portion of the Application Site.	Negligible
Ruderal Vegetation	Ruderal vegetation is present within discrete scattered areas throughout the Application Site.	Negligible
Trees	Few trees are present within the Application Site comprising a mixture of immature (I) and semi-mature (SM) native and non-native species. No notable, over-mature / veteran tree species are present.	SM: Application Site I: Negligible
Amenity Grassland (Rank)	A number of small, linear strips of former amenity grassland are present at the Application Site, which have been left unmanaged for some time and now comprise rank swards.	Negligible
Amenity Planting	Small areas of former amenity planting that have fallen out of management are present throughout the Application	Negligible



	Site. These comprise amenity assemblages in various states of colonisation by bramble and buddleja <i>Buddleja davidii</i> .	
Amenity Hedgerows	Three amenity hedgerows are present at the Application Site within the northern portion. These are subject to limited management.	Negligible
Miscellaneous Habitats / Features	Two piles of vegetation / earth / log / rubble are present at the Application Site.	Negligible
Invasive Plants	Two stands of Japanese knotweed and two cotoneaster are present within the north-western portion of the Application Site and growing against building B1a respectively.	Detrimental

Roosting Bats

12.60 No records of bats within the Site were identified during the data search and no evidence of roosting bats was recorded within any of the buildings present at the Site. The internal and external building inspections indicated that these buildings provide **negligible-low** potential for roosting bats as there were some minor features recorded associated with both buildings B1 and B2. These features include weather-boarding and holes in walls where pipe-work has been removed which provide some limited or very limited potential to support single or small numbers of roosting bats.

12.61 Four trees at the Site's south-western boundary have features with suitability to support roosting bats as described in **Table 12.3** and shown in **Appendix 12.2**. However, no evidence of any use of the suitable bat roosting features associated with these trees was recorded. As such, all four trees are considered to provide no more than sub-optimal opportunities for roosting bats, i.e. suitable to support a single, or at best, a small number of bats in a roost of low ecological value over the summer months.



Table 12.3 – Trees Within the Site with Suitability for Roosting Bats.

Tree ID (Plan 3 of Appendix 12.1)	Species	Age Class	Species	BCT Category (Ref. 12.5)
T1	Poplar <i>populus</i> sp.	Semi- mature	Split in limb and a woodpecker hole	Low / moderate
T2	Cherry <i>Prunus</i> sp.	Semi- mature	Snapped main stem and a woodpecker hole	Low / moderate
T3	Cherry	Semi- mature	Peeling bark and damage to main stem	Low / moderate
T4	Poplar	Semi- mature	Significant split in main stem. Split is somewhat exposed to the elements, hence only likely to provide limited opportunities to crevice-dwelling bats over the summer months	Low / moderate

12.62 None of the remaining trees present within the Site, or immediately adjacent to the Site support features with elevated suitability for roosting bats, and therefore are considered to be of **negligible suitability** for roosting bats.

12.63 Overall, the Site is considered to be of value at the **Site level** with regard to bats.

Peregrine Falcon

12.64 A single pair of peregrine falcon, listed on the Wildlife and Countryside Act 1981 (as amended) Schedule 1 Part I, were recorded nesting upon the northerly-facing walkway near the top of the concrete grain silos during spring 2014. The peregrines were likely attracted to the walkway given its height and the accumulation of windblown substrate and sparse vegetation. Although there is good evidence that the pair of peregrines attempted to breeding during spring 2014, no evidence of any young was recorded. The UK population of peregrine falcon was estimated at 1,402 breeding pairs in 2002 (Ref. 12.14), with no breeding pairs recorded in Hertfordshire County. In 2014, this breeding pair was one of only two pairs known within the County of Hertfordshire. Nonetheless, peregrine falcon were not recorded to nest or breed within the site between 2015 and 2017 inclusive. As such, the Site is currently considered to be of value at the **local level** with regard to peregrine falcons. Should peregrine falcon return to the Site to nest again, it is likely that the Site will be of County value for this species.

12.65 In accordance with the peregrine falcon mitigation strategy developed to support outline planning application N6/2015/0294/PP, measures have been implemented to both discourage peregrine falcon from nesting at the silo building and provide temporary replacement nesting opportunities. This has involved the clearing of substrate material at the silo and the erection of a Temporary Mitigation Site (TMS) in the form of a nesting site on a platform at the top of a tower structure (planning permission N6/2015/0231/MA). This has been erected within the Phase 2 area of the Site. Full details of the bespoke peregrine falcon mitigation strategy for implementation at the Site are provided within **Appendix 12.1**.

Other Birds

12.66 Tall scrub, trees and built structures present within the Site, excluding hardstanding and low-lying vegetation, are considered to provide some opportunities to common species of nesting birds and all semi-natural habitats within the site present foraging opportunities. Numerous similar nesting and foraging opportunities are abundant within the local area and no notable species were observed during the survey work undertaken at the Site with the exception of house sparrow *Passer domesticus* and starling *Sturnus vulgaris* which, although Red-listed and Priority Species, remain common within both a local and national context. Consequently, the Site is considered to be of no more than value at the **Site level** for other birds.

Other Mammals

12.67 No evidence of any protected, rare or notable mammal species was recorded within the Site. Common and widespread mammals such as fox and grey squirrel *Sciurus carolinensis* are known to utilise the Site; such species are of typically inherent negligible ecological value. Nonetheless, the Site is suitable for hedgehog (UK priority species) and records exist within the vicinity of the Site for this species. Consequently, the Site is considered to be of value at the **Site level** for other mammals.

Slow-worm

12.68 Presence / likely absence surveys in 2014 identified a small population of slow-worm within the north-western portion of the Site. These were subsequently translocated to the adjacent railway cutting as a facilitative mitigation measure for construction of an access road. The habitats within the north-western portion of the Site which were optimal reptile habitat are now sub-optimal and largely separated from suitable habitat at the site boundaries and within the railway cutting off site by the newly constructed access road. Nonetheless, sub-optimal



habitats with limited suitability for slow-worm are present throughout vegetated areas of the Site such that there is potential to support a low population of slow-worm within the Site. Given that slow-worm remains a common and widespread species, the Site is considered to be of value to slow-worm at the **Site level**.

Invasive Plants

12.69 Cotoneaster and Japanese Knotweed are present at the Site. As invasive and non-native species listed on Schedule 9 Part I of the Wildlife and Countryside Act 1981 (as amended), these are considered to be **detrimental** to ecology at the **Site level**.



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Roosting Bats

12.70 The loss and / or refurbishment of existing buildings during the construction phase would remove all features within buildings which present limited / very limited potential to support single or small numbers of bats. Due to their location and condition, all of the four trees identified with suitability for roosting bats are proposed for removal.

12.71 In the absence of mitigation measures the removal of these buildings and trees would result in the loss of potential bat roosting features. Furthermore, in the unlikely event that bats were utilising the buildings or trees to be removed, demolition and clearance work could result in the death or injury of a small number of bats. Further still, overnight light spill from site lighting onto site-adjacent / off-site trees could disturb roosting bats in the event that they are present within these trees and potentially lead to roost site abandonment. As such, the likely effect of the loss of potential bat roosting opportunities during demolition and construction would be **adverse** and of **significance at the local level**.

12.72 Consequently, mitigation and compensation methods are required, see Section 'Enhancement, Mitigation and Residual Effects' below.

Peregrine Falcons

12.73 The pair of peregrine falcons identified at the Site in spring 2014 or their young (if any have been successfully produced) could be expected to return to the Site and attempt to breed again. The northerly-facing silo walkway which was the location of peregrine falcon nesting activity at the Site will be retained within the development. Nonetheless, construction phase works (comprising extensive refurbishment and maintenance to the silo buildings) would take place in close proximity to the nesting area. In the absence of mitigation measures, this would result in disturbance to nesting peregrine falcons should these works fall within the nesting season; this would also breach wildlife legislation. The potential effect of this impact would be nest abandonment for that year and potentially subsequent years which would be **adverse** and of **significance at the County level**.

12.74 Consequently, mitigation and compensation methods are required with regards to nesting peregrines, see Section 'Enhancement, Mitigation and Residual Effects' below.



Other Nesting Birds

12.75 The site is not considered likely to support notable breeding assemblages of birds (with the exception of peregrine falcon, see above) above the Site level context. Furthermore, the species of birds likely to be supported by the site are well-adapted to urban environments and, therefore, resilient to disturbance from sources such as noise and light typically associated with urban environs. As such, any impacts from disturbance during site clearance or construction works would be **insignificant**. Some disturbance would be anticipated to result from construction and demolition works as these are not necessarily typical of urban environs that birds would be accustomed to; nonetheless, these impacts would still be of **low significance**.

12.76 Nonetheless, in the absence of mitigation measures, the clearance of vegetation and construction / demolition works to the buildings would result in loss of nesting habitat for a number of common and widespread bird species. Should these works fall within the bird nesting season, this could also involve the destruction of active nests and the killing and injury of young birds and eggs; this would be in contravention of wildlife legislation. The effect of this impact would be a loss of nesting habitat and a temporary reduction in local population size of common and widespread bird species, potentially including Priority Species such as house sparrow and starling. Given the small size of the Site and the abundance of similar opportunities within the surrounding area, it is unlikely that the Site supports a significantly notable population of nesting birds within the local context. Consequently, the effect of vegetation clearance and construction / demolition works to the buildings would be **adverse** and of **significance at the Site level**.

12.77 As such, mitigation and compensation methods are required with regards to nesting birds, see Section 'Enhancement, Mitigation and Residual Effects' below.

Other Mammals

12.78 In the absence of mitigation measures, clearance and construction works could result in killing and injury of small mammals that are unlikely to disperse quickly such as hedgehog or foxes within dens. Additionally, the clearance of vegetation will comprise a loss of foraging and sheltering habitat for mammal species. The unnecessary killing of wild mammals would represent a contravention of wildlife legislation. Given the small size of the Site and the typically high densities of hedgehog and fox within urban areas, it is unlikely that it supports a significantly notable population of wild mammals within a local context. Consequently, the effect of clearance works would be **adverse** and of **significance at the Site level**.



12.79 As such, mitigation and compensation methods are required with regards to other mammals, see Section 'Enhancement, Mitigation and Residual Effects' below.

Slow-worm

12.80 Slow-worms may have recolonised sub-optimal habitats within the Site. In the absence of mitigation measures, potential impacts to slow-worm comprise killing and injuring during clearance works and a loss of foraging and sheltering habitat. Killing and injury of slow-worm would represent a contravention of wildlife legislation. Nonetheless, the area of suitable reptile habitat to be cleared at the site is not extensive and has since been partially fragmented from the suitable habitats off-site and at the site boundaries by the construction of the new access road. As such, the Site has the potential to support no more than a small population of slow-worm. Consequently, the effect of clearance works would be **adverse** and **significant at the Site level**.

12.81 As such, mitigation and compensation methods are required with regards to slow-worm, see Section 'Enhancement, Mitigation and Residual Effects' below.

Invasive Plants

12.82 In the absence of mitigation measures to prevent the spread of invasive plants such as Japanese knotweed, potential impacts with regard to invasive plants could comprise spread beyond the site boundary via vehicular or human vectors. This would have an **adverse** effect of at least **local significance**.

12.83 As such, mitigation and compensation methods are required with regards to invasive plants, see Section 'Enhancement, Mitigation and Residual Effects' below.

ASSESSMENT OF CUMULATIVE EFFECTS

12.84 All potential impacts and effects described above will be sufficiently mitigated and compensated for within the Site such as to have no net adverse impact on biodiversity or conservation objectives of individual species / groups (see Section 'Enhancement, Mitigation and Residual Effects' below). As such, no adverse cumulative effects are anticipated to be contributed to by the Proposed Development. Consequently, cumulative effects are not considered within this chapter.



12.85 A review of publicly available planning documents and aerial / street side photography databases was undertaken for the relevant planning applications for consideration during cumulative impact assessment within the surrounding area. The review found that these applications are unlikely to result in a net loss of biodiversity; as such, they will not have an adverse ecological impact on the Site. On the contrary, any ecological effects realised as a cumulative result of the Proposed Development and these developments are likely to be beneficial.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Changes to on-site Habitat Value

12.86 The majority of habitats / features within the Site are of negligible value as these are common habitats within a local and national context and can easily be re-created or restored. The semi-mature trees are of value within the context of the Site and the ephemeral / short perennial and shrub / tree / ruderal mosaic are of limited local value.

12.87 The majority of existing trees forming the northern boundary of the Site are to be retained as part of the proposals. This area, and other locations within the Site would be supplemented with new tree planting including native species and fruiting trees. Once established, these trees would provide suitable nesting habitat for common bird species and foraging opportunities for bats and birds.

12.88 The mosaic habitat in the north-west and north of the Site which comprises shrub, grassland, ephemeral / short perennial and ruderal habitats to be removed would be replaced within the development. Replacement habitats provided would comprise a permanently wet SuDS feature and areas of wet wildflower mixes, shrub and tree planting and wildflower-rich grassland.

12.89 New habitat that would be provided within the Proposed Development includes:

- Wildflower-rich grassland and marginal planting;
- Living roofs and walls;
- Plants of known value to pollinating invertebrates;
- Native tree and shrub species including fruit-bearing species; and
- New aquatic habitat comprising swales and sustainable urban drainage systems including permanently wet areas.



12.90 Incorporation of these new habitats would compensate fully for the minor loss of habitats of elevated ecological value and provide a number of ecological enhancements such as new habitat types (aquatic), enhanced foraging opportunities for bats, birds and invertebrates and an increase in native biodiversity.

12.91 As such, the changes to on-site habitat value after mitigation and enhancement measures are completed will have a **beneficial effect, significant** at the **local level** that will be **permanent**.

12.92 The incorporation of these habitat changes and creation of new habitats would contribute positively to saved policies **R11**, **R17** and **R8** of the Welwyn Hatfield District Plan; policies **SP1**, **SP11**, **SP12** and **SADM16** of the Welwyn Hatfield Local Plan; and **Objective 2** , **Action UR/A/2.7** of the Hertfordshire BAP (2006).

Roosting Bats

Construction Phase Impacts 1: Loss, Damage or Obstruction to Roosting Features

12.93 During the construction phase, works to the buildings and trees will result in damage, destruction and obstruction to suitable roosting features. In order to minimise the risk of killing or injuring bats, a detailed mitigation strategy would be put in place to safeguard roosting bats in the event that they are present. Detailed mitigation measures can be secured by planning condition and are summarised below.

12.94 A further detailed inspection of the trees requiring removal prior to felling would be undertaken. Should this inspection also produce negative results then a watching brief during sensitive tree removal would be carried out. A pre-works check and watching brief would also be undertaken for building demolition / renovation works. In the unlikely event that bats are encountered during tree removal or building demolition, these works would immediately cease, and a suitably qualified ecologist would provide advice.

12.95 Provided these mitigation and compensation measures are implemented, adverse impacts on bats would be **insignificant** and **temporary** (given that replacement roosting features are proposed below).



Construction Phase Impacts 2: Light Spill

12.96 In order to minimise the effect of disturbance from light on roosting bats that may be present in trees adjacent to the site or in close proximity off site, construction site lighting should avoid overnight light spill onto these trees. Detailed construction lighting schemes / restrictions can be secured by planning condition or construction management plan or similar.

12.97 Provided these mitigation measures are implemented, the adverse effect of light spill would be **insignificant** and temporary.

12.98 Implementation of these mitigation measures will comply with saved policy **R20** of the Welwyn Hatfield District Plan.

Operation Impacts 1: Loss or Obstruction to Roosting Features

12.99 The loss of potential roosting features would be compensated by the provision of a number of bat boxes on retained and proposed trees and the incorporation of bat roosting features (such as bat bricks or bat tubes) into the proposed buildings. The exact number, type and location of provisioned bat roosting features can be secured by planning condition.

12.100 Provided these avoidance and compensation measures are implemented, the adverse residual effect of loss of potential roosting features would be **insignificant and temporary**. Conversely, it is anticipated that the provision of roosting features would represent an increase in opportunities provided to roosting bats by the Site and thus comprise a **beneficial** residual effect for roosting bats that is **permanent** and **significant at the local level**.

12.101 The incorporation of a number of bat roost features within the Proposed Development will contribute positively to policies **SP11** and **SADM16** of the Welwyn Hatfield Local Plan.

Operational Impacts 2: Light Spill

12.102 In order to minimise the effect of disturbance from light on roosting bats, a lighting scheme should be developed to avoid overnight light spill onto retained trees and off-site or site-adjacent trees (which may have suitability for roosting bats) and any built in bat features. Detailed lighting schemes can be secured by planning condition.



12.103 Provided this mitigation measure is implemented, the adverse residual impact of light spill would be **insignificant**.

12.104 Implementation of these mitigation measures will comply with saved policy **R20** of the Welwyn Hatfield District Plan.

Peregrine Falcon

Construction Phase Impacts

12.105 As previously discussed in this chapter, the former nesting site of peregrine falcons atop the silos has been cleared of suitable nesting substrate and a TMS has been erected in the southern portion of the site. As such, should peregrine falcon return to the site to attempt to nest, it is anticipated that they will utilise the TMS rather than the silos. The TMS is situated in the Phase 2 area of the site well removed from construction works that could potentially disturb nesting peregrine falcons during the first phase of Proposed Development works. In accordance with the mitigation strategy, suitable nesting opportunities will be restored and maintained in perpetuity at the silos prior to the removal of the TMS and commencement of Phase 2 works. At any one time throughout the construction phase, at least one suitable nesting site (either the silos or the TMS) will be maintained for peregrine falcon and protected from disturbance. Should either site be in use for nesting by peregrine falcon, a suitably experienced and qualified ecologist will provide advice to ensure that nesting peregrine falcon are not disturbed by nearby works. Detailed design specification can be secured via planning condition.

12.106 Consequently, the adverse impact of disturbance on peregrine falcon would be **insignificant**.

Operational Phase Impacts

12.107 In accordance with the peregrine falcon mitigation strategy, suitable nesting opportunities (nest box and ledge) will be retained and maintained in perpetuity for peregrine falcon atop the retained silo structures. The nesting opportunities will be sited away from possible sources of disturbance such as lighting and windows.

12.108 As such, nesting opportunities will be retained for peregrine falcon at the site such that residual effects are considered to be **neutral**.



Other Nesting Birds

Construction Impact: Site Clearance During the Nesting Season

12.109 Potential breaches of wildlife legislation with regards to nesting birds have been avoided through the scheme design as much as possible via retention of the majority of boundary-associated trees and scrub which provide bird nesting potential. Impacts on nesting birds could be avoided by undertaking clearance and demolition works outside of the bird nesting season (March – August inclusive). Where this is not possible, buildings and vegetation that are suitable for nesting birds will be subjected to a pre-works check no more than 48 hours prior to works. Any active nests identified will be cordoned off and safeguarded on a case-by-case basis and remain in place until the nests are no longer active.

12.110 These avoidance and mitigation measures will ensure that the impacts on nesting birds of the construction phase would be **insignificant**.

Operational Impact: Loss of Suitable Nesting Habitat

12.111 The loss of suitable nesting habitat has been avoided, where possible, through the retention of boundary trees and scrub. Where unavoidable, the loss of suitable nesting habitat would be compensated by newly planted trees and shrubs under the landscape proposals and the provision of a number of nest boxes on retained and proposed trees and the incorporation of bird nesting features (such as nest boxes and bricks) into the proposed buildings. The newly-proposed buildings themselves will also provide nesting opportunities for birds. The exact number, type and location of provisioned bird nesting features can be secured by planning condition and will target notable / Priority Species.

12.112 Provided these avoidance and compensation measures are implemented, the adverse residual effect of loss of suitable nesting habitat would be **insignificant and temporary**. Conversely, it is anticipated that the provision of replacement nesting opportunities would represent an increase in opportunities provided to nesting birds by the Site and thus be a **beneficial** residual effect for birds that is **permanent** and **significant at the local level**.

12.113 Provision of a variety of nesting opportunities for birds will contribute positively to policies **SP11** and **SADM16** of the Welwyn Hatfield Local Plan and saved policy **R11** of the Welwyn Hatfield District Plan.



Other Mammals

Construction Impacts: Potential for Killing and Injury

12.114 In order to avoid the potential for killing and injury of other mammals, clearance works should take place outside of winter months when mammals are active and capable of dispersing away from danger. Should clearance works be undertaken during winter, these will need to avoid unsupervised breaking soft ground beneath vegetation and any brash or rubble piles will need to be dismantled under ecological supervision. Should a fox den be discovered within the site, this should be left *in-situ* until reported to a suitably qualified ecologist who will advise on appropriate steps to safeguard wild mammals if needed for works to resume. During construction, a number of measures will be implemented to safeguard wild mammals should they enter or utilise the Site during works (e.g. providing a means of escape from pits and trenches and storing chemicals securely). Measures will also be implemented to discourage certain wild mammals from entering the Site (e.g. avoiding storage of easily excavated mounds and litter). A detailed mitigation strategy can be secured via a planning condition.

12.115 Provided these avoidance and mitigation measures are implemented, the effects of clearance and construction works at the Site on other mammals would be **insignificant**.

Operational Impacts: Loss of Suitable Habitat

12.116 Loss of suitable foraging and sheltering habitat for wild mammals has been avoided where possible through the Proposed Development by retaining boundary scrub, trees and associated habitats. Where unavoidable, the loss of suitable habitat would be compensated by the provision of suitable green space habitats under the landscape proposals and the installation of a number of hedgehog domes / boxes within retained green space. Exact provision and specification of hedgehog domes / boxes can be secured via planning condition.

12.117 As such, it is considered that the residual effect of loss of suitable habitat would be **insignificant and temporary**. On the contrary, it is anticipated that the provision of ecologically-sensitively managed green space and new habitat, such as aquatic areas and associated wet grasslands, will represent an increase in foraging opportunities provided to mammals such as hedgehog within the Site and thus comprise a **beneficial** residual effect that is **permanent** and **significant at the local level**.



12.118 Provision of new foraging and sheltering opportunities would contribute positively to policies **SP1** and **SP11** of the Welwyn Hatfield Local Plan saved policies **R11**, **SP12** and **SADM16** of the Welwyn Hatfield District Plan and **Objective 2, Action UR/A/2/7** of the Hertfordshire BAP (2006).

Slow-worm

Construction Impacts: Potential for Killing and Injury

12.119 In order to avoid the potential for killing and injury of slow-worm during site clearance works, a mitigation strategy is recommended to safeguard slow-worm in the event that they have recolonised sub-optimal habitats within the site. A detailed mitigation strategy can be secured via planning condition; in short, the mitigation strategy will involve a controlled habitat manipulation exercise and sensitive site clearance under watching brief. Any slow-worm captured during these exercises will be relocated to suitable habitats adjacent to the site (i.e. the railway cutting) outside of the works footprint.

12.120 Provided these avoidance and mitigation measures are implemented, the effects of clearance works at the Application Site on reptiles would be **insignificant**.

Residual Impacts: Loss of Suitable Habitat

12.121 Loss of suitable foraging and sheltering habitat for slow-worm has been avoided where possible through the scheme design by retaining boundary scrub, trees and associated habitats. Where unavoidable, the loss of suitable habitat would be compensated by the provision of suitable green space habitats under the landscape proposals and a number of artificial refugia / hibernacula (such as partially buried log or rubble piles) within retained green space. The precise provision of suitable foraging and sheltering habitat for slow-worm can be secured via a planning condition.

12.122 As such, it is considered that the residual effect of loss of suitable habitat would be **insignificant and temporary**. On the contrary, it is anticipated that the provision of ecologically-sensitively managed greenspace and new habitat, such as wildflower-rich grasslands, will represent an increase in foraging opportunities provided to slow-worm within the Site and thus comprise a **beneficial** residual effect that is **permanent** and **significant at the local level**.



12.123 Provision of new foraging and sheltering opportunities would contribute positively to policies **SP1** and **SP11** of the Welwyn Hatfield Local Plan saved policies **R11**, **SP12** and **SADM16** of the Welwyn Hatfield District Plan and **Objective 2, Action UR/A/2/7** of the Hertfordshire BAP (2006).

Invasive Plants

12.124 Invasive plants should be eradicated from the Site. This should be completed by and under the advice of a suitably qualified specialist company. An eradication strategy to avoid spread of invasive species as a result of the Proposed Development can be secured via planning condition.

12.125 Eradication of invasive plants at the Site will avoid spreading invasive species via vehicular and human vectors. Additionally, as a feature of detrimental ecological value, the removal of invasive plants will represent a **significant beneficial** effect at the **Site level**.

Other Enhancements

12.126 The Proposed Development also presents the opportunity to secure a number of net gains for wildlife via the provision of additional ecological enhancements. Additional enhancements proposed at the Site include a stag beetle loggery and insect sheltering structures such as insect hotels and houses. These sheltering structures will benefit valuable invertebrate assemblages such as solitary bees, especially in conjunction with planting of high pollen / nectar flowering areas. The exact number and location of these enhancements can be secured via planning condition.

12.127 The residual effect of these additional ecological enhancements will be **beneficial** and **significant at the local level**.

12.128 Provision of a stag beetle loggery would contribute positively to **Object 22.6.2/SB4** of the Hertfordshire BAP (2006).



SUMMARY

12.129 The ecological baseline value and likely significant effects resulting from the development were assessed in accordance with guidelines published by CIEEM. An ecological assessment of the Site was undertaken in 2015 and subsequently updated in 2017.

12.130 The Site is dominated by buildings and hardstanding with trees located primarily at the Site perimeter. Scrub, grassland, ephemeral / short perennial, bare / re-colonising ground and ruderal habitat is also present within the north-west and south of the Site. The Site currently contains limited ecological interest with habitats that are largely of negligible or limited local ecological value.

12.131 The existing buildings have negligible to low suitability for roosting bats and four trees are suitable for roosting bats. During demolition of buildings and removal of the trees with bat roost potential, pre-works checks and watching briefs would be employed. In the unlikely event that bats are encountered during these works, works would immediately cease and a suitably qualified ecologist would provide advice. This would ensure that no harm would come to any bats that may be roosting within the buildings or trees.

12.132 A single pair of peregrine falcon was recorded nesting at the Site during spring 2014. The silo walkway structure that was used for the nesting site would be retained within the Proposed Development. To avoid disturbance of these birds during demolition and construction, a mitigation strategy has been developed. This aim is to discourage peregrine falcon from nesting at the silo and instead encourages nesting at a temporary site which has already been provided by the Applicant away from the silo in the southern portion of the Site. In addition, a permanent nesting box / ledge will be installed as part of the renovation work on the retained silo, ensuring a long-term nesting opportunity for peregrine falcons within the Site.

12.133 Other mammals and nesting birds within the site will be safeguarded during clearance and construction works through the implementation of standard avoidance and mitigation measures. Long-term, opportunities for these groups, including hedgehog, will be maintained and enhanced at the site through the provision of suitable habitat and sheltering / nesting opportunities such as hedgehog domes and bird boxes.

12.134 A small population of slow-worm has previously been translocated out of the site and the site is now considered sub-optimal for this species. Any slow-worm that have recolonised the site will be safeguarded during clearance and construction works by a habitat manipulation exercise and ecological supervision of sensitive clearance. Residual opportunities for



slow-worm will be maintained and enhanced by the inclusion and ongoing management of suitable habitat within landscape proposals and the provision of enhancements such as artificial refugia / hibernacula.

12.135 The majority of existing trees forming the north-western boundary of the Site are to be retained as part of the proposals. Invasive plants at the Site such as Japanese knotweed will be eradicated as part of the Proposed Development. These areas, and other locations within the Site will be supplemented with new tree planting, including native trees of local provenance and known value to wildlife.

12.136 The ecological value of the Site would be improved as a result of habitat creation and ecological enhancement measures such as wildflower-rich grassland and marginal planting, provision of bird and bat nesting and roosting opportunities, provision of hedgehog and reptile sheltering opportunities and the creation of new habitat types such as aquatic habitats and living walls / roofs.

12.137 A summary of the ecological impacts and effects assessed during this chapter is provided in **Table 12.4**.

Table 12.4: Ecology Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Construction phase: killing or injury of roosting bats (if present) as a result of loss, damage or destruction to bat roosting features.	Permanent	Major adverse with local significance	Implementation of a mitigation strategy centred around a pre-works check and supervised demolition / soft-felling to safeguard roosting bats in the unlikely event they are present.	None
Construction phase: disturbance of roosting bats (if present) within off-site trees from construction lighting.	Temporary	Minor adverse with Application Site significance	Construction scheme will avoid excessive overnight light spill onto off-site trees with suitability for roosting bats.	Insignificant
Construction phase: disturbance of nesting peregrine falcon.	Temporary	Major adverse with county significance	Continuation of bespoke peregrine falcon mitigation strategy comprising utilisation of a temporary mitigation site and avoidance of disturbance to active nests (see relevant sections).	Insignificant



Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Construction phase: damage / removal of active birds' nests or killing of eggs and young during site clearance.	Permanent	Minor adverse with Application Site significance	Retention of suitable trees / scrub where practicable and adoption of standard avoidance measures where clearance of suitable nesting habitat is avoided during bird nesting season or subject to a pre-works check.	Insignificant
Construction phase: killing and injury of wild mammals during site clearance and construction.	Permanent	Minor adverse with Application Site significance	Safeguarding of wild mammals during site clearance and construction works through supervised and sensitive working methods.	Insignificant
Construction phase: killing and injury of slow-worm during site clearance.	Permanent	Moderate adverse with Application Site significance	Implementation of a supervised habitat manipulation exercise and controlled destructive search under ecological supervision.	Insignificant
Spreading of invasive plant species via vehicular and human vectors.	Permanent	Major adverse with Local Significance	Eradication of invasive plant species from the Application Site prior to risk of spreading.	Minor beneficial and permanent with Application Site significance
Operational phase: loss of roosting opportunities for bats.	Permanent	Minor adverse with Application Site significance	Provision of roosting opportunities such as bat boxes on retained / proposed trees and bat roosting features such as bat bricks incorporated into proposed buildings as compensation and enhancement.	Beneficial and permanent with local significance
Operational phase: disturbance of roosting bats (if present) within off-site trees from proposed lighting.	Permanent	Minor adverse with Local Significance	Lighting scheme design will avoid excessive overnight light spill onto off-site trees with suitability for roosting bats.	Insignificant
Operational phase: disturbance of nesting peregrine falcon.	Permanent	Major adverse with County Significance	Implementation of bespoke peregrine falcon mitigation scheme which will ensure, through sensitive design of retained nesting site, that disturbance from light and windows will not impact nesting peregrine falcon.	Insignificant



Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Operational phase: loss of nesting opportunities for birds.	Permanent	Minor adverse with Application Site significance	Provision of new nesting opportunities for birds comprise nest boxes and incorporated nesting features within proposed buildings. Additional opportunities provided by proposed landscape planting once mature.	Minor beneficial and permanent with local significance
Operational phase: loss of habitat for wild mammals.	Permanent	Minor adverse with Application Site significance	Provision of additional foraging opportunities within suitable habitat as part of landscape proposals. Provision of additional sheltering opportunities such as hedgehog domes. Creation of new foraging habitat such as aquatic areas and associated wet grasslands.	Minor beneficial and permanent with local significance
Operational phase: loss of habitat for slow-worm.	Permanent	Minor adverse with Application Site significance	Provision of additional foraging opportunities within suitable habitat as part of landscape proposals. Provision of additional sheltering opportunities such as hibernacula. Creation of new foraging habitat such as aquatic areas and associated wet grasslands.	Minor beneficial and permanent with local significance
Changes to habitat value on site.	Permanent	Moderate beneficial	Retention of habitats of elevated ecological value. Provision of new native trees and scrub under landscape proposals alongside creation of wildflower-rich grasslands and formation of new habitat types for the Application Site such as aquatic habitats and living roofs / walls. Ongoing ecologically-sensitive management.	Moderate beneficial and permanent with local significance

REFERENCES

- Ref 12.1:** CIEEM (2016); 'Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, 2nd Edition', Chartered Institute of Ecology and Environmental Management.
- Ref 12.2:** Bradley Murphy Design (2015); 'Ecological Assessment Report Land at Broadwater Road, Welwyn Garden City, Hertfordshire, BMD.219.EA.003, 11/02/15', Bradley Murphy Design.
- Ref 12.3:** Bradley Murphy Design (2017); 'Phase 1 Habitat Verification Broadwater, Welwyn Garden City, AL8 6UN, BMD.17.023.RP.901, 26/09/2017', Bradley Murphy Design.
- Ref 12.4:** Entran (2017); 'Shredded Wheat Factory, Welwyn Garden City, Environmental Impact Assessment Scoping Report, 19-10-17', Entran.
- Ref 12.5:** Collins, J. (ed) (2016); 'Bat Surveys for Professional Ecologists: Good Practice Guidelines 3rd Edition', London, The Bat Conservation Trust.
- Ref 12.6:** Crick, H.Q.P. and Ratcliffe, D.A. (1995); 'The Peregrine *Falco peregrinus* breeding population of the United Kingdom in 1991', *Bird Study* **42**, pp. 1–19.
- Ref 12.7:** Blood, D. and Banasch, U. (2001); '*Hinterland Who's Who Bird Fact Sheets: Peregrine Falcon*' Online at <https://web.archive.org/web/20080508212057/http://www.hww.ca/hww2.asp?id=60> [accessed 10.11.2017].
- Ref 12.8:** Drewitt, E. (2014); '*Urban Peregrines*', London: Pelagic Publishing.
- Ref 12.9:** Reeve, N.J. (1982); 'The Home Range of the Hedgehog as Revealed by a Radio Tracking Study', *Symposia of the Zoological Society of London*, **49**, pp. 207-230.
- Ref 12.10:** Hubert, P., Julliard, R., Biagiantis, S. and Poulle, M-L., (2011); 'Ecological Factors Deriving the Higher Hedgehog (*Erinaceus europaeus*) Density in an Urban Area Compared to the Adjacent Rural Area', *Elsevier*, **103**(1), pp. 34-43.
- Ref 12.11:** Fuke, C. (2011); 'A Study of a Translocated Population of *Anguis fragilis* in Cornwall, UK', *The Plymouth Student Scientist*, **4**(2), pp. 181-221.
- Ref 12.12:** Smith, N.D. (1990); 'The Ecology of the Slow-worm (*Anguis fragilis*) in Southern England, A Thesis Submitted for the Degree of Master of Philosophy', *Department of Biology, University of Southampton*.
- Ref. 12.13:** British Standards Institution (2013), 'BS 42020:2013 Biodiversity. Code of Practice for Planning and Development', British Standards Institution.
- Ref 12.14:** Banks, A.N., Crick, H.Q.P., Coombes, R., Benn, S., Ratcliffe, D.A. and Humphreys, E.M. (2010); 'The Breeding Status of Peregrine Falcons *Falco peregrinus* in the UK and Isle of Man in 2002', *Bird Study*, **57**(4), pp. 421-436.



13 WATER QUALITY, HYDROLOGY AND FLOOD RISK

INTRODUCTION

13.1 This Chapter assesses the likely significant effects of the Proposed Development on the environment with regard to water quality, hydrology and flood risk. It describes the methods used to assess the effects; the baseline conditions currently existing at the Site and the surrounding area; the mitigation measures required to prevent, reduce or offset any significant negative effects; and the likely residual effects after these measures have been adopted.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Baseline Data

13.2 The study area is defined as that generally within a 2 km radius of the Site, although a number of issues are considered at a greater distance or at the river catchment level, where necessary. The assessment of effects encompasses surface water and groundwater quality, surface water and groundwater resources (in terms of water quantity), drainage and flood risk.

13.3 The assessment has been undertaken in accordance with the National Planning Practice Guidance (PPG) on EIA (Ref. 13.1) and has involved review of the following sources of baseline data:

- review of the Phase 1 Environmental Assessment by Delta-Simons (refer to Chapter 14 - Soils, Geology and Contaminated Land) and the Groundsure Review report (refer to Appendix 13.1) for the Site and up to a 2 km radius; providing data on surface water and groundwater discharged and abstractions, river quality, baseline hydrology, groundwater vulnerability and pollution incidents;
- review of Factual and Interpretative Geotechnical report by Delta-Simons (refer to Chapter 14 - Soils, Geology and Contaminated Land);
- review of Environment Agency (EA) data records on groundwater Source Protection Zones (SPZs), chemical and biological river quality, ecological status, groundwater quantity and quality and the location of indicative floodplain;
- review of the planning policy framework to identify specific plans and policies relating to the protection of the aquatic environment;
- review of the Welwyn Hatfield Borough Council (WHBC) Strategic Flood Risk Assessment (SFRA) and accompanying reports; and



-
- review of the accompanying FRA and Drainage Strategy relating to the Proposed Development (refer to Appendix 13.2).

13.4 The assessment methodology has been entirely desk-based. Recent data on local river quality has been acquired from the EA, therefore, water sampling was not considered necessary.

Assessment and Evaluation of Effects

13.5 The assessment of effects has involved the following general approach:

- the sensitivity or importance of aquatic receptors has been established on the basis of their use, proximity to the Site, existing quality or resource value and consideration of potential pollutant pathways (refer to Table 13.1);
- evaluation of the magnitude of the potential changes in water quantity and quality and assessment of the sensitivity of the aquatic environment to the predicted changes (refer to Table 13.2);
- the potential effects have been given a significance of Negligible or Minor, Moderate or Major Adverse or Beneficial based on the matrix in Table 13.3; and
- where any predicted effects are Minor, Moderate or Major Adverse, these are considered significant and, therefore, mitigation measures have been incorporated to eliminate or reduce the effects to an acceptable level. The residual effects (post-mitigation) are discussed in the final subsection of this chapter.



Table 13.1: Definition of Receptor Sensitivity

Receptor Sensitivity	Receptor Type	Sensitivity Details
High	Surface Water	<ul style="list-style-type: none">• WFD catchment classification of 'High' or 'Good'• No pathway constraints to this receptor
	Groundwater	<ul style="list-style-type: none">• Principal Aquifer• Groundwater Source Protection Zone (SPZ) Zone I
	Flood Risk and Drainage	<ul style="list-style-type: none">• Flood Zone 3a or 3b (high flood risk)• Critical drainage or flood storage areas
	Water Resources and Infrastructure	<ul style="list-style-type: none">• Area of major known water stress/foul sewerage capacity issues
Medium	Surface Water	<ul style="list-style-type: none">• WFD catchment classification of 'Moderate'
	Groundwater	<ul style="list-style-type: none">• Secondary A or B Aquifer• Groundwater SPZs Zone II or III• Areas of potential historic contamination
	Flood Risk and Drainage	<ul style="list-style-type: none">• Flood Zone 2 (medium flood risk)• Problem (but not critical) drainage area
	Water Resources and Infrastructure	<ul style="list-style-type: none">• Area of known water stress/foul sewerage capacity issues
Low	Surface Water	<ul style="list-style-type: none">• WFD catchment classification of 'Poor' or 'Bad'
	Groundwater	<ul style="list-style-type: none">• Unproductive Strata, i.e. Non-Aquifer• Not located on groundwater SPZ
	Flood Risk and Drainage	<ul style="list-style-type: none">• Flood Zone 1 (low flood risk)• No known drainage or flooding problems
	Water Resources and Infrastructure	<ul style="list-style-type: none">• Area of no known water stress/foul sewerage capacity issues



Table 13.2: Methodology for Assessing Magnitude

Magnitude of Effect	Criteria for Assessing Effect
Major	Total loss or major/substantial alteration to key elements/features of the baseline (pre-development) conditions such that the post-development character/composition/attributes will be fundamentally changed.
Moderate	Loss or alteration to one or more key elements/features of the baseline conditions such that post-development character/composition/attributes of the baseline will be materially changed.
Minor	A minor shift away from baseline conditions. Change arising from the loss/alteration will be discernible/detectable but not material. The underlying character/composition/attributes of the baseline condition will be similar to the pre-development circumstances/situation.
Negligible	Very little change from baseline conditions. Change barely distinguishable, approximating to a 'no change' situation.

Table 13.3: Effect-Significance Matrix

Magnitude	Sensitivity*		
	High	Medium	Low
Major	Major	Moderate to Major	Minor to Moderate
Moderate	Moderate to Major	Minor to Moderate	Minor
Minor	Minor to Moderate	Minor	Negligible to Minor
Negligible	Negligible	Negligible	Negligible

Limitations and Assumptions

13.6 When referring to the data from the Groundsure Enviro Insight reports within this chapter, the distances and directions are quoted directly. These are based on reference points within the Site and, therefore, it is possible that some of the data location are at a different distance and/or direction from the closest part of the Site boundary. The study area is defined as that generally within a 2 km radius of the Site; however, some data provided by the Groundsure Reports has a smaller information radius. The radius is stated in the assessment, where relevant.



13.7 The residential element of the Proposed Development is assumed to have an operational lifetime of 100 years, with commercial elements assumed to have an operational lifetime of 60 years. The assessment of construction phase effects is based on the indicative construction methodology and phasing for the Proposed Development.

13.8 The assessment of operational phase effects is based on the maximum parameters of the detailed elements of the Proposed Development as described in Chapter 5 (The Proposed Development).

LEGISLATION, PLANNING POLICY AND GUIDANCE

13.9 The following subsection provides a summary of relevant planning policy at a National, Regional and Local level as well as key environmental legislation. These planning policies and legislation form the basis of planning decision-making in relation to water quality, hydrology and flood risk.

National Planning Policy

National Planning Policy Framework (NPPF) 2012

13.10 The NPPF (Ref. 13.2) sets out the Government's planning policies for England and how these are expected to be applied. The principles of policy relevant to water resources and flood risk are provided in Section 10 'Meeting the challenge of climate change, flooding and coastal change' and Section 11 'Conserving and enhancing the natural environment' and, combined with the associated Planning Practice Guidance (PPG), form the current policy at the national level.

Local Planning Policy

13.11 The WHBC Draft Local Plan is to be formally adopted in early 2018. Currently, a Summary and Guide to the Welwyn Hatfield Draft Local Plan (Ref. 13.3) is available online and was released in August 2016.

13.12 The Local Plan sets out a vision for the borough and, from this, a number of objectives have been identified. Strategic and non-strategic policies, including development allocation policies, have been designed in order to achieve the objectives and the following policies are considered relevant to this technical chapter and the Proposed Development:



- SP10 – Sustainable Design and Construction: *“Development needs to be responsive and resilient to environmental risks and climate change, and seek to protect and enhance other aspects of the natural environment”*;
- SP11 – Protection and Enhancement of Critical Environmental Assets: *“This policy sets out the strategic approach to protecting and enhancing the borough's critical environmental assets within the planning process”*;
- SP12 – Strategic Green Infrastructure: *“The Council will plan positively for the creation, protection, enhancement and management of networks of green infrastructure, which includes parks, open spaces, playing fields, river corridors and woodlands”*; and
- SP17 – Mixed use development site at Broadwater Road West (site SDS3 north and SDS4 west): *“An allocation for mixed use development of around 1,020 dwellings, in addition to those already on site, and at least 17,650 square metres of Class B1 employment floorspace in addition to that already provided on site”*.

Legislative Context

13.13 A summary of key relevant UK water legislation is provided below:

- Environmental Protection Act (1990) (Ref. 13.4): sets out a range of provisions for environmental protection, including integrated pollution control for dangerous substances;
- Water Resources Act (1991) (Ref. 13.5): consolidated previous water legislation with regard to both the quality and quantity of water resources;
- Environment Act (1995) (Ref. 13.6): established a new body (the Environment Agency (EA)) with responsibility for environmental protection and enforcement of legislation. This Act introduced measures to enhance protection of the environment including further powers for the prevention of water pollution;
- Water Industry Act (1999) (Ref. 13.7): consolidated previous legislation relating to water supply and the provision of sewerage services;
- Anti-Pollution Works Regulations (1999) (Ref. 13.8): provides powers to the EA to stop any activity (e.g. construction) that is giving or is likely to give rise to environmental pollution or to adequately enforce pollution control measures;
- Control of Pollution (Oil Storage) (England) Regulations (2001) (Ref. 13.9): Imposes general requirements for preventing pollution of controlled waters from oil storage, particularly fixed tanks or mobile bowsters. Makes contravention a criminal offence;



- Water Act (2003) (Ref. 13.10): extends the provisions of the Water Resources Act (1991) and the Environment Act (1995) with regard to abstractions and discharges, water conservation and pollution control;
- Water Environment (Water Framework Directive) (WFD) (England and Wales) Regulations (2003) (Ref. 13.11): requires the development and implementation of a new strategic framework for the management of the water environment and establishes a common approach to protecting and settling environmental objectives for groundwater and surface waters; and
- Flood and Water Management Act (2010) (Ref. 13.12): makes provisions about the management of risks in connection with flooding and coastal erosion.

BASELINE CONDITIONS

Surface Water Quality

Hydrological Features

13.14 From a review of EA and Ordnance Survey mapping, the closest 'main river' is the Mimram River located approximately 1.7 km to the north of the Site. There are no other 'main rivers' or open-channel ordinary watercourses that have been identified within a 2 km radius of the Site.

Water Quality

13.15 Since the introduction of the WFD, the EA assigns a classification for water bodies on the basis of their 'ecological status', which encompasses chemical, biological and ecological assessment parameters. For catchment purposes, the Site lies within the 'Mimram (Codecote Bottom to Lee) Catchment' which was classified as having a 'Moderate' ecological status in 2016 with the objective of 'Good' by 2021.

Designations, Abstractions and Discharges

13.16 According to the EA, the Application Site lies within a Nitrate Vulnerable Zone (NVZ). However, the Site does not lie within a surface water safeguard zone for drinking water.

13.17 According to the Groundsure Review report (refer to Appendix 13.1), there are no surface water abstraction licences within 1 km of the Site.



13.18 The Groundsure Review report identifies no licensed surface water discharge consents within 500 m radius of the Site. There are no records of any Red List Discharge Consents (potentially harmful discharges to controlled waters) within 500 m of the Site.

Pollution Incidents

13.19 The Groundsure Review report (refer to Appendix 13.1) identifies one recorded national pollution incident within 500 m of the Site. This incident occurred in October 2002 approximately 184 m east of the Site and involved heavy metal pollution. The incident was classified as Category 4 (no impact) on hydrology.

Sensitivity

13.20 In accordance with Table 13.1, the hydrology of the Site is considered to be of **Medium Sensitivity**. The Site falls within the 'Mimram (Codecote Bottom to Lee) Catchment' which was classified as having a 'Moderate' ecological status in 2016.

Hydrogeology and Groundwater Quality

Groundwater Quality

13.21 As reported on the British Geological Survey (BGS) online Geology of Britain Viewer as well as the Groundsure reports, the majority of the Site is underlain by the superficial geology of the Kesgrave Catchment Subgroup comprising sand and gravel. Areas in the north-western part of the Site and along the southern boundary are underlain by the superficial geology of the Lowesoft Formation, comprising diamicton.

13.22 According to the EA, the Kesgrave catchment Subgroup is classified as Secondary A aquifer. Secondary A Aquifers are defined as "*permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers*".

13.23 The Lowestoft Formation superficial geology is classified as undifferentiated Secondary Aquifer by the EA. Undifferentiated Secondary Aquifers are "*assigned in cases where it has not been possible to attribute either category A or B to a rock type*."

13.24 According to BGS, the Site is further underlain by the bedrock geology of the Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated), comprising chalk.



This bedrock geology is classified as Principal Aquifer by the EA. Principal Aquifers are defined as *“layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.”*

Designations, Abstractions and Discharges

13.25 The Site does not lie within a groundwater safeguard zone for drinking water or a groundwater NVZ.

13.26 Groundwater Source Protection Zones (SPZs) are provided by the EA which *“show the risk of contamination from any activities that might cause pollution in the area”*. The Groundsure Enviro Insight reports and the EA data identify that the Site is located within a Total Catchment (Zone 3) groundwater SPZ; however, there are no groundwater abstraction licences for potable supply within 2 km of the Site.

13.27 According to the Groundsure Review report, there are no records of groundwater abstraction licences within the Site boundary. However, there is one recorded groundwater abstraction licence within 1 km of the study area. This abstraction comprises two grouped boreholes located approximately 97 m south of the Site and is for a maximum daily volume of 1,364 m³ for use as process water.

13.28 The Groundsure report identifies one licensed groundwater discharge consent within 500 m radius of the Site. This discharge consent is located approximately 346 m north of the Site and was for a miscellaneous discharge of mine/groundwater. The consent expired in 1996.

Pollution Incidents

13.29 The Groundsure report identifies no recorded pollution incidents to groundwater within 500 m of the Site.

13.30 The report identifies a number of potentially historical land uses within the Site boundary. The land use for the Site has consisted of industrial and manufacturing use since 1938. The 1938 map shows the land uses include a cereals manufacturing and factory, chimneys, tanks, unspecified tanks, film studios, sawmills, electric heaters manufacturing and unspecified manufacturing.



13.31 From 1960 to 1994, the land uses include unspecified works, unspecified factories and chimneys. The 1971 map shows a biscuit factory located on the Site. An unspecified commercial/industrial use was shown on the 1986 map and unspecified tanks were shown on the maps between 1986 and 1993. An electrical substation was shown on the 1993 map of the Site.

13.32 The land use also includes rail infrastructure from 1898 to 1994 with the earliest land use in 1898 as a railway. Railway sidings are located on the Site between 1928 to 1992. A railway building and coal yard was located on the Site on the 1960 map and a freight terminal was located on the Site on the 1986 map.

13.33 A Phase 1 Environmental Assessment was undertaken by Delta-Simons in January 2015 at the Site in the context of the approved outline planning application (refer to Chapter 14 – Soils, Geology and Contaminated Land).

13.34 The Phase 1 investigation identified “*significant solvent (VOC) contamination of the groundwater in the underlying chalk aquifer and localised soil contamination associated with the former tanks farm*”.

13.35 Remediation of groundwater at the Site has taken place and resulted in a significant reduction in dissolved phase contaminant concentrations in the groundwater.

13.36 The pollution linkages range from low to medium risk and it is recommended that additional investigations of the shallow soils, ground gas and soil vapour monitoring are completed (refer to Chapter 14 – Soils, Geology and Contaminated Land).

Sensitivity

13.37 The Site is located on a Principal Aquifer and is within an SPZ Zone 3; therefore, the hydrogeology is considered to be of **High Sensitivity**.

Flood Risk and Drainage

Flood Risk

13.38 The EA's flood map for planning shows that the Site lies entirely within Flood Zone 1 (low risk). Land located within Flood Zone 3 (high risk) is located approximately 1.7 km to the



north. It is therefore concluded that the Site would remain in Flood Zone 1 for its operational lifetime (assumed to be 100 years).

13.39 According to the EA's surface water flood map, there is a very low risk of surface flooding to the majority of the Site, defined by the EA as having an annual chance of flooding of less than 0.1%. An area near the northern boundary and other isolated areas have up to a high risk of surface water flooding, defined by the EA as having an annual chance greater than 3.3%. The medium and high risk surface water flood risk extents are comparably limited and are not considered to pose a significant risk to the Site.

13.40 A review of the Welwyn Hatfield Council Strategic Flood Risk Assessment (SFRA; JBA, 2016) has identified that the Site is potentially at risk from sewer flooding. Sewer flooding can be associated with surface water flooding and occurs when the sewers are overwhelmed by heavy rainfall, become blocked or are of inadequate capacity. The Site is located within the postcode area of AL73 and this has 19 records of internal flooding of property and 32 records of external flooding according to Thames Water DG5 register.

13.41 The Delta-Simons Geotechnical Report (2015) indicated groundwater levels of between 21.23 and 22.62 m below ground level (mbgl) and, as a result, the Site is not considered to be at risk of groundwater flooding. According to the Phase 1 Environmental Assessment report (Delta-Simons 2015), groundwater has been recorded between 20 m and 26 m bgl. According to the Groundsure report, a BGS groundwater flooding susceptibility area falls within 50 m of the boundary of the Site.

13.42 According to the FRA (refer to Appendix 13.2), the risk of flooding from reservoirs is considered to be low.

Existing Drainage

13.43 The Site is a brownfield site comprising industrial and manufacturing uses and rail infrastructure. Currently, any surface water runoff generated within the Site is dealt with via the existing drainage infrastructure associated with the Site which discharges to the Thames Water public sewer via a number of lateral drains in Broadwater Road and Bridge Road at an unrestricted rate.

13.44 A 50% reduction in the existing 1 in 1 year rate to 310 l/s was agreed with Thames Water for the previous application. The proposed surface water drainage strategy has been designed to accommodate the 1 in 100 year rainfall event including a 40% allowance for climate change.



13.45 The Site has been divided into six sub-catchment areas and each area has a separate proposed discharge point to the Thames Water surface water sewer. The SuDS features will include attenuation tanks, permeable paving, infiltration and surface level attenuation features throughout the Site.

Sensitivity

13.46 The Site is located within Flood Zone 1 (low risk) and the Site is potentially at risk from surface water and sewer flooding. There are no other significant sources of flooding within the Site or surrounding area according to the SFRA or EA maps.

13.47 The Site itself has no known drainage problems and due to its location in Flood Zone 1 is considered to be of **Low Sensitivity**.

Water Resources and Infrastructure

Water Resources

13.48 The BGS borehole scan website indicates that there are two borehole records within the Site and 11 borehole records have been identified within 250 m of the Site boundary. The data indicate relatively deep groundwater within the area as the most recent borehole record on Site (BGS Ref: TL21SW11) indicates groundwater at a depth of 22.42 m depth below datum (mbd). The boreholes surrounding the Site indicate similar groundwater levels except for the boreholes to the north-west of the Site which indicated that no groundwater was encountered due to the superficial geology of clay.

13.49 As well as this, the Delta-Simons Geotechnical Report (2015) (refer to Chapter 14 – Soils, Geology and Contaminated Land), involved drilling boreholes to a maximum depth of 30.0 at 16 locations. Groundwater was encountered at levels of between 21.23 m and 22.62 mbgl.

13.50 There are no potable water abstractions within close proximity to the Site; however, as the Site is located in SPZ3 over a Principal Aquifer, it confirms that the groundwater resources in the area are used for drinking water supply.

Foul Water

13.51 Consultation was undertaken with Thames Water in 2015 and 2017 with regard to a previous planning application and it was later confirmed that the comments given prior to the



application going to committee are still valid (refer to Appendix 13.3). Thames Water indicated that the existing wastewater infrastructure does not have the capacity to accommodate the needs of the Proposed Development and appropriate mitigation will need to be implemented following further consultation. This may include the use of foul pumping stations to attenuate foul flows and restrict the discharge rate to the sewer.

13.52 Private on-site drainage has been identified in the previous FRA for the outline planning application, consisting of separate foul and surface water systems serving the existing commercial buildings. No storage tanks or flow control devices were found, indicating that the existing drainage discharges at unrestricted rates.

Network Infrastructure

13.53 Consultation with Thames Water has identified that there are sewer assets owned by Thames Water within the Site boundary. The Thames Water owned sewers pass across the north and east of the Site and connect to the sewer network in Broadwater Road and Bridge Road. Therefore, it is recommended that 6 m wide easements around the Thames Water sewers are implemented in order to protect the public sewers and to ensure that Thames Water can access the sewers for future repair and maintenance.

13.54 The closest sewage treatment works, Mill Green Sewage Treatment Works, is situated approximately 2.8 km south of the Site (refer to Appendix 13.3).

Sensitivity

13.55 Consultation with Thames Water has confirmed that local foul drainage infrastructure does not have capacity to accept the proposed flows from the Proposed Development and mitigation will be required. Therefore, infrastructure improvements to the existing foul sewer network may be necessary. For the purposes of this assessment, foul drainage and mains water supply have been classified as **High Sensitivity**.



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

13.56 As the Site is located in Flood Zone 1 (low risk), flooding from rivers or the sea is not considered to be a significant effect and is therefore not included in the assessment of likely construction and operational effects.

Construction Phase

13.57 There are three potentially significant effects on water quality and hydrology during the construction phase of the Proposed Development, these are as follows:

- potential remobilisation of contamination that may already be present at the Application Site;
- potential contamination from general construction related activities; and
- potential interruption of groundwater flows, giving rise to an elevated risk of groundwater flooding and/or effects on baseflow to local water bodies.

13.58 For the purpose of this assessment, the potential effects identified during the construction phase are considered to be temporary in nature and of relevance at the local level only.

Potential Remobilisation of Contamination that may already be Present at the Site

13.59 As established within the baseline section of this chapter, the Site has a number of potentially contaminative historical land uses. The Ground Investigation Report (refer to Appendix 13.1) concluded that there is localised soil contamination associated with the former tank farm in the Polycell Factory. Widespread or significant contamination has not been identified elsewhere on the Site, though a further investigation is needed to provide coverage of previously un-investigated areas and remediation works have been undertaken to remove contaminated soils for on-site remediation.

13.60 Construction works would disturb the ground at the Site which could cause the remobilisation of any existing contaminants present in the shallow soils. The main construction works that could disturb the underlying strata are localised site levelling, excavations for foundations, services and construction of drainage routes and associated features.

13.61 Therefore, the effect magnitude of remobilising contamination during construction is considered to be Minor. Prior to mitigation, the effect significance of the remobilising of



contaminants arising during construction-related activities is considered to be **Minor to Moderate Adverse** for groundwater and **Minor Adverse** for surface water.

Potential Contamination from General Construction Related Activities

13.62 The operation of construction vehicles and general construction activities could give rise to the potential for groundwater to become contaminated with hydrocarbons, silt and other construction materials. This may in turn lead to a contamination event should the Site drainage be allowed to enter existing drainage infrastructure or the ground untreated.

13.63 The Proposed Development will be constructed in a number of phases. Referring to Table 13.2, the effect magnitude of contamination arising from general construction activities is considered to be Minor. Prior to mitigation, the effect significance of contamination arising from general construction activities is considered to be **Minor to Moderate Adverse** for groundwater and **Minor Adverse** for surface water.

Potential Interruption of Groundwater Flows

13.64 Records from the Geotechnical Report and the Phase 1 Environmental Assessment report undertaken by Delta-Simons in 2015 indicate that groundwater depths lie between 20 m and 26 mbgl.

13.65 The Geotechnical Report (refer to Chapter 14 – Soils, Geology and Contaminated Land) identifies that the Made Ground and Lowestoft Foundation are considered too variable, weak and compressible for conventional shallow foundations given the expected foundation loads. Therefore, the foundations may need to extend down to the Upper Chalk Formation.

13.66 However, as groundwater depths are recorded at 20 mbgl and deeper, it is considered likely that even if the piles intercept the underlying groundwater, they would not give rise to an increase in groundwater flood risk, due to the depth of the underlying groundwater. The impact on groundwater interruption is therefore considered to be **Negligible** and no mitigation is considered necessary.

Operational Phase

13.67 There are four potential significant effects on water quality and hydrology during operational phase of the Proposed Development;



- the control of surface water runoff taking climate change predictions into account;
- potential contamination of local surface waters and/or groundwater from the routine Site drainage or accidental spills;
- water demand and the effect on the availability of local water resources; and
- foul drainage and the effect on local surface waters and/or groundwaters.

13.68 For the purpose of this assessment, the potential effects identified during the operational phase are considered to be long-term in nature (i.e. for the duration of the operational phase of the Proposed Development) and of relevance at a local level, unless stated otherwise.

Control of Surface Water Runoff

13.69 As indicated within the FRA (refer to Appendix 13.2), the risk of surface water flooding within the Site ranges from very low to high, therefore the drainage strategy is required to reduce the risk of surface water flooding. The existing site is brownfield and therefore the surface water runoff rates from the Site are required to be improved. The existing drainage strategy discharges to the Thames Water public sewer via a number of lateral drains in Broadwater Road and Bridge Road, at an unrestricted rate. The Proposed Development would result in a similar percentage of hardstanding compared to the former use and therefore runoff rates (prior to mitigation) would be largely unchanged.

13.70 The effect magnitude of the control of surface water runoff taking climate change into account during the operational phase is considered to be Negligible prior to mitigation and the effect significance is **Negligible**.

Contamination of Surface Water and/or Groundwater from the Routine Site Drainage

13.71 The proposed drainage strategy could have the potential to contaminate surface water and/or groundwater from a number of sources. The majority of the Site will be utilised for residential development and, as such, the typical range of potential contaminants will be limited to hydrocarbons and vehicle-related oils and lubricants, as well as small quantities of general household chemicals. Employment areas, commercial areas, significant road infrastructure and other associated development have a wider range of potential contaminants which would also likely be stored and transported in higher volumes.



13.72 The effect magnitude is considered to be Minor. Prior to mitigation, the risk of contamination from the routine Site drainage is considered to be **Minor Adverse** for surface water and **Minor to Moderate Adverse** for groundwater.

Water Demand

13.73 The water demand for the existing site use is unknown. There is likely to be an increase in water demand as a result of the Proposed Development which consists of 1,471 new residential dwellings and commercial uses.

13.74 Consultation is ongoing with Thames Water to ensure there is sufficient capacity in the local mains water supply to serve the Proposed Development and to establish whether any off-site infrastructure improvements are required.

13.75 The effect magnitude of increased water demand from the Proposed Development is therefore considered to be Minor. Prior to mitigation, the increase in water demand arising from the Proposed Development is **Minor to Moderate Adverse**.

Foul Drainage Demand

13.76 The foul drainage demand is expected to significantly increase as a result of the Proposed Development. Thames Water have confirmed that the foul sewerage system does not have the capacity to accommodate the needs of the Proposed Development (refer to Appendix 13.3). Appropriate mitigation will need to be implemented following further consultation with Thames Water and this may include the use of foul pumping stations to attenuate foul flows and restrict the discharge rate to the sewer network.

13.77 The effect magnitude of increased foul drainage demand from the Proposed Development is therefore considered to be Moderate. Prior to mitigation, the effect significance is considered to be **Minor to Moderate Adverse**.

ASSESSMENT OF CUMULATIVE EFFECTS

13.78 The committed developments described in Chapter 4 (Alternatives and Design Evolution) of this ES have been considered within the assessment of cumulative effects.

13.79 All committed major developments in the area surrounding the Proposed Development will have to satisfy the requirements for the control of surface runoff within the NPPF PPG, i.e.



discharge at the current greenfield runoff rate or the provision of a betterment in runoff rates post-development. Therefore, the cumulative effect of other local developments should result in a net positive effect through reducing overall flood risk in the area.

13.80 In terms of water quality, new or committed developments will also have to incorporate appropriate pollution control measures to protect the underlying groundwater and/or local surface waters through planning conditions enforced by the Local Authority and/or discharge consents enforced by the EA.

13.81 The cumulative effects of new development on water resources and foul drainage provision are managed at the regional level by the appropriate water companies in consultation with statutory bodies such as the Local Planning Authorities and the EA. The cumulative effect of increases in mains water and foul drainage demand have to be offset by sustainable design and water efficiency measures and infrastructure contributions for sewage treatment works, where necessary. These measures should collectively ensure that the cumulative effects on regional water resources and treatment performance are controlled to an acceptable level.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

13.82 The following subsections set out the mitigation measures that would be implemented to eliminate potential environmental effects and reduce these to an acceptable level.

Construction Phase

Potential Remobilisation of Contamination that may already be Present at the Site

13.83 Although the Phase 1 Environmental Assessment has concluded that the remediation scheme has been successful in removing the primary sources of the soil contamination, it is recommended that further assessment is undertaken at the Site to provide coverage of previously un-investigated areas. This further investigation can be completed at the detailed design stage.

13.84 Should this further contamination assessment identify that contaminated soils are present elsewhere on the Site, it is recommended that a remediation/removal strategy is prepared and agreed with the Council before construction works begin to ensure that garden and public open space areas have suitably clean subsoil/topsoil. This will ensure that any significant pollution linkages are eliminated or minimised to an acceptable level with appropriate remediation and control measures in place.



13.85 With these mitigation measures in place, it is considered that the residual effect would be **Negligible**.

Potential Contamination from General Construction Related Activities

13.86 Construction vehicles will be properly maintained to reduce the risk of hydrocarbon contamination and will only be active when required. Construction materials will be stored, handled and managed with regard to the sensitivity of the local aquatic environment and thus the risk of accidental spillage or release will be minimised.

13.87 The construction drainage system will be designed and managed to comply with BS6031:2009 'The British Standard Code of Practice for Earthworks' (Ref. 13.13), which details methods that should be considered for the general control of drainage on construction sites. Further advice is contained within the British Standard Code of Practice for Foundations (BS8004: 2015) (Ref. 13.14).

13.88 These mitigation measures have been incorporated into a Construction Environmental Management Plan (CEMP) as set out in Chapter 6 (Development Programme and Construction), which sets out measures for the control of the Site drainage, reducing the risk of accidental spillages and the storage and handling of materials.

13.89 With these mitigation measures in place, it is considered that the residual effects would be **Negligible**.

Operational Phase

Control of Surface Water Runoff

13.90 The drainage strategy (Appendix 13.2) proposes to discharge surface water runoff via a range of SuDS features at a 50% reduction compared to existing rates.

13.91 The strategy involves discharging runoff from the Proposed Development into a range of SuDS features such as attenuation tanks, permeable paving, infiltration and surface level attenuation features. The Site has been divided into six sub-catchment areas and each area has a separate proposed discharge point to the Thames Water surface water sewer. The strategy ensures that all designs are for the 1 in 100-year flood event with a 40% allowance for climate change.



13.92 The implementation of the drainage strategy for the Site would ensure that the surface water runoff rates would be reduced significantly compared to the existing rates, for the operational lifetime of the Proposed Development.

13.93 With these mitigation measures in place, it is considered that the residual effects would be **Minor Beneficial**.

Contamination of Surface Water and/or Groundwater from the Routine Application Site Drainage

13.94 The proposed drainage strategy is included within the FRA (Appendix 13.2) and will ensure that all runoff from the Site will receive an appropriate level of treatment in accordance with the SuDS Manual (Ref. 13.15).

13.95 Table 26.2 of the SuDS Manual sets out pollution hazard indices for different land use classifications including residential roofs, commercial roofs, commercial areas and sites with heavy pollution. For each land use, a pollution hazard index is outlined for Total Suspended Solids (TSS), metals and hydrocarbons. Mitigation indices are given to SuDS components for discharges to surface water and groundwater, which in total should exceed the pollution hazard indices.

13.96 The EA previously responded to the FRA and drainage strategy submitted for a previous application (the response dated 6th May 2016). The EA concluded that they have no objection to the drainage strategy; however, they do state that no infiltration of surface water drainage into the ground is permitted other than for those parts of the Site where it has been demonstrated that there is no risk to controlled waters. As the historical soil and groundwater contamination in the Site has been remediated, the risk to controlled waters is considered to be low.

13.97 The use of the SuDS techniques for pollution control will ensure that the surface water discharge from the Proposed Development will be of a sufficient quality in accordance with latest guidance.

13.98 With these mitigation measures in place, it is considered that the residual effect would be **Negligible**.

Water Demand

13.99 It is anticipated that any increase in water demand will be reduced as far as possible by the incorporation of appropriate water-saving devices, where practicable. The buildings will be



designed to maximise water efficiency through the consideration of measures such as rainwater and greywater harvesting, as well as incorporating water efficiency measures, where possible.

13.100 With these mitigation measures in place, it is considered that the residual effect would be **Minor Adverse**.

Foul Drainage Demand

13.101 Consultation with Thames Water has confirmed that the foul sewerage system does not have the capacity to accommodate the needs of the Proposed Development. Appropriate mitigation will need to be implemented following further consultation with Thames Water and this may include the use of foul pumping stations to attenuate foul flows and restrict the discharge rate to the sewer network.

13.102 With these mitigation measures in place, it is considered that the residual effect would be **Minor Adverse**.

SUMMARY

13.103 From reviewing the baseline conditions within and surrounding the Site, groundwater and foul drainage and mains water supply are considered to be the key receptors in terms of the Proposed Development. For groundwater, this is due to the Site being situated on a Principal Aquifer and within an SPZ Zone 3. For foul drainage and mains water supply, the high sensitivity classification is due to the local drainage infrastructure not having the capacity for the Proposed Development without mitigation and consultation with Thames Water is ongoing. Surface water is considered to be medium sensitivity as the Site is located within the 'Mimram' catchment which has a 'Moderate' ecological status. Flood risk and drainage are considered to be low sensitivity receptors as the site is located in Flood Zone 1 and is not in a critical drainage area.

13.104 The key effect during the construction phase is the potential for the remobilisation of contaminants at the Site. However, with suitable mitigation measures, the residual effect is considered to be **Negligible**. Water demand and foul demand are considered to be the key potential effects during the operational phase of the Proposed Development. However, with suitable mitigation measures put in place, the residual effects are considered to be **Minor Adverse** for water demand and foul demand.



13.105 The Proposed Development will include Sustainable Drainage Systems (SuDS), as detailed within the Flood Risk Assessment and Drainage Strategy report. The system seeks to reduce the rate of surface water runoff in accordance with local policy. This runoff rate would be lower than the current natural rate of surface water runoff during extreme events.

13.106 In conclusion, given the location and nature of the receptors, the overall environmental effect of the Proposed Development in relation to water resources and flood risk following mitigation measures is considered to be **Negligible to Minor Adverse**. All residual effects are Negligible with the exception of surface water drainage (Minor Beneficial) and water/foul demand (Minor Adverse).



Table 13.4: Water Quality and Hydrology Summary Table

Phase	Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Construction	Potential remobilisation of contamination	Temporary	Groundwater-Minor to Moderate Adverse Surface water-Minor adverse	<ul style="list-style-type: none"> Further ground investigation works Potential for remediation/removal of topsoil as required 	Negligible
	Potential groundwater contamination from general construction-related activities	Temporary	Minor to Moderate Adverse	<ul style="list-style-type: none"> Construction materials and vehicle properly maintained in compliance with BS6031:2009 Preparation of a CEMP 	Negligible
	Potential interruption of groundwater flows	Permanent	Negligible	<ul style="list-style-type: none"> Piling construction is not considered to increase the risk of groundwater flooding so mitigation is not required 	Negligible
Operational	Control of surface water runoff	Permanent	Negligible	<ul style="list-style-type: none"> Compliance with the SuDS drainage strategy within the FRA to provide a reduction in runoff rates 	Minor Beneficial
	Potential contamination of surface water or groundwater from the routine Site drainage	Permanent	Groundwater-Minor to Moderate Adverse Surface Water-Minor Adverse	<ul style="list-style-type: none"> Compliance with drainage strategy Infiltration features located in areas where there is no risk to controlled waters 	Negligible
	Water demand	Permanent	Minor to Moderate Adverse	<ul style="list-style-type: none"> Incorporation of water-saving devices, where possible 	Minor Adverse
	Foul demand	Permanent	Minor to Moderate Adverse	<ul style="list-style-type: none"> Further consultation with Thames Water and mitigation measures put in place 	Minor Adverse

REFERENCES

Ref 13.1: Department for Communities and Local Government. (2014). Guidance – Environmental Impact Assessment. [Online]. [Accessed 20th December 2016]. Available from: <http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/>

Ref 13.2: Department for Communities and Local Government. (2012). National Planning Policy Framework

Ref 13.3: Welwyn Hatfield Borough Council. (2016). Summary & Guide to the Welwyn Hatfield Draft Local Plan Proposed Submission. [Online]. [Accessed on: 26th October 2017]. Available from: <http://www.welhat.gov.uk/CHttpHandler.ashx?id=11449&p=0>

Ref 13.4: Environmental Protection Act 1990 (c. 43). London: Her Majesty's Stationery Office.

Ref 13.5: Water Resources Act 1991 (c. 57). London: Her Majesty's Stationery Office.

Ref 13.6: Environment Act 1995 (c. 25). London: Her Majesty's Stationery Office.

Ref 13.7: Water Industry Act 1999 (c. 9). London: Her Majesty's Stationery Office.

Ref 13.8: Anti-Pollution Works Regulations S.I. 1999 No. 1006. London: Her Majesty's Stationery Office.

Ref 13.9: Control of Pollution (Oil Storage) (England) Regulations S.I. 2001 No. 2954. London: Her Majesty's Stationery Office.

Ref 13.10: Water Act 2003 (c. 37). London: Her Majesty's Stationery Office.

Ref 13.11: Water Environment (Water Framework Directive) (England and Wales) Regulations S.I. 2003 No. 3242. London: Her Majesty's Stationery Office.

Ref 13.12: Flood and Water Management Act 2010 (c. 29). London: Her Majesty's Stationery Office.

Ref 13.13: BS6031:2009, The British Standard Code of Practice for Earthworks, (2009). British Standards Institute.

Ref 13.14: BS8004:2015, The British Standard Code of Practice for Foundations, (2015) British Standard Institute.

Ref 13.15: The SuDS Manual (C753), (2007), CIRIA



14 SOILS, GEOLOGY AND CONTAMINATED LAND

INTRODUCTION

14.1 This Chapter discusses the historical and current use of the Site with respect to contaminated land and the underlying geology and hydrogeology. It details the objectives, methodology and findings of a desk-based environmental review and considers the potential impacts of disturbance of the soils on the Site associated with the Proposed Development.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Assessment Methodology

14.2 The assessment of contaminated soils in the UK follows a risk based approach and is structured in a tiered manner. As well as having a systematic approach to collecting the data it is also necessary to adopt recognised techniques and standards in assessing them and particularly regarding environmental risk assessment.

14.3 An assessment of baseline conditions has been undertaken based on the findings of a desk based study. The methodology employed in completing the desk-based review of the Site and surroundings involved the following:

- a Site walkover by an experienced environmental consultant to provide an assessment of current site activities and the site's environmental setting;
- a review of available historic maps to determine the land-use history in the context of potentially contaminative activities;
- a review of environmental data relating to the Site and its surroundings using a proprietary third-party environmental database;
- a detailed review of previous environmental data relating to the Site (i.e. earlier phases of environmental assessment both desk-study and field-based);
- desk-based assessment of site geology, hydrogeology and hydrology from published mapping and web-based sources to determine the Site's environmental setting and sensitivity;
- a web-based search of the Environment Agency (EA) website and other freely available sources of information to identify any potential issues relating to the Site;

- review of the internet-based MAGIC environmental mapping service, a web-based interactive service which maps governmental environmental information; and
- provision of a qualitative contaminated land risk assessment based on Source-Pathway-Receptor as per current EA best practice contained in CLR11 (Ref. 14.1).

Development of a Conceptual Site Model

14.4 Information from the data sources identified above enable the identification of potential pollution sources and pathways for pollutants to migrate from the source areas to potential receptors (*i.e.* humans, ecosystems, buildings, *etc.*). Based on this information a Conceptual Site Model (CSM) has been formed for the Site and its proposed end use. The CSM is based on the risk assessment principles of source, pathway and receptor connecting to form a pollutant linkage.

14.5 CLR11 (Ref. 14.1) provides a technical framework for applying a risk management process when dealing with contaminated land. The process involves identifying, making decisions on, and taking appropriate action to deal with land contamination in a way that is consistent with Government policies and legislation.

14.6 *The Contaminated Land (England) Regulations 2006* (SI 2006/1380) as amended by *The Contaminated Land (England) (Amendment) Regulations 2012* (SI 2012/263) and accompanying DEFRA Contaminated Land Statutory Guidance (Ref. 14.2) describes a risk assessment methodology in terms of 'significant pollutants' and 'significant pollutant linkages' within a 'contaminant-pathway-receptor' conceptual model. For land to be determined as 'contaminated' in a regulatory sense, and therefore requiring remediation (or a change to less sensitive use), all three elements (contaminant-pathway-receptor) of a significant pollutant linkage must be present.

Assessment of Significant Effects

14.7 There are no published qualitative criteria for assessing the likely significant effects from ground conditions and contamination. Significance criteria have therefore been developed using the criteria outlined, published guidance on contaminated land and professional judgement.



14.8 An adverse effect (with respect of ground contamination) relies on the presence of a source, pathway and receptor pollutant linkage. The significance of the effect depends on the value of the resource, the sensitivity of the receptor and the ways in which the Development can provide a pathway to the receptor. The significance of an effect also partly depends on the timescales involved, i.e. short, medium or long term and the extent of the area affected.

14.9 The potential effects have been classified, prior to mitigation, as minor, moderate or major (either “Adverse”, “Neutral/Negligible” or “Beneficial”). Where the predicted effects are significant (substantial), mitigation measures have been incorporated to eliminate or reduce the effects to an acceptable level. The significance criteria are outlined in Table 14.1.

Table 14.1: Significance Criteria for Ground Conditions and Contamination Assessment

Category		Significance Criteria
Adverse	Major	Acute or severe chronic effects to human health and/or animal/ plant populations predicted. Effect on a potable groundwater or surface water resource of regional importance e.g. Principal Aquifer, public water reservoir or inner Source Protection Zone (SPZ) of a public supply borehole.
Adverse	Moderate	Proven pollutant linkages with human health and/or animal/plant populations, with harm from long-term exposure. Effect on a potable groundwater or surface water resource at a local level e.g. effect on an outer groundwater Source Protection Zone or Principal Aquifer, which is not abstracted locally. Temporary alteration to the regional hydrological or hydrogeological regime or permanent alteration to the local regime.
Adverse	Minor	Potential pollutant linkages with human health and / or animal / plant populations identified. Reversible, localised reduction in the quality of groundwater or surface water resources used for commercial or industrial abstractions, Secondary Aquifer.
Neutral/Negligible		No appreciable effects on human, animal or plant health, potable groundwater or surface water resources.
Beneficial	Minor	Minor local scale improvement to the quality of groundwater or surface water resources used for commercial or industrial abstraction.
Beneficial	Moderate	Moderate local improvement to the quality of potable groundwater or surface water resources. Significant improvement to the quality of groundwater or surface water resources used for public water supply.
Beneficial	Major	Regional scale improvement to the quality of potable groundwater or surface water resources.



Assumptions and Limitations

14.10 The assessment presented in this Chapter is based primarily on information presented in earlier Dames and Moore and Delta-Simons site investigation reports combined with the recently conducted Earth & Marine Environmental Consultants Limited (EAME) assessments that build on those reports and the current site conditions.

14.11 The existing status with respect to ground conditions and contamination are presented within this Chapter as the baseline conditions. It is considered unlikely that the existing conditions will deteriorate in the short term (during the proposed demolition and construction period) or longer term (once the Development would be completed). The baseline conditions presented are therefore representative of future conditions in the absence of the Development (i.e. without Development proceeding).

14.12 Dames and Moore and Delta-Simons have carried out site investigations at the Site as well as substantial remediation works. However, site investigation has not been possible in the locations where buildings that are proposed for demolition remain standing. Despite this limitation, it is considered that there is sufficient information available on ground conditions from desk based sources in addition to the various site investigation phases, remediation and monitoring data available for most of the Site, to identify and evaluate the likely significant effects associated with the development proposals.

14.13 Taking a precautionary approach further site investigation is identified as a requirement in the areas currently inaccessible to either ensure that the Site is suitable for the residential end use proposed or inform further remediation. As remediation is routinely and successfully applied at development sites such as this, it is considered, that a high degree of confidence can be applied to the evaluation of the likely residual effects (i.e. post remediation).

LEGISLATION, PLANNING POLICY AND GUIDANCE

14.14 The National Planning Policy Framework (March 2012) (Ref. 14.3) sets out the Government's planning policies for England and how these are expected to be applied. The National Planning Policy Framework (NPPF) constitutes guidance for local planning authorities and decision-takers both in drawing up plans and as a material consideration in determining applications. Fundamental to the NPPF is a presumption in favour of sustainable development.

14.15 The NPPF states that in order “to prevent unacceptable risks from pollution and land instability, planning policies and decisions should ensure that new development is appropriate



for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be taken into account. Where a site is affected by contamination or land stability issues, responsibility for securing a safe development rests with the developer and/or landowner”.

14.16 Planning policies and decisions should also ensure that:

- “the site is suitable for its new use taking account of ground conditions and land instability, including from natural hazards or former activities such as mining, pollution arising from previous uses and any proposals for mitigation including land remediation or impacts on the natural environment arising from that remediation”;
- “after remediation, as a minimum, land should not be capable of being determined as contaminated land under Part IIA of the *Environmental Protection Act 1990*”; and
- “adequate site investigation information, prepared by a competent person, is presented”.

14.17 The NPPF specifies that the minimum information that should be provided by an applicant is the report of a desk study and site reconnaissance.

14.18 The NPPF replaces the key Planning Policy Statements (PPS) which formed national planning policy, including PPS23 directly relevant to land contamination. PPS 23 stressed that land contamination, or the possibility of land contamination, is a material planning consideration in taking decisions on individual planning applications. This remains a fundamental part of the NPPF.

14.19 The planning process can influence how contaminated sites are managed through planning policy and development control. In terms of the latter, planning conditions often require detailed site assessment or, in some cases, the restoration of a site to render it suitable for its proposed new use.

14.20 Part 2A of the *Environmental Protection Act 1990* (“Part 2A”) provides the legislative framework for the Contaminated Land regime in England, Wales and Scotland. It provides for Contaminated Land to be identified and dealt with in a risk-based manner. *The Contaminated Land (England) Regulations 2006* (SI 2006/1380) set out provisions for procedural matters under Part 2A. The 2006 regulations were modified with the introduction of *The Contaminated*

Land (England) (Amendment) Regulations 2012, (SI 2012/263) which came into force on 6th April 2012. This includes an amendment to Regulation 3(c) to take account of the updated definition of “controlled waters” in Section 78A(9) of the *Environmental Protection Act 1990*.

14.21 Section 78A(2) of Part 2A of the EPA 1990 defines contaminated land as “land which appears to the local authority in whose area it is situated to be in such a condition, by reason of substances in, on or under the land, that:

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

14.22 The implementation of Section 86 of *The Water Act 2003* on 6th April 2012 by *The Water Act 2003 (Commencement No. 11) Order 2012* (SI 2012/264) modifies the definition of contaminated land to also include land where there is “significant possibility of significant pollution of controlled waters”.

14.23 Defra Contaminated Land Statutory Guidance published in April 2012 (Ref. 14.2) provides for a four-category test which is intended to clarify when land does or does not need to be remediated, where Category 1 is deemed as being high risk and Category 4 as being low risk.

14.24 “Significant harm” is defined in the Guidance on risk based criteria and must be the result of a significant “pollutant linkage”. The presence of a pollutant linkage relies on the Source-Pathway-Receptor concept, where all three factors must be present and potentially or linked for a potential risk to exist. An initial assessment of pollutant linkage can be made qualitatively (*i.e.* through identifying these factors) and may be assessed using qualitative risk assessment models.

14.25 Contaminated Land Report 11 (CLR 11), Model Procedures for the Management of Land Contamination (Ref. 14.1) identifies the risk management framework to be followed when dealing with land affected by contamination.

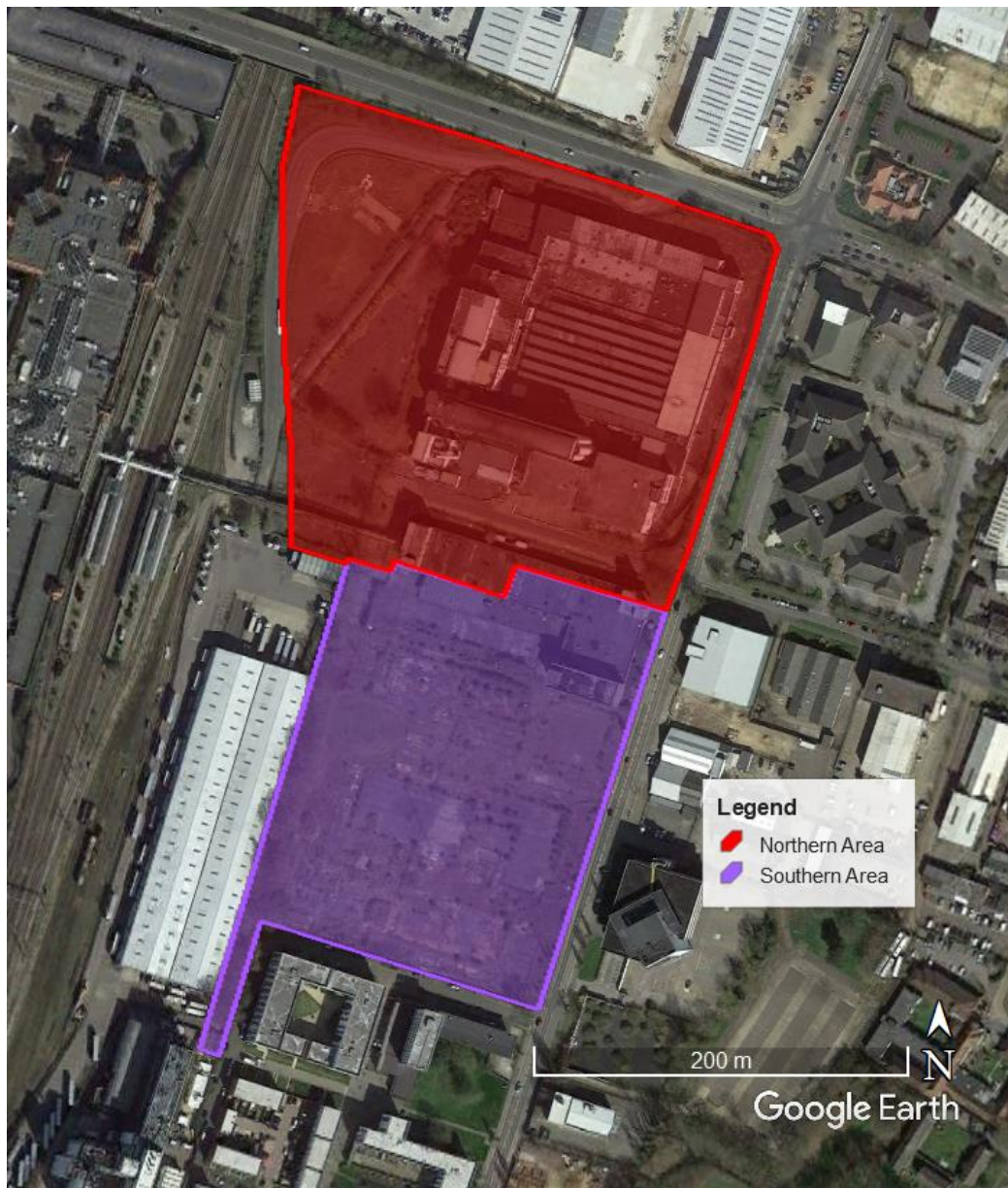
14.26 Further guidance documents relevant to the assessment of contaminated land are provided by various statutory and non-statutory bodies and are referenced where applicable.

BASELINE CONDITIONS

14.27 The Site is split into two distinct areas via a public road (Hydeway). As these are two distinct land parcels they are described separately (Figure 14.1).

Figure 14.1: Proposed Development boundary (north and south sites)

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Northern Site

14.28 The northern Site is approximately 4.5 ha and is accessed via Hydeway off Broadwater Road (A1000). The Site is located centrally within the town of Welwyn Garden City at National Grid Reference (NGR) TL 24199 12957 (51.801470, -0.20019472). The Site is relatively flat and lies at an elevation of between 84 and 85 metres above ordnance datum (AOD). The Site is currently 95% covered with buildings. Most of these buildings, apart from those with Grade II listing, will be demolished as part of the Proposed Development.

Photograph 14.1: View of northern Site from adjacent vacant land



Photograph 14.2: View of boiler house and silos from Hydeway





14.29 The following current uses were identified surrounding the northern Site:

- NORTH – Bridge Road beyond which is a large-scale retail park.
- EAST – Broadwater Road (A1000) beyond which are commercial premises and offices.
- SOUTH – Hydeway beyond which is the southern Site.
- WEST – Railway lines (East Coast Mainline) associated with Welwyn Garden City station beyond which is the Howard Centre (2-storey mall with high-street fashion shops and department stores).

14.30 The northern Site is currently occupied by the former shredded wheat factory and has not been actively used since 2008.

14.31 As part of the environmental assessment, historical maps, photographs and previous assessments were obtained and reviewed by EAME to determine the historical development of the Site and surrounding area. The northern Site has been divided into the following zones.

Zone N01 – Historic Shredded Wheat factory (North of Hydeway)

14.32 The area North of Hyde Way comprises several factory buildings ranging from single to four storeys in height. Associated buildings include offices, large grain silos, a main boiler house, firewater sprinkler tanks, substation(s), historic above ground storage tanks (ASTs) (associated with secondary boiler house), small vehicle repair garage and plant rooms. Anecdotal evidence suggests that a boiler house and associated diesel storage tanks were formerly located around the current sprinkler tanks (this has yet to be confirmed). It is also understood that the southern area of the main factory building was formerly utilised as a print works for the packaging of cereal products. An underground storage tank (UST) is reportedly located to the North of the factory building under the visitor car park, however it is understood that the tank was never used. A former UST (now decommissioned and filled) is believed to have been located halfway down the vehicle access ramp near the boundary with Broadwater Road.

Figure 14.2: Zone N01 – Site Features

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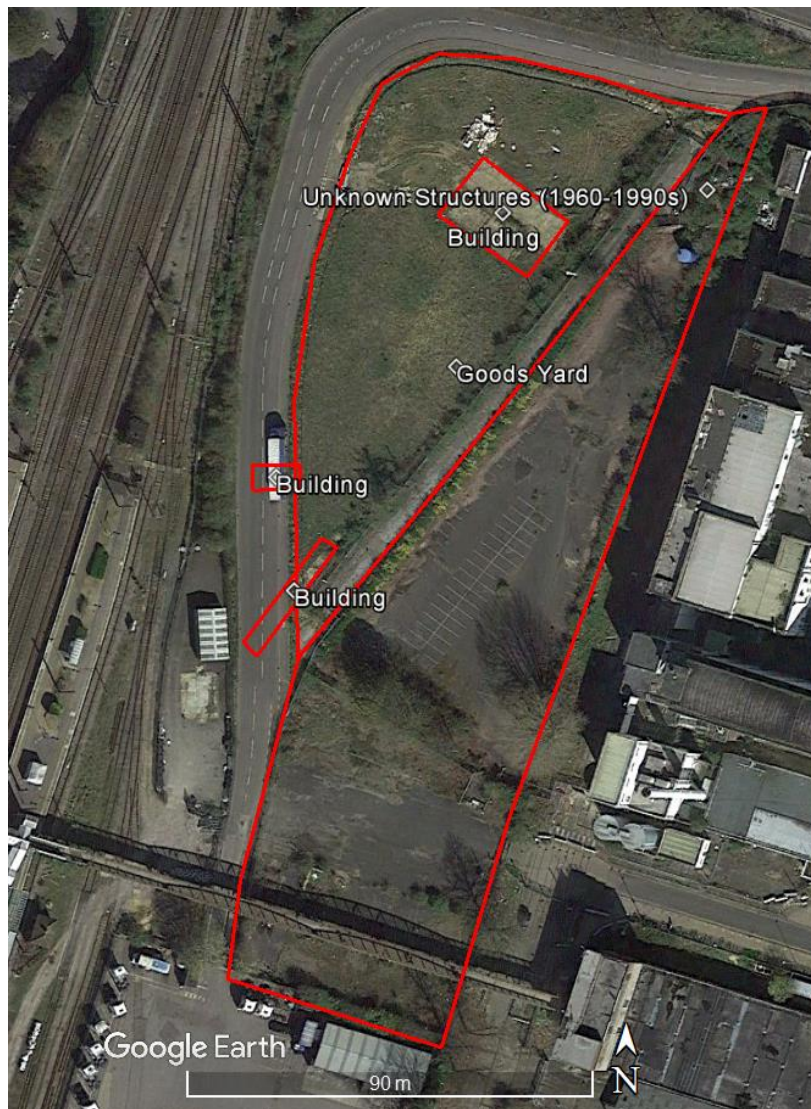
Zone N02 – Employee Car Park and Zone N03 – Vacant Land

14.33 The northwest corner of the Site can be conveniently split into two distinct zones (i) the former employee car park and (ii) vacant land undeveloped and occupied by rough grassland and hedges.

14.34 No significant sources have been identified within the car park area apart from an unknown structure indicated on the 1960-1990 historical maps. Three small historic buildings have been identified associated with the vacant parcel of land likely to be associated with the areas historic use as a goods handling yard.

Figure 14.3: Zone N02 and N03 – Site Features

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Southern Site

14.35 The southern Site is approximately 4 ha and is accessed via Hydeway off Broadwater Road (A1000). The Site is located centrally within the town of Welwyn Garden City at National Grid Reference (NGR) TL 24134 12739 (51.799529, -0.20121127). The Site is relatively flat and lies at an elevation of between 84 and 85 metres above ordnance datum (AOD). The Site has largely been cleared of all above ground structures apart from one remaining building that abuts Hydeway. This building covers 0.47 ha (approximately 13% of the Site). This building will be demolished as part of the Proposed Development.

Photograph 14.3: View of southern Site from pedestrian railway bridge



Photograph 14.4: View of southern Site from centre of remediation area



14.36 The following current uses were identified surrounding the southern Site:

- NORTH – Hydeway beyond which is the northern Site.
- EAST – Broadwater Road (A1000) beyond which are commercial premises and offices.
- SOUTH – Disused Roche Products facility (buildings Grade II listed) and multiple residential blocks.
- WEST – P.W Gates Distribution Ltd warehouse (southern hub) beyond which are railway lines (East Coast Mainline) associated with Welwyn Garden City station and car parking.



14.37 The Southern Site is currently mostly clear of all buildings, except for the remaining Cereal Partners Warehouse and Research and Development Building, and has not be actively used since 2008.

14.38 As part of the environmental assessment historical maps, photographs and previous assessments were obtained and reviewed by EAME to determine the historical development of the Site and surrounding area. The southern Site has been divided into the following zones.

Zone S01 – Cereal Partners Facility (South of Hydeway) and Zone S02 – Historic Suchard Chocolate (confectionary)

14.39 The area immediately south of Hyde Way is occupied by two buildings understood to have been a warehouse for the storage of raw materials and packaging products (known as the Cromac building) and a Cereal Partners research and development laboratory. A maintenance warehouse and associated storage yard was also understood to have been in this area. Potential asbestos containing materials (PACMs) in the form of corrugated asbestos cement sheets were noted within the buildings. The asbestos containing materials (ACMs) were removed from the building during Q4-2017. The area has included an historic AST (no longer present) and a former substation (no longer present).

14.40 Other historic users of this area have included Unity Heating (Young, Osmond and Young), Artotex Engineering (1929) and a plastics engineering works. The area to the south was occupied by Suchard Chocolate and used as a confectionary storage warehouse. The Site was operated by Suchard as a regional distribution unit and offices until closure in the mid-1970s. This area (Zone S02) is fully clear of all above ground structures.

Figure 14.4: Zone S01 and S02 – Site Features

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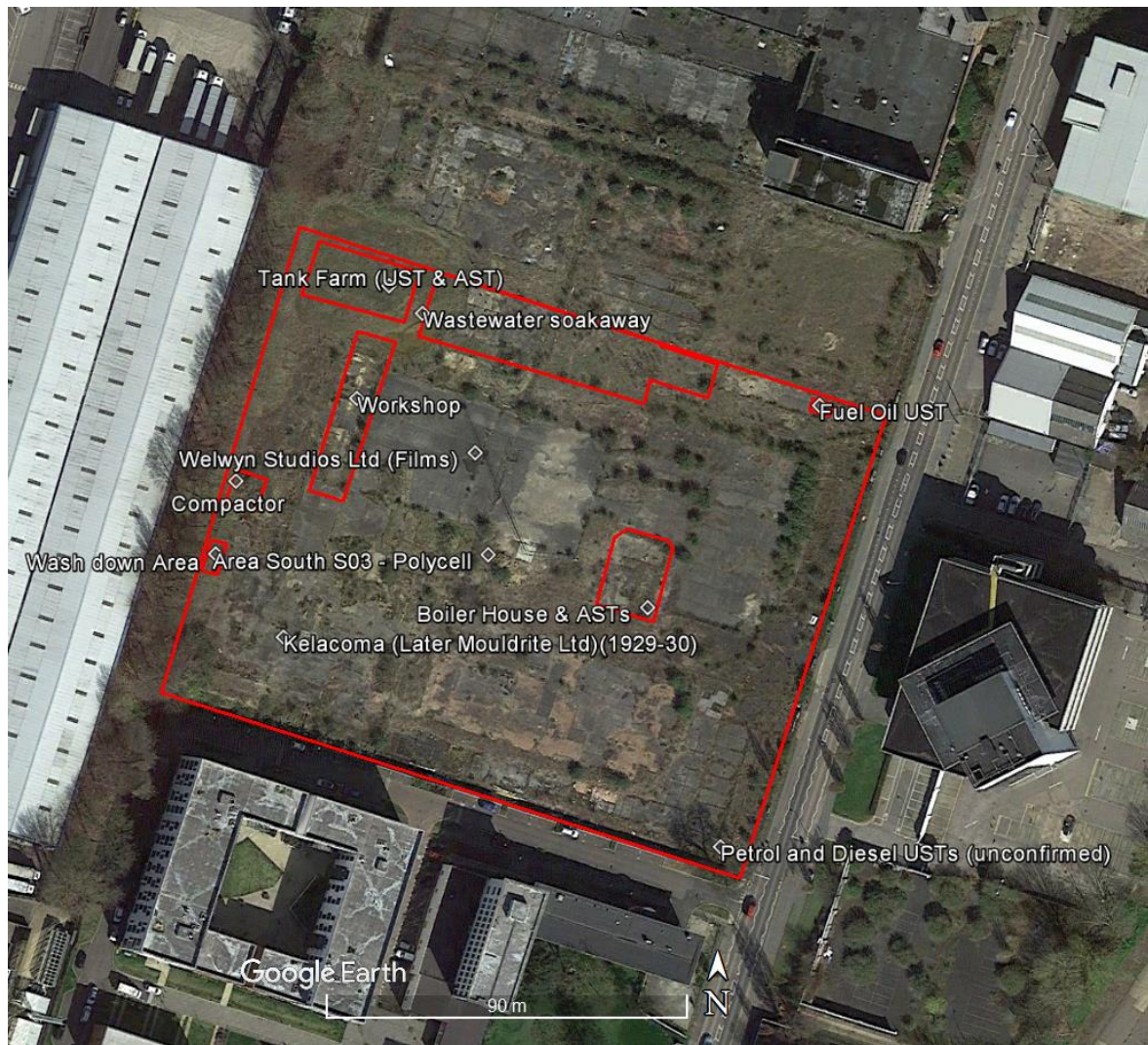


Zone S03 – Historic Polycell factory

14.41 The Polycell factory most recently produced a range of DIY products including Polyfilla and associated products, wallpaper adhesives and paint cleaning fluids. The primary operations carried out on-Site involved mixing raw materials and packaging of products. There were two principal areas of production; the Polyfilla powder and paste area and the liquids area. The Polyfilla and paste area was used primarily to produce dry products and some liquid pastes, and was in the southwestern corner of the Site. Associated with this area was the wastewater tank for receiving the washing water from the paste lines. The warehouse was adjacent to the powders and paste building and was used for storage of all products on-Site.

Figure 14.5: Zone S03 – Site Features

Google Earth Imaging with the permission of Google – Licensed to Earth and Marine Environmental Consultants Ltd.



14.42 The liquids area, located at the northern end of the factory was used to produce paint strippers and brush cleaners. Associated with the liquids area was the solvent tank farm comprising 13 underground storage tanks (USTs) (6 in use when the Site was last operational, 7 redundant) and one AST. Naphtha, white spirit and methanol were stored in the 6 operational 4,000-gallon USTs (tanks 7 & 8, 5 & 6 and 3 & 4 respectively) and dichloromethane was stored in the 6,250-gallon AST (tank 14). The 7 redundant tanks had volumes ranging from 1,500 to 6,000 gallons and were used to store white spirit, derv, IPA, naphtha, turps and methanol. A fuel oil UST was also located in the northeast of the Polycell area.

14.43 Other facilities included the boiler room, located in the centre of the Site with three heavy fuel oil ASTs in the adjacent room. The administration building, and goods warehouse were



both located near the gatehouse at the front of the factory on Broadwater Road. In the eastern corner of the Site it was reported that two USTs were used historically for diesel and petrol. It is reported that these tanks were cleaned, decommissioned and infilled with concrete in the late 1970s.

14.44 The Polycell Site formerly held a waste management license to dispose of industrial effluent from wastewater treatment to a soakaway, understood to be located adjacent to the tank farm area.

14.45 Other historic users of this area have included Kelacoma (Later Mouldrite Ltd) (1929 – 1930) and Welwyn (film) Studios Ltd (1928 – 1950). This area (Zone S03) is fully clear of all above ground structures.

Historical Land Uses of the Site and Surrounding Area

The historical development of the Site has been assessed in the Delta-Simons Phase 1 Environmental Assessment report (Appendix 14.1) through a review of available historical Ordnance Survey maps dating from 1878 to 2013, previous reporting pertaining to the Site and an internet search. A summary of the findings is provided below.

14.46 The development of the Site and surrounding area was begun in the 1920s in conjunction with the 'new town' development of Welwyn Garden City.

- 1878 – 1920s: The Site was undeveloped, assumed to have been agricultural land;
- 1920s - 1965: The south of the Site had been developed as a film studio and an electric heater manufacturer was in the centre of the Site with a rail siding along the eastern edge of the Site and centre of the Site with a branch line serving the heater manufacturer. The north of the Site had been developed as a Cereals Manufacturer with tanks located close to the centre of the northern boundary of the Site; and
- 1965 – 2000s: The Site had been developed to the final layout and marked as factories and works. The tank farm in the northeast of the Polycell area in the south of the Site was shown from 1960. The centre of the Site occupied by a confectionery factory and a plastics engineering works and a biscuit factory in the north.

14.47 Key land uses near the Site included:



- 1878 – Present: Railway tracks 10-50 metres west of the Site;
- 1920s – 2000: Chemical and Pharmaceutical Works (Roche site) adjacent to the south of the Site;
- 1920s – 1970s: Engineering works 25 metres north of the Site;
- 1920s – 1970s: An iron foundry 75 metres northeast of the Site; and
- 1920s - Present: Various small works and warehouses from 20m east of the Site along Broadwater Road, including garages, a laundry and wireless manufacturers.

14.48 A full Site history is outlined within Appendix 14.1.

Geology

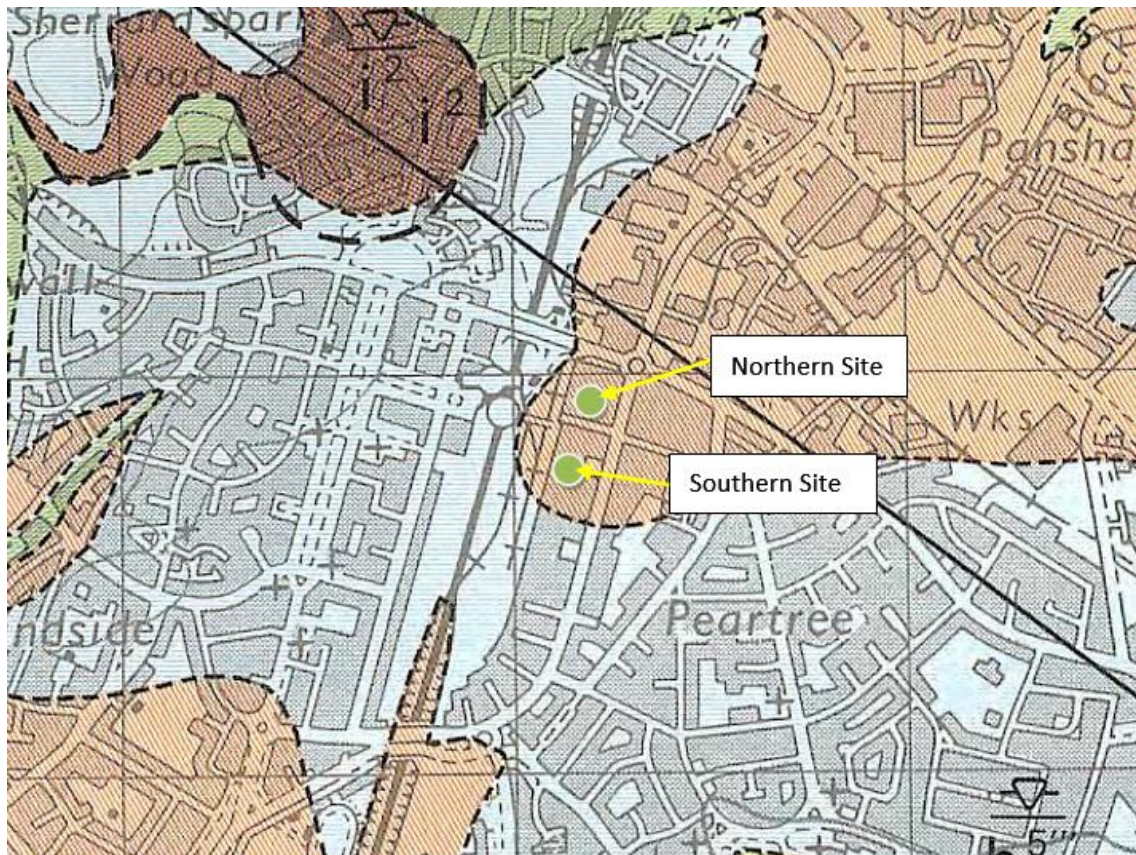
14.49 The geology of the Site has been established from British Geological Survey (BGS) sources and information obtained by previous Delta-Simons intrusive investigations, including the most recent geotechnical assessment reported in January 2015 (Appendix 14.2).

14.50 The relevant British Geological Survey (BGS) 1:50,000 map of the area (Sheet 239, Hertford, drift, 1:50,000, 1996) (Figure 14.6) the Site is directly underlain by:

- Superficial deposits – The northern part of the Site is underlain by Kesgrave Catchment Subgroup (Sand and Gravel) and the southern area by Boulder Clay (Lowestoft Formation – Diamicton).
- Bedrock deposits – The entire Site is underlain by Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated).

Figure 14.6: Published Site Geology

British Geological Survey (<http://www.largeimages.bgs.ac.uk/iip/mapsportal.html?id=1001732>)



14.51 A summary of the encountered geology at the Site is provided within Table 14.2.

Table 14.2: Site geology

Stratum	Area	Depth Range	Description
Made Ground (mostly hardstanding)	Across northern and southern areas	Ground to 0.4 m below ground level (bgl) (proven by Delta-Simons assessment)	Tarmacadam, concrete, reinforced concrete
Made Ground	Across all areas	0.30 m to 3.5 m bgl (proven by Delta-Simons assessment)	Variable inconsistent stratum. Clay, silty sand, gravelly clay or gravelly sand, gravel, bricks, ash, slag, concrete, flint. Rare brick cobbles.
Lowestoft Formation and the Kesgrave Catchment Subgroup	Across all areas	3.20 m to 18.0 m bgl (proven by Delta-Simons assessment)	Variable sometimes inconsistent strata across the Site. Lowestoft – Typically comprised layers of orange and brown and light brown sandy gravelly clay with sand and gravel in varying fractions. Locally encountered as clayey sandy gravel and clayey gravelly sand. Kesgrave Catchment Subgroup – Typically comprised orange brown sandy gravel and gravelly sand. Gravel of flint.
Lewes Nodular Chalk Formation and Seaford Chalk Formation (Undifferentiated)	Across all areas	Proven to maximum depth of 30.0 m bgl (proven by Delta-Simons assessment)	Predominantly recovered as structureless chalk composed of slightly gravelly silt (Grade Dm.). Grade Dc structureless chalk was encountered locally between 17.1 m and 20.0 m bgl.

14.52 The Site is not located within a coal mining affected area (Ref. 14.4) or within the Chalk mine buffer zone according to WHBC mapping (Ref. 14.5).

14.53 According to Public Health England (PHE) all parts of the Site (1km grid square) are in the lowest band of radon potential i.e. Less than 1% of homes above the Action Level (Ref. 14.6).

14.54 There are 35 Natural Cavities recorded within 1km of the Site (11 within 250 metres of the Site), all refer to sinkholes or solution pipes. The closest entry (a sinkhole) is located approximately 40 metres south of the Site (Appendix 14.2).

14.55 The 2015 Delta-Simons geotechnical assessment (Appendix 14.2) identified mixed soils with low density in borehole location BH407 (located in the former Polycell factory area, adjacent

to the former tank farm) from 13.80 m to 17.10 m bgl with possible voiding between 14.8 m to 16.0 m bgl. Also in borehole location BH414 (located in the West of the Site in the car park area) a void was identified from 12.95 m to 16.95 m bgl and low density clayey gravelly sand to 17.50 m bgl (the base of the feature was not identified). Both locations are highlighted on Figure 4 of the Delta-Simons geotechnical assessment (Appendix 14.2). The evidence observed in borehole locations BH407 and BH414 was described by Delta-Simons as likely to be caused by dissolution features which are described in CIRIA C574. Delta-Simons state that evidence of the existing development in the surrounding area does not suggest that dissolution features represent a significant risk to overall land stability, but are at least likely to affect localised areas. Delta-Simons state that it is unlikely that borehole BH407 and BH414 have encountered the only dissolution features, or the worst case of loose ground within the Site.

Hydrogeology

14.56 As detailed in the Delta-Simons Phase 1 Environmental Assessment report (Appendix 14.1) and according to the Environment Agency's aquifer designation maps, the geological sequence underlying the Site is classified as in Table 14.3. The Site is in Zone 3 (Total Catchment) of a groundwater source protection zone (SPZ).

Figure 14.7: Source Protection Zones

<http://maps.environment-agency.gov.uk/>



14.57 Information obtained from the Delta-Simons reports indicates that resting groundwater levels recorded in all investigation in the chalk aquifer were recorded between 20.0 m and 26.0 m bgl.

14.58 According to the Delta-Simons Phase 1 Environmental Assessment report (Appendix 14.1), the nearest current licensed groundwater abstraction is located approximately 1.3 km northwest of the Site and used for golf course irrigation.

14.59 Groundwater abstractions for 'chemical – process water' are also recorded approximately 100 m south of the Site on the former Roche Products Ltd site. However, as this area has been recently redeveloped with residential properties it is considered likely that this abstraction is no longer active. In addition, a further abstraction 340m North of the Site, used by Rank Xerox Ltd for miscellaneous industrial processing is listed as revoked, lapsed or cancelled.



Table 14.3: Hydrogeology

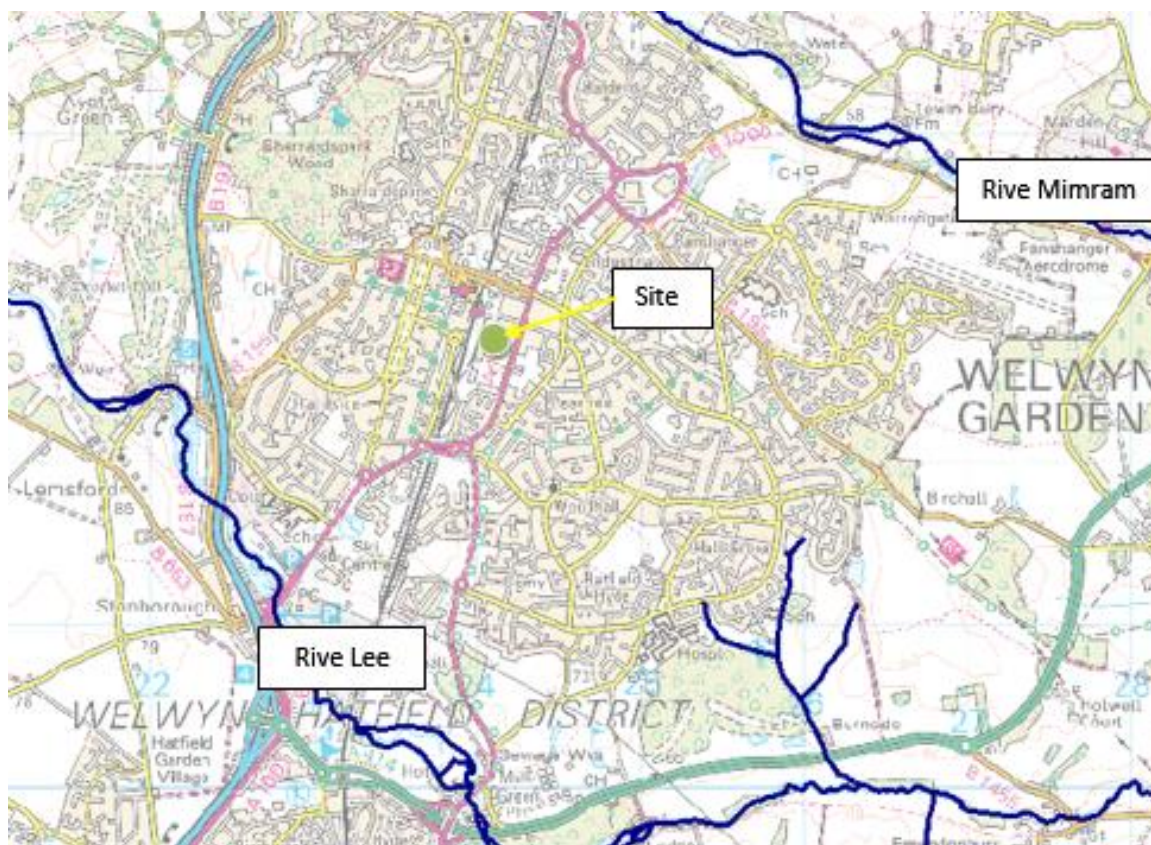
Stratum	EA Designation	Significance
Made Ground	Unproductive Strata	No specific hydrogeological significance although localised perched water may be present within made ground although not often encountered during previous site investigations.
Kesgrave Catchment Subgroup	Secondary A Aquifer	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
Lowestoft Formation	Unproductive Strata	Rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.
Chalk Group	Principal Aquifer	High intergranular and / or fracture permeability, usually providing a high level of water storage. May support water supply and / or river base flow at a strategic scale.

Hydrology

14.60 There are no surface water features located on the Site. The nearest surface watercourse is located approximately 320 m north of the Site. The nearest mainline surface watercourses to the Site are the River Mimram (1.75 km north) and the River Lee (1.76 km south southwest).

Figure 14.8: Mainline Rivers

<http://maps.environment-agency.gov.uk/>

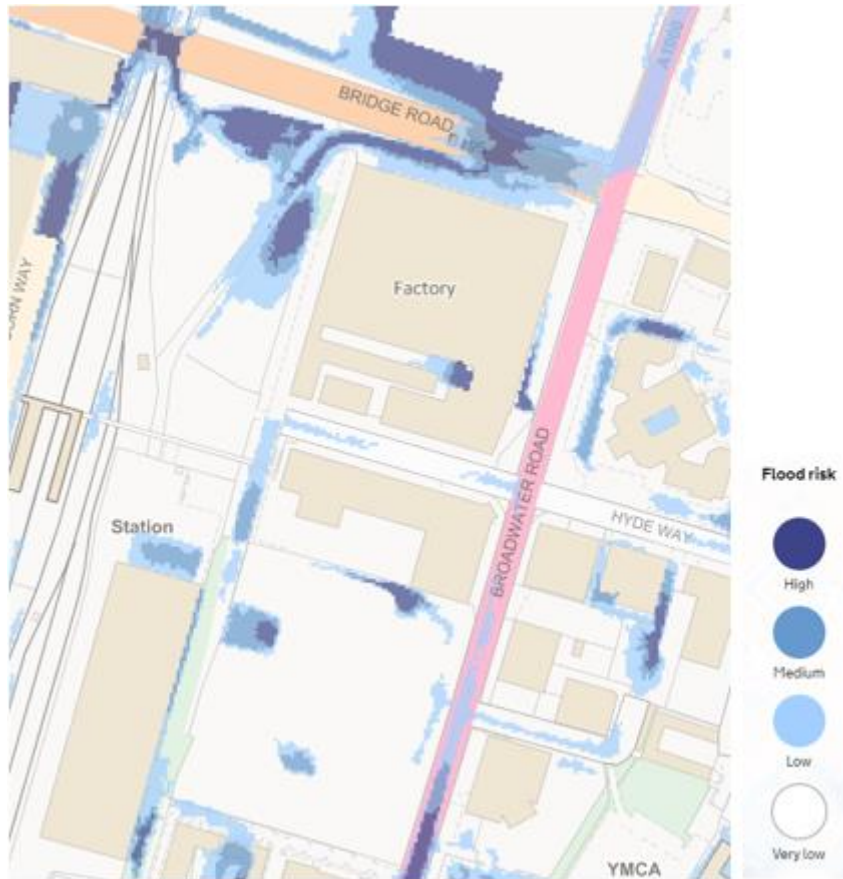


14.61 Information provided within the Envirocheck report included with the Delta-Simons Phase 1 Environmental Assessment report (Appendix 14.1) indicates that there are no licensed abstraction points from surface water within 1 km of the Site.

14.62 According to the EA flood mapping the Site is not located in a Flood Zone (Zone I, II, III) and is not at risk of flooding from rivers. Parts of the Site are predicted to be at risk of surface water flooding (Ref. 14.7).

Figure 14.9: Flood risk from surface water

<https://flood-warning-information.service.gov.uk/>

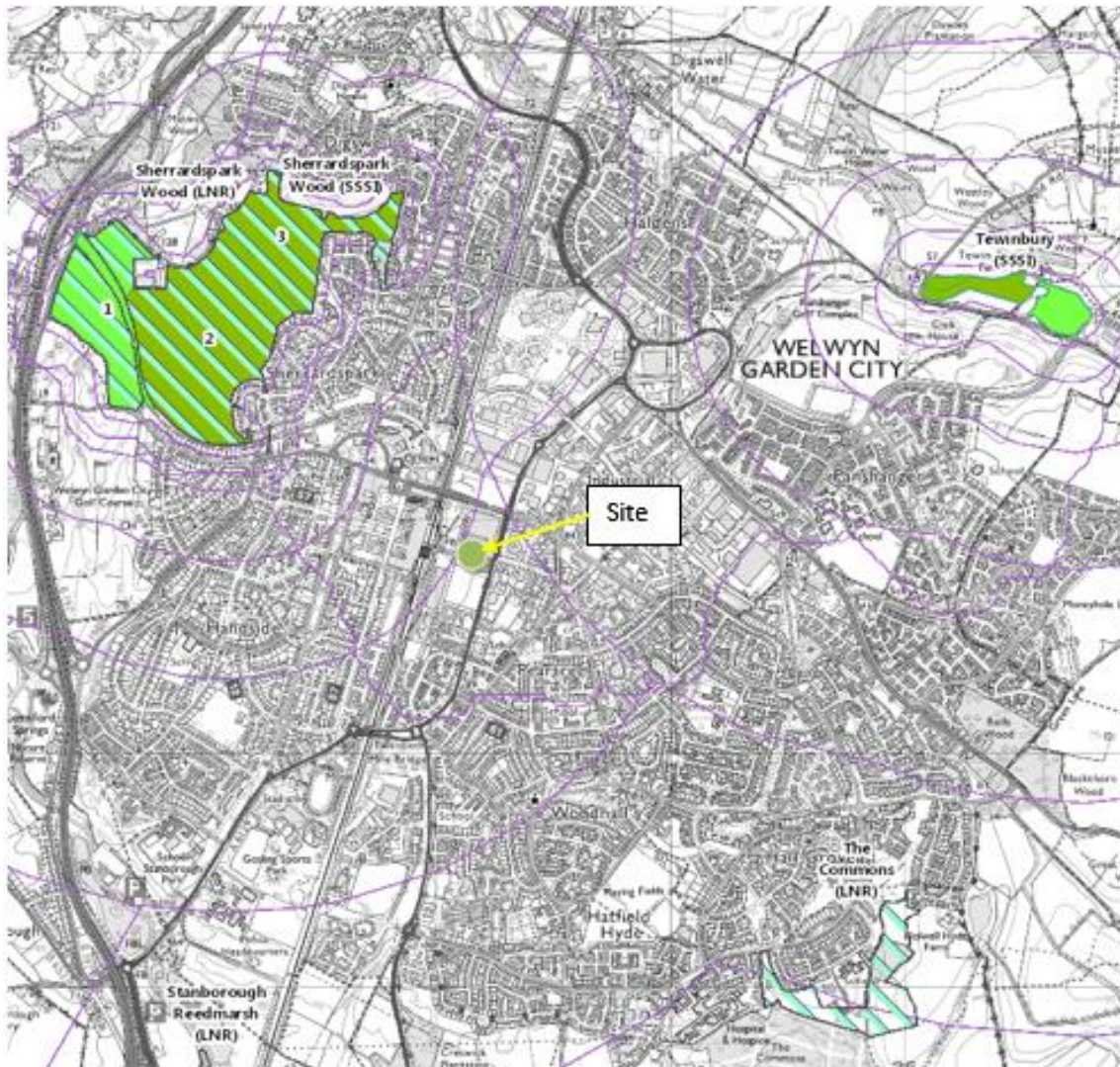


Ecological Receptors

14.63 The MAGIC website which is managed by the Department for Environment, Food and Rural Affairs (Defra), was queried (Ref. 14.8) to locate Sites of Special Scientific Interest (SSSI), Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Ramsar Sites, National Nature Reserves (NNR), Areas of Outstanding Natural Beauty (AONB), National Parks and Local Nature Reserves (LNR) within 1km of the Site. The closest designated site is the Sherrard Spark Wood SSSI, located c.940 metres to northwest of the Site (Figure 14.10).

Figure 14.10: Environmental landscape and ecological designations

<http://www.natureonthemap.naturalengland.org.uk/>



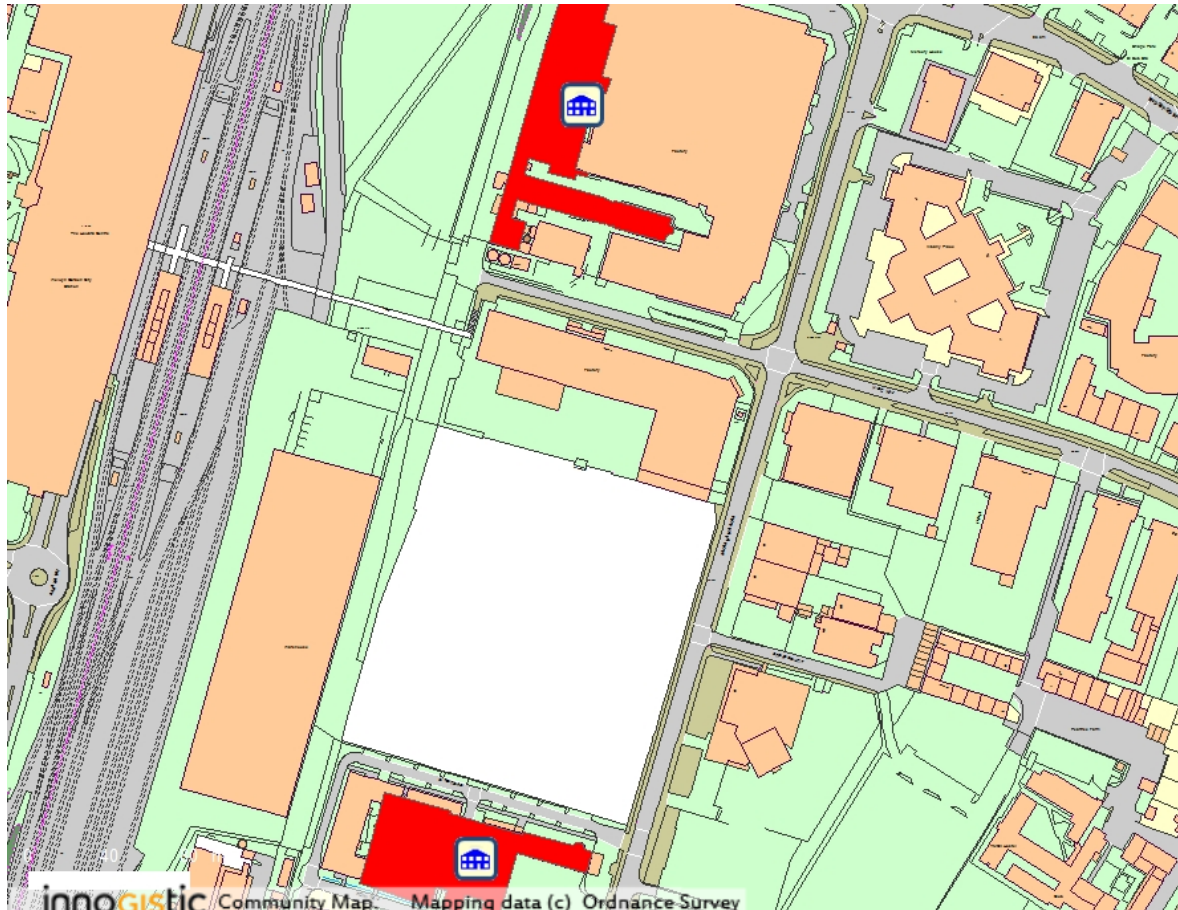
Protected Buildings

14.64 Both the MAGIC (Ref. 14.8) Historic England (Ref. 14.9) and Welwyn Hatfield Borough Council (Ref. 14.5) websites were queried to locate Scheduled Monuments, World Heritage Sites and Listed Buildings within 1km of the Site. There is one listing associated with the Site i.e. The Nabisco Shredded Wheat Factory, Reference1101084, Grade II, Legacy UID158251 (Figure 14.11).

14.65 In addition, there is a single listed property immediately adjacent to the southern boundary i.e. an Office Block (Buildings 1 to 4) To Roche Products Factory, Reference1348142, Grade II, Legacy UID158234.

Figure 14.11: Listed Buildings

<http://www.welhat.gov.uk/index.aspx?articleid=2075>



14.66 The edge of the Welwyn Garden City conservation area is located 140 metres west of the Site. There are no Tree Preservation Orders (TPOs) related to the Site.

Significance of the Environmental Setting

14.67 The significance of the environmental setting is considered by EAME to be as follows:

- **Groundwater [HIGH SENSITIVITY]** – The Site is partially located on a Secondary A Aquifer and a Secondary (Undifferentiated) Aquifer (superficial deposits) and underlain by a Principal Aquifer (bedrock). The site is in the Total Catchment (Zone 3) of an SPZ. 13.57. According to the Delta-Simons Phase 1 Environmental Assessment report (Appendix 14.1), the nearest current licensed groundwater abstraction is located approximately 1.3 km northwest of the Site and used for golf course irrigation.



- **Surface Water [LOW SENSITIVITY]** – The nearest mainline surface watercourse to the Site is the River Mimram (1.75 km north) and the River Lee (1.76 km south southwest).
- **Flood Risk [LOW SENSITIVITY]** – The site is not located in area at risk of flooding due to Rivers. Parts of the Site are predicted to be at risk of surface water flooding.
- **Ecological Sensitive Areas [LOW SENSITIVITY]** – The closest designated site is the Sherrard Spark Wood SSSI, located c.940 metres to northwest of the Site.
- **Protected Buildings and Structures [MODERATE SENSITIVITY]** – There is one listing associated with the Site i.e. The Nabisco Shredded Wheat Factory, Reference 1101084, Grade II, and one property immediately adjacent to the southern boundary i.e. Office Block (Buildings 1 to 4) To Roche Products Factory, Reference 1348142, Grade II.
- **Residential Areas [HIGH SENSITIVITY]** – With respect to residential properties the Site is in a highly sensitive area (i.e. residential receptors are currently located adjacent to the southern boundary).

Environmental Licenses and Permits

14.68 According to the Envirocheck report included within the Delta-Simons Phase 1 Environmental Assessment (Appendix 14.1), a registered landfill and waste treatment site, dated 1979, relating to a soakaway for aqueous effluent waste and industrial effluent treatment sludge is recorded on the Site associated with the former Polycell Product Ltd facility. The maximum input rate is listed as less than 10,000 tonnes per year.

14.69 The following licenses and permits are recorded in the area surrounding the Site:

- one discharge consent (expired) was located 330 m north of the Site;
- one environmental permit (former Integrated Pollution Prevention and Control permit) relating to a lead recovery process operated by British Lead Mills Ltd 190m East of the Site. The former Roche Products Ltd facility to the South of the Site was previously permitted for the manufacture and use of organic chemicals;
- the nearest former Local Authority Pollution Prevention and Control environmental permit sites relate to dry cleaners located 210m west and 260m north west and a petrol filling station 230m east of the Site;



- the nearest pollution incident to 'Controlled Waters' relates to a category 3 – Minor pollution incident associated with the release of unknown chemicals approximately 230m northeast of the Site in 1991;
- the nearest landfill to the Site is located approximately 1km south and is dated 1965. The waste types accepted are not specified. The nearest waste facility is a vehicle depollution facility located approximately 350m northeast of the Site. A former waste transfer (with treatment) facility is recorded on the Xerox site approximately 25 m north of the Site and a former waste solvent storage facility is recorded on the Roche site approximately 100 m south of the Site;
- the nearest petrol filling station is located approximately 230m east of the Site; and
- other listed facilities near the Site include: garage services, MOT testing centres, pharmaceutical manufacturers & distributors, sheet metal works and laboratories.

Principal Sources of Contamination Identified at the Site

14.70 The principal sources of contamination identified at the Site in the historical review provided in the Delta-Simons Phase 1 Environmental Assessment report (Appendix 14.1) are recorded as former above and below ground solvent and fuel tanks, Polycell liquids production area and boiler houses.

14.71 Potential off-Site sources of significant contamination are recorded as a former chemical and pharmaceutical works to the south of the Site and an engineering works and iron foundry to the north and northeast, however these are not considered by Delta-Simons to pose a significant risk to the Site.

14.72 Several phases of investigation, dating back to 1998, have been completed at the Site by Dames and Moore and Delta-Simons which have identified significant volatile organic compound (VOC) solvent contamination of the groundwater in the underlying chalk aquifer and localised soil contamination, considered to be associated with the former tank farm in the Polycell factory part of the Site (Zone S03). Detailed descriptions of the numerous phases of investigation undertaken at the Site by Dames and Moore and Delta-Simons are provided in the Delta-Simons Phase 1 Environmental Assessment report presented as Appendix 14.1. However, a summary of the main findings is provided below:

- the key contaminants were recorded to comprise 'White Spirit' characterised by a mix of light end aliphatic hydrocarbons, dichloromethane, naphthalene,

ethylbenzene and xylenes. Non-aqueous phase liquid (NAPL) free product was identified on the surface of the groundwater at a depth of approximately 22 m bgl within the chalk.

- elevated concentrations of total petroleum hydrocarbons (TPH) and volatile organic compounds (VOC) were identified within shallow made ground around the periphery of the tank farm. The contamination is considered by Delta-Simons to have been caused by leakages from the pipework associated with the tank farm, or from the USTs/AST themselves.
- elevated concentrations of TPH, semi-volatile organic compounds (SVOCs) and VOC at depth within the chalk aquifer, in the direction of the identified groundwater flow (primarily to the southeast) are considered by Delta-Simons to be associated with the free product on the surface of the groundwater, and relate to a smear zone caused by fluctuations in the height of the water table.
- groundwater monitoring undertaken by Delta-Simons prior to remediation works identified that the dissolved contamination was reaching the boundaries of the Site and investigation on the adjacent former Shredded Wheat Factory area of the Site to the north identified deep groundwater contamination in a few boreholes, which has been identified as originating from the tank farm in the Polycell factory part of the Site.
- ACMs were identified in the current and former Site buildings and fragments were identified on the Site surface around the demolished buildings in the south of the Site. Lagged pipes with asbestos warning labels were identified within below ground ducts in the south of the Site.

14.73 Widespread, or significant contamination has not been identified elsewhere at the Site by Delta Simons. However, they concluded that further site investigation will be required prior to redevelopment to confirm that the remainder of the Site is suitable for its intended use. These additional works commenced in September 2017.

14.74 Ground gas monitoring, undertaken in the Northern part of the Site, occupied by the former Shredded Wheat Factory, did not identify significantly elevated concentrations or flows of ground gases.



Remediation Works 2008 - 2013

14.75 To address the identified groundwater contamination at the Site, a long-term strategy was agreed between the land owner and the Regulators (Environment Agency and Welwyn Hatfield Borough Council (WHBC)) to undertake a voluntary remediation scheme to reduce the environmental risks and liabilities.

14.76 A remediation strategy and monitoring programme was devised following a detailed quantitative risk assessment (DQRA) completed by Delta-Simons in December 2005. The main objective was to remove the major source of contamination present at the Site, comprising the tank farm and surrounding impacted shallow soils and the free product on the groundwater at depth beneath the tank farm to prevent the continued contamination of groundwater from the source area. The secondary objective of the remediation programme was to remediate the dissolve phase groundwater contamination to the derived remedial targets, to minimise the effect on the wider groundwater environment.

14.77 The remediation scheme comprised a combination of techniques to remove the source of the contamination and address the dissolved phase contamination plume across the wider Site. These included:

- Tank pull and soil excavation – completed September/ October 2008;
- Excavation validation – completed October 2008;
- On-Site ex-situ biopile remediation – completed July 2009;
- Pump and Treat groundwater remediation/ Free product recovery – completed January 2011;
- Soil vapour extraction – completed January 2011;
- Oxygen releasing compound injection – completed early January 2011; and
- Monitored natural attenuation (MNA) – October 2008 to September 2015.

14.78 Details of the various phases of remediation undertaken at the Site are provided below. A summary is also provided in the Delta-Simons Phase 1 Environmental Assessment report included as Appendix 14.1.

Tank Pull and Soil Excavation Phase

14.79 The tank pull and soil excavation phase of the remediation works was undertaken between September and October 2008. Thirteen tanks were found to be present below a concrete surface in two separate tank farms. The Western tank farm contained five tanks of



various capacities in a relatively poor condition. Significant visible hydrocarbon contamination was noted within the base and at the sides of the tank farm. The Eastern tank farm contained eight tanks of equal capacity and of more recent construction and better condition. Visible hydrocarbon contamination was also less apparent in the base and at the sides.

14.80 The tanks were removed from the Site for recycling by a specialist sub-contractor. Prior to removal the tanks were degassed and confirmed to be free of liquid contents. Following removal, the concrete bases were broken out and removed for disposal at an appropriate facility. Surrounding impacted soils were excavated to a depth of approximately 3 m with an area of approximately 30 m by 30 m. Localised highly impacted areas were excavated to a depth of approximately 4.5 m bgl. The most significant contamination was noted around former pipework runs and the former off-set filling point.

14.81 Contaminated soils were run through an Allu screening bucket prior to being transferred to biopiles to promote bioremediation.

14.82 Following excavation of the contaminated soils to the required depth, verification sampling was carried out by Delta-Simons at the base and sides of the excavation to confirm that the source had been effectively removed. A total of 62 soil samples were collected and submitted for analysis of speciated TPH and VOC.

Excavation Verification Analysis

14.83 The excavation verification sample analysis results were compared to Site-specific remedial target values (RTVs) derived for the protection of groundwater and Human Health for the key contaminants. In addition, the results were compared to generic screening criteria for the protection of Human Health for all contaminants in the context of a proposed residential end-use (without private gardens).

14.84 None of the target contaminant concentrations were above the Site-specific remedial target values for groundwater. Exceedances of the Site-specific remedial target values for the protection of Human Health were recorded in 8 of the 62 validation samples. However, as the samples were taken from the base and sides of the excavation (at approximately 2m to 3m depth) which was subsequently backfilled to original levels, the comparison to the screening values is for information only.

Biopile Remediation Verification Analysis



14.85 Composite samples were taken by Delta-Simons from each of the six biopiles. Remedial target values protective of human health and groundwater at the Site boundary were derived using Scotland and Northern Ireland Forum for Environmental Research guidance and the Environment Agency's 'Methodology for the Derivation of Remedial Targets for Soil and Groundwater to Protect Water Resources' respectively.

14.86 The results demonstrated that concentrations of VOC and 'light end' speciated TPH typically ranged from less than the laboratory limit of detection to negligible. Slightly elevated levels of 'mid – heavy end' speciated TPH concentrations were identified, however none of the composite samples exceeded the derived values for the protection of Human Health or Groundwater.

14.87 Two composite samples were collected and submitted for waste classification (WAC) analysis. Testing confirmed that the bioremediation of the excavated soil has been successful in reducing contaminants down to concentrations which are below inert threshold limits for disposal to landfill.

Groundwater Remediation

14.88 The groundwater remediation system was installed by the remediation contractor, Eneotech Ltd and comprised a modular 'pump and treat' system including separation, aeration and activated carbon filtration.

14.89 A network of 40 No. 100mm diameter remediation wells were installed in the source area to abstract the contaminated groundwater and re-inject treated water. The remediation wells were installed to a depth of 30mbgl on a 7 to 10m grid, the majority of which were located within the footprint of the tank farm, whilst a number were placed outside this area up and down gradient of the source area.

14.90 During the remediation borehole drilling works significant VOC concentrations were recorded using field instruments throughout the boulder clay and upper chalk deposits. The decision was then taken that a Soil Vapour Extraction (SVE) module would need to be added to the remediation plant to remove product smeared through the unsaturated zone below the tank farm. The SVE module removed adsorbed and free phase solvent contamination within the vadose and smear zones. Due to the high volatility of the free product, it was calculated that 70 tonnes of hydrocarbons were removed in the gas phase. The bulk of the contamination was removed between March and November 2009, with negligible recovery from August 2010



indicating that the remediation scheme had reached steady state and further operation of the plant was no longer required.

14.91 The final stage of the groundwater remediation works comprised the injection of Oxygen Releasing Compound (ORC) into the groundwater in early 2011 to raise dissolved oxygen levels within the aquifer and promote the biodegradation of the contaminants.

Groundwater Monitoring (Monitored Natural Attenuation)

14.92 An ongoing groundwater monitoring programme was implemented by Delta-Simons to assess the effectiveness of the active remediation phase and long-term remediation through MNA based on the following schedule:

- monthly monitoring between October 2008 and March 2009;
- quarterly monitoring between June 2009 and September 2013; and
- six monthly until monitoring completion in September 2015.

14.93 Groundwater samples are collected from up to 22 monitoring wells across the Site during each monitoring visit, with samples submitted for analysis for speciated TPH, VOC and naphthalene:

- Speciated TPH – TPH contamination at the Site has significantly reduced since the remediation programme commenced in September 2008. The average concentrations show a clear declining trend in the source area and down gradient TPH concentrations;
- VOC & Naphthalene – Groundwater samples were submitted for VOC analysis comprising a suite of approximately 55 compounds, as of September 2013, 21 of these compounds remained identifiable in the groundwater at the Site. In addition, naphthalene, a semi volatile polycyclic aromatic hydrocarbon (PAH), is also included within the groundwater analysis suite. Concentrations of the identified VOC concentrations have reduced significantly over time, dissolved phase concentrations as of September 2013 were typically 90 – 99% lower than the previously identified maximum concentrations. Although the VOC results often show a large variance between each round, the overall results show an overall declining trend over time. The monitoring wells at the edge of the plume show generally low, but more variable concentrations over time with a less clear overall trend.



Remediation Findings and Conclusions (2015)

14.94 The results show that the source removal and ex-situ soil remediation have proven to be successful in removing the bulk of the soil contamination source near the Polycell tank farm and treating the contaminated soils.

14.95 The active groundwater remediation phase was successful in removing free product from the groundwater, with free product not recorded on the groundwater table from March 2010 to the reporting of the Delta-Simons Phase 1 Environmental Assessment report in December 2013. In addition, the soil vapour extraction system removed approximately 70 tonnes of volatile compounds from the soils beneath the former tank farm.

14.96 The results of the ongoing monitoring programme indicate that the groundwater remediation scheme has been effective in significantly reducing the dissolved phase hydrocarbon and VOC contamination within the source zone. It is noted however that although contamination levels within the groundwater beneath the former tank farm remain significantly elevated, the identified concentrations are below the 2005 derived remedial target values.

14.97 The results continue to show that concentrations of contaminants within the monitoring wells down hydraulic gradient of the source area are showing an overall declining trend, whereas monitoring wells to the South of the main plume show highly variable, but generally reduced concentrations.

Environmental Site Assessment Works 2017

14.98 To address one of the current planning requirements i.e. N6/2015/0294/PP – Planning Condition No. 1 (“A site investigation scheme, based on the submitted phase 1 Environmental Assessment (Delta-Simons ref 2342.17 V2) to provide information for a detailed assessment of the risk to all receptors that may be affected, including those off site”) a proposed scope of works (Appendix 14.3) was submitted to and approved by WHBC in October 2017.

14.99 The works outlined within Appendix 14.3 are currently underway and will be formally reported as results become available.



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

14.100 This section considers the potential effects of the Proposed Development, both during the construction and operational phases.

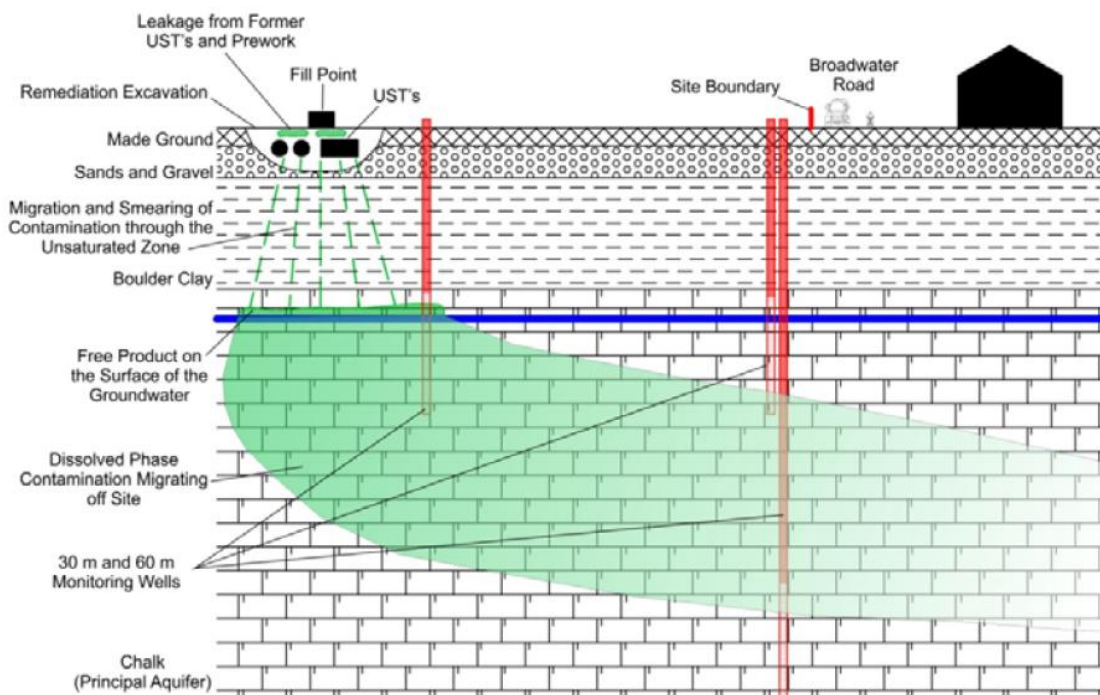
14.101 The regime for contaminated land was set out in Part 2A (ss.78A-78YC) of the *Environmental Protection Act 1990* (EPA), as inserted by S.57 of *The Environment Act 1995* and came into effect in England on the 1st April 2000 as '*The Contaminated Land (England) Regulations 2000* (SI 2000/227)'. These regulations were subsequently revoked through the provision of '*The Contaminated Land (England) Regulations 2006* (SI 2006/1380)', which came into force on 4th August 2006, and consolidated the previous regulations and amendments. The 2006 regulations were modified with the introduction of *The Contaminated Land (England) (Amendment) Regulations 2012*, which came into force on 6th April 2012. Under Part 2A of the EPA Section 78A(2), "contaminated land" is defined as "land which appears... to be in such a condition, by reason of substances in, on or under the land, that –

- significant harm is being caused or there is a significant possibility of such harm being caused; or
- pollution of controlled waters (including streams, lakes and groundwater) is being, or is likely to be caused.

14.102 Based on the above factors, an initial qualitative assessment of the presence of potential pollutant linkages can be undertaken. The results of the Qualitative Risk Assessment are outlined within Appendix 14.1 and are in-line with CIRIA guidance C552 (Ref. 14.10). The Delta-Simons Conceptual Site Model (CSM) is outlined in Figure 14.12.

Figure 14.12: Southern Site Conceptual Site Model (Delta-Simons, 2015)

Appendix 14.1 Delta-Simons Phase 1 Environmental Assessment Report



Demolition and Construction

Effects on Human Health from Ground Contamination, Vapours and Ground Gas

14.103 Earthworks would primarily involve the excavation of the basement and drainage routes, piling and the breaking up of existing structures, floor slabs and hardstanding. Whilst remediation works have been undertaken within the area of the former Polycell tank farm there is a potential for a degree of residual soil and groundwater contamination to be present and earthworks have the potential to disturb and expose demolition and construction workers to this, particularly during basement excavations. In addition, there is a potential for contamination hot spots to be present in areas of the Site not yet investigated, such as below building footprint and areas of hardstanding. Demolition and construction workers could potentially be exposed to any such contamination during earthworks.

14.104 Whilst investigations at the Site have not identified significantly elevated concentrations or flows of ground gases, it is recognised that Site investigation is incomplete in certain areas. There remains a potential for ground gas (generated from made ground soils or organic soils



beneath the Site) to accumulate in poorly ventilated confined spaces, thereby posing a risk to demolition and construction workers. In addition, previous investigation at the Site has highlighted the potential for residual contamination within the soils to generate vapour, particularly around the former Polycell tank farm, but potentially locally across the Site, which could also migrate into confined spaces, thereby posing a risk to demolition and construction workers.

14.105 ACMs have been identified at the Site in current and former Site buildings, in fragments on the Site surface and as lagging on pipes located within below ground ducts in the South of the Site. ACMs pose a potential risk to demolition and construction works and the public through inhalation pathways.

14.106 All demolition and construction workers would be subject to mandatory health and safety requirements under the Construction (Design and Management) (CDM) Regulations 2015 (SI 2015/51) and the Control of Substances Hazardous to Health (COSHH) Regulations 2002 (SI 2002/2677) (as amended). Groundworkers should be made aware of the possibility of encountering contaminated soils and asbestos in made ground through toolbox talks. Safe working procedures should be implemented, good standards of personal hygiene should be observed and appropriate levels of personal protective equipment (PPE) and respiratory protective equipment (RPE), provided and utilised, thereby minimising the risk of exposure to potentially contaminated soils, dust, ACMs, vapour, ground gas and groundwater.

14.107 A refurbishment/demolition asbestos surveys of all buildings and ducts has been carried to identify the type and extent of ACMs. Following on from any such survey, appropriate Health and Safety Plans would be developed as required to remove and dispose of asbestos in an appropriate and safe manner in-line with current Health and Safety Executive (HSE) Guidance.

14.108 Adherence to these legislative requirements would significantly reduce the health and safety risk posed to demolition and construction workers to a low level. Therefore, the likely effect would be insignificant.

14.109 In the event of exposing soils and stockpiling demolition and construction waste arisings (including excavated materials), dust could be generated during dry and windy conditions. Under these conditions, surrounding residents and the public could temporarily be exposed to potentially contaminated dust or asbestos fibres. In the absence of mitigation, the effect is likely to be temporary, local, adverse and of minor significance.



Contamination of Controlled Waters

14.110 During demolition and construction, relevant existing buildings would be demolished and areas of existing hardstanding at ground level would be broken out to accommodate the Proposed Development, allowing increased rainwater and surface run-off infiltration to the subsurface. This could potentially mobilise localised areas of contamination not identified during previous phases of Site investigation which could then migrate vertically into the underlying principal aquifer. However, it is recognised that when considered in the context of the known contamination associated with the former Polycell tank farm, the potential effects associated with unknown contamination are likely to be relatively minor.

14.111 To facilitate demolition and construction, it is anticipated that new sources of contamination would be introduced and stored on the Site in the form, for example, of diesel fuel, oils, chemicals and other construction materials. As a result, there would be a risk of leakages or spillages directly or indirectly into the ground and the underlying Principal Chalk aquifer.

14.112 Piled foundations at the Site are likely to be founded within the underlying Principal Chalk bedrock aquifer identified from depths of between 8.4 m and 16.6 m bgl, proven to a maximum depth of 30.0 m bgl. Consequently, piling has the potential to create a preferential pathway for the lateral and vertical migration of contaminants into the Principal Chalk aquifer.

14.113 Overall, the likely effects of demolition and construction on the quality of groundwater is temporary, local, adverse and of minor significance.

14.114 The closest surface water body to the Site is located approximately 320 m north of the Site. Given the distance from the Site it is not considered to be a sensitive receptor and, as such, no effect on surface water is likely.

Effects on Human Health from Ground Dissolution

14.115 Previous investigation at the Site has identified localised dissolution features. Ground dissolution occurs when water passing through rocks that are susceptible to erosion (e.g. chalk) produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits. In their Factual and Interpretative Geotechnical Report (Appendix 14.2), Delta-Simons state that unaffected existing development in the surrounding area indicates that dissolution features do not represent



a significant risk to overall land stability, but are at least likely to affect localised areas. Consequently, it is considered that ground dissolution represents a potential risk of localised subsidence/ground collapse. Subsidence/ground collapse could potentially have an effect on future demolition or construction workers in confined spaces such as excavations. Consequently, in the absence of mitigation, effects are likely to be temporary, Site-wide, adverse and of moderate significance.

Completed Development

Effects on Human Health from Ground Contamination, Vapours and Ground Gas

14.116 Much of the Proposed Development would comprise either building footprint or hardstanding surfacing (roads, pavements, etc.) which would form a barrier between occupants and users of the Site and any contamination that may be present. The current proposals also include green space (e.g. shared gardens, amenity grassland, raised bed allotments etc.) and play space. As the allotments are proposed as raised beds it is highly unlikely that any residual contaminants would be taken up by vegetables and fruit plants and ingested. Consequently, in the absence of mitigation, the potential for long-term exposure to contaminated soils by future occupants is considered possible albeit localised in nature. In the absence of mitigation, the effects of ground contamination on human health are long-term, Site-wide, adverse and of moderate significance.

14.117 Previous investigations have highlighted the potential for residual contamination within the soils at the Site to generate vapours, particularly near the former Polycell tank farm area. These vapours could potentially migrate into the basement and buildings at the Site, thereby posing a risk to future occupants, Site users/ visitors and sub-surface maintenance workers. In the absence of mitigation, the effects of vapour on human health are long-term, Site-wide, adverse and of moderate significance.

14.118 Whilst investigations at the Site to date have not identified significantly elevated concentrations or flows of ground gases, it is recognised that further investigation is required. There remains a potential for ground gas (generated from made ground soils or organic soils beneath the Site) and volatile contaminants (such as hydrocarbons) to accumulate in buildings, particularly the basement area, thereby posing a risk to future occupants and Site users through asphyxiation or explosion.



14.119 In the absence of targeted Site investigation data and mitigation measures as necessary, the risk to future occupants and Site users is long-term, Site-wide, adverse and of minor significance.

Contamination of Controlled Waters

14.120 The Proposed Development does not include land uses likely to give rise to significant contamination. Any hazardous materials kept on the Site would be stored and maintained in accordance with relevant legislation which aims to reduce contamination risks. Whilst accidental spillages cannot be ruled out (for example, from the storage of hazardous materials and/or fuel spillages, the Development would be predominantly buildings and drained hardcover which would prevent most of the rainwater and surface run-off infiltration into the ground. The drainage system would be designed to avoid the discharge of any fuels or oils that have entered the system into the underlying groundwater.

14.121 The nearest surface water course to the Site is located approximately 320 m north of the Site. The distance of the water course from the Site and the lack of significant contamination sources associated with the Development once completed is such that water quality is unlikely to be affected.

14.122 Taking the above into account, the likely effect of the Proposed Development on Controlled Waters once completed is insignificant.

Effects on Human Health and Property from Ground Dissolution

14.123 The potential for localised instability associated with ground dissolution cannot be discounted without additional Site investigation data. Instability could potentially affect the structural integrity of the Proposed Development which could subsequently have a significant effect on the human health of occupants, Site users or sub-surface maintenance workers. Consequently, in the absence of mitigation, effects are long-term, Site-wide, adverse and of moderate significance. It should be recognised, however, that as part of the site design and development works further geotechnical investigation will take place and will inform the foundation and site earthworks design which will be such that such potential ground disturbance effects can be mitigated.

Effects on Buried Structures and Services from Ground Contamination.

14.124 Buried structures and services associate with the Proposed Development would be suitably designed for the ground conditions at the Site to ensure that the integrity of the materials is maintained. This may include a requirement for sulphate resistant concrete and/or Water Regulations Advisory Scheme (WRAS) approved barrier water supply pipes (Ref. 14.14 and 14.15). Consequently, in the absence of mitigation, effects are long-term, Site-wide, adverse and of minor significance.

Effects on Vegetation from Ground Contamination

14.125 Areas of soft landscaping within the Proposed Development would contain clean imported soils. Therefore, an effective barrier would exist between any residual contamination at the Site and areas of vegetation. Consequently, in the absence of mitigation, effects are long-term, local, adverse and of minor significance.

ASSESSMENT OF CUMULATIVE EFFECTS

14.126 Cumulative schemes considered within the assessment are outlined within Table 3.1 in Chapter 3.

14.127 Effects relating to ground conditions and contamination are typically site-specific. As such, it is considered highly unlikely that any nearby committed developments have the potential to give rise to effects that could interact with those arising from the Proposed Development.

14.128 Furthermore, as with the Proposed Development, the potential for contamination and associated risks and effects would be identified by the applicants to ensure that each development would be 'suitable for use' in accordance with the requirements of Part IIA of the Environmental Protection Act, 1990 and associated planning conditions. All demolition and construction activities would also be controlled and managed via the implementation of both relevant legislative requirements and best practice guidance to minimise contamination risks and effects to the environment to acceptable levels. The likely demolition and construction related cumulative ground conditions and contamination effects would therefore be insignificant.



ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Demolition and Construction

Effects on Human Health from Ground Contamination, Vapours and Ground Gas

14.129 It is expected that further intrusive Site investigation of the shallow soils and groundwater, including ground gas and soil vapour monitoring, will be required to confirm that the Site is suitable for the proposed end use and that there would be no unacceptable risk posed to sensitive receptors (human health effects). These works commenced in September 2017. The scope and extent of the investigation has been agreed in consultation with WHBC. The Site investigation would identify the requirement for any further remediation of the Site. If required, an appropriate remediation strategy would be prepared and agreed in consultation with WHBC. Implementation of any remediation strategy would be followed by a process of validation.

14.130 During demolition and construction, a Construction Environmental Management Plan (CEMP) would be implemented which would include the following precautions to minimise the exposure of Site workers and the public to potentially harmful substances:

- adherence to the Control of Substances Hazardous to Health Regulations 2002 (as amended) and the Construction Design and Management Regulations 2015;
- adherence to current best practice standards for working on contaminated sites such as CIRIA C132 (Ref. 14.12) and HSE HS(G)66 (Ref. 14.13);
- the requirement for all Site workers to wear and utilise appropriate and well maintained Personal Protective Equipment (PPE) and, where necessary Respiratory Protective Equipment (RPE);
- the provision of adequate welfare facilities and procedures to enable Site workers to wash and change;
- the erection of appropriate hoardings around the works;
- the use of dust suppression techniques;
- the provision of wheel washing facilities for vehicles leaving the Site;
- the regular cleaning of Site access roads;
- the avoidance of stockpiling any contaminated materials but where this is not possible, the covering of stockpiled material on the Site and of materials being transported to and from the Site;



- removal of all excavated material in line with relevant legislation. For example, any excavated material to be removed off-Site, would be subject to chemical testing and a hazard assessment. Waste Acceptance Criteria (WAC) tests would be carried out, as necessary to classify the waste. Waste would need to be transported, treated and disposed of in accordance with The Waste (England and Wales) Regulations 2011.

14.131 WAC testing would be required to confirm the disposal classification prior to disposal. Any Made Ground would likely be classified as either 'hazardous' or 'non-hazardous'. The natural soils would be expected to be classified as inert.

14.132 Following the classification of excavation wastes, the options available for the waste would be considered in the context of the waste hierarchy:

- On-site reuse (with or without prior treatment);
- Off-site reuse (with or without prior treatment), e.g. use of waste in construction at a site exempt from the requirement to hold an environmental permit; and
- Off-site disposal (with or without prior treatment), i.e. landfill.

14.133 All waste transfer documentation shall be maintained by the Principal Contractor for the required statutory period (i.e. two years for general waste and three years for hazardous waste).

14.134 Following completion of the current Site investigation, remediation and validation as required and adherence to a CEMP, the risk of harm to human health during demolition and construction works from ground contamination would be very low. Therefore, the likely residual effect on human health during the demolition and construction works would be minor beneficial.

Contamination of Controlled Waters

14.135 It is expected that further intrusive Site investigation of the shallow soils and groundwater, including ground gas and soil vapour monitoring, will be required to confirm that the Site is suitable for the proposed end use and that there would be no unacceptable risk posed to sensitive receptors (controlled water effects). These works commenced in September 2017. The scope and extent of the investigation has been agreed in consultation with WHBC. The Site investigation would identify the requirement for any further remediation of the Site. If required, an appropriate remediation strategy would be prepared and agreed in consultation with WHBC. Implementation of any remediation strategy would be followed by a process of validation.



14.136 A Foundation Works Risk Assessment (FWRA) should be prepared in consultation with the Environment Agency (Ref. 14.11) to minimise contamination risks to the underlying Principal Aquifer within the Chalk bedrock.

14.137 The following measures would be included within the CEMP and implemented to minimise the potential risk to Controlled Waters during demolition and construction:

- the provision of adequate drainage to manage surface water run-off and minimise contaminated water reaching the ground;
- the handling and storage of any potential hazardous liquids / materials in accordance with relevant legislation and Environment Agency Pollution Prevention Guidance (PPG) (withdrawn but still representing good practice);
- the use of appropriately tanked and bunded storage areas for fuels, oils and other chemicals; and
- procedures for the management of materials, spillage and spill clean-up, use of best practice construction methods and monitoring.

14.138 All site works will be undertaken in accordance with the EA's Pollution Prevention Guidance Note PPG6 Working at Construction and Demolition Sites (now withdrawn). Construction vehicles will be properly maintained to reduce the risk of hydrocarbon contamination and will only be active when required. Construction materials will be stored, handled and managed to reduce the risk of accidental spillage or release. Construction contractors will also take full account of the requirements of the EA's General Guide to Understanding Your Environmental Responsibilities - Good Environmental Practices (PPG1) (now withdrawn) and guidance set out in PPG2 (Above Ground Oil Storage Tanks) (now withdrawn).

14.139 No underground storage tanks will be used during the construction phase. Any liquids such as degreasers, oils or diesel required as part of the construction works will be stored in above ground tanks and located on designated areas of hardstanding. In accordance with the Control of Pollution (Oil Storage) (England) Regulations 2001, any tanks storing more than 200 litres of oil will have secondary bunding. Bunding will be specified having a minimum capacity of 'not less than 110% of the container's storage capacity or, if there is more than one container within the system, of not less than 110% of the largest container's storage capacity or 25% of their aggregate storage capacity, whichever is the greater'.

14.140 During construction, dewatering of groundwater from excavations is possible. Should dewatering be necessary, care will be taken to ensure the quality of this water is sufficiently high



to allow discharge into the municipal sewer. Prior to the construction phase, discussions will be held with the local water company to ascertain if such disposal would be possible. Alternatively, if the quality of the groundwater is unsuitable for discharge to sewer, collection and off-site disposal to a suitably licensed waste facility will be undertaken.

14.141 Following the completion of the ongoing programme of remediation, a degree of residual contamination is expected to remain within the groundwater. However, contaminant concentrations would be compliant with agreed remedial target values (RTVs). Establishment of an appropriate piling methodology and implementation and adherence to a CEMP would ensure that the introduction of new contaminant sources is minimised as far as possible and consequently the likely residual effect on the quality of the groundwater as a result of the demolition and construction phase is considered to be minor beneficial.

Effects on Human Health from Ground Dissolution Features

14.142 As stated above, further intrusive site investigation will be required to confirm that the Site is suitable for its proposed use. Future site investigation would include coverage of previously un-investigated areas and would include investigation of potential dissolution features at proposed building/pile locations. Where potential dissolution features are identified, design and construction mitigation and/or remediation would be implemented as necessary to ensure that risks to future demolition and construction personnel are minimised. As such, the likely residual effects of ground dissolution on future demolition and construction personnel are insignificant.

Completed Development

Effects on Human Health from Ground Contamination, Vapour and Ground Gas

14.143 Whilst several phases of site investigation have been previously undertaken at the Site, further intrusive site investigation (currently underway) would be carried out at the Site to identify potential human health risks in relation to any residual contamination present in the shallow soils. Where deemed necessary, a scheme of remediation would be designed and undertaken during the demolition and construction phase to ensure that the Site is suitable for its intended use. This may include the provision of imported, clean subsoils and topsoils to landscaping and public open spaces to act as a barrier between future Site users and any residual contamination. Should ground gas and soils vapour monitoring identify elevated concentrations of gas or vapour, appropriate protection measures (i.e. ventilation, damp proof membrane,



hydrocarbon/solvent vapour barriers) would be incorporated into future building and basement design.

14.144 Taking the above into account, the likely residual effect of ground contamination on future occupants, Site visitors and sub-surface maintenance workers would be insignificant.

Contamination of Controlled Waters

14.145 No specific mitigation measures are required. The likely residual effects of the Development on Controlled Waters once completed are insignificant.

Effects on Human Health and Property from Ground Dissolution

14.146 To reduce potential risks associated with ground dissolution at the Site, future site investigation would provide coverage of previously un-investigated areas and further investigate potential dissolution features at proposed building/pile locations. In addition, pile design would consider the presence of potential dissolution features, which may include design and construction mitigations, spanning affected areas following discovery and capping, pre-pile probing, grouting, and use of different factors of safety and engineering redundancy.

14.147 Taking the above mitigation into consideration it is considered that risks associated with ground dissolution would be mitigated as far as practicable and consequently the likely residual effect on future occupants, Site visitors and sub-surface maintenance workers would be insignificant.

Effects Buried Structures and Services from Ground Contamination.

14.148 No mitigation measures are required. The residual effects of the Proposed Development on buried structures and services once completed are insignificant.

Likely Effects to Vegetation from Ground Contamination

14.149 No mitigation measures are required. The residual effect of the Proposed Development on vegetation once completed is insignificant.



SUMMARY

14.150 An assessment of ground conditions and contamination has been undertaken using the findings of a desk-based study and intrusive site investigation undertaken at the Site over many years.

14.151 The site investigation identified significant contamination of the groundwater underlying the Site and localised soil contamination around the former Polycell Factory (now demolished). Remediation measures were therefore used to address this former source of contamination and groundwater testing has established that levels of contamination have significantly decreased within groundwater as a result. Widespread, or significant contamination has not been identified elsewhere within the Site, however site investigation has not been completed across the entire Site. Further site investigation works commenced in September 2017.

14.152 Further site investigation would be undertaken to determine and quantify the nature and extent of any other contamination present at the Site. If it is established that further remediation is required, a Remediation Strategy would be developed and agreed with the relevant statutory authorities, including WHBC and the Environment Agency, and be implemented during the early stages of the demolition and construction programme.

14.153 A Foundation Works Risk Assessment (FWRA) should be prepared in consultation with the Environment Agency to establish the appropriate piling methodology to minimise further groundwater contamination. In addition, several measures for good site management have been recommended to minimise exposure of workers and the public to potentially harmful substances during demolition and construction.

14.154 In addition to any specific remediation measures, the provision of building footprint and hardstanding across most of the Site and the provision of clean topsoil in areas of soft landscaping would result in a very low risk of harm to human health and the wider environment following completion of the Proposed Development.

14.155 The overall effect of the scheme is generally positive and will bring about effective land remediation and prevent further leaching/mobilisation of residual soil and groundwater contamination.



Table 14.4: Soils, Geology and Contaminated Land Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Demolition & Construction Effects on human health from ground contamination, vapours and ground gas	Temporary Local	Minor Adverse	Site investigation and remediation Construction Environmental Management Plan	Minor beneficial
Demolition & Construction Contamination of controlled waters (principal aquifer)	Temporary Local	Minor Adverse	Site investigation and remediation Construction Environmental Management Plan Foundation Works Risk Assessment	Minor beneficial
Demolition & Construction Effects on human health and property from ground dissolution	Temporary Site-wide	Moderate Adverse	Site investigation and remedial action Risk assessment	Negligible
Completed development Effects on human health from ground contamination, vapours and ground gas	Permanent Site-wide	Moderate Adverse	Site investigation and remediation Use of engineering design (barriers and clean break layers)	Negligible
Completed development Contamination of controlled waters (principal aquifer)	Permanent Site-wide	Insignificant	No specific mitigation measures are required	Negligible
Completed development Effects on human health and property from ground dissolution	Permanent Site-wide	Moderate Adverse	Site investigation Risk assessment Engineering measures (capping, pre-pile probing, grouting, and use of different factors of safety and engineering redundancy)	Negligible



Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Completed development Effects on Buried Structures and Services from Ground Contamination	Permanent Site-wide	Minor Adverse	Site investigation and remediation Selection of appropriate construction materials	Negligible
Completed development Effects on Vegetation from Ground Contamination	Permanent Site-wide	Minor Adverse	Site investigation and remediation Use of engineering design (barriers and clean break layers)	Negligible



GLOSSARY OF TERMS

ACM	Asbestos Containing Material
AOD	Above Ordnance Datum
AONB	Areas of Outstanding Natural Beauty
AST	Above-ground Storage Tank
BGS	British Geological Society
BRE	Building Research Establishment
CDM	Construction Design and Management
COMAH	Control of Major Accident Hazards
COSHH	Control of Substances Hazardous to Health
CEMP	Construction Environmental Management Plan
CIRIA	Construction Industry Research and Information Association
CLR	Contaminated Land Report
CSM	Conceptual Site Model
DEFRA	Department for the Environment, Food and Rural Affairs
DQRA	Detailed Quantitative Risk Assessment
EA	Environment Agency
EAME	Earth & Marine Environmental Limited
EIA	Environmental Impact Assessment
EPR	Environmental Permitting Regulations
EPA	Environmental Protection Act
FWRA	Foundation Works Risk Assessment



FRA	Flood Risk Assessment
HSE	Health and Safety Executive
IBC	Intermediate Bulk Container
IPPC	Integrated Pollution Prevention and Control
LNR	Local Nature Reserve
MNA	Monitored natural attenuation
NAPL	Non-aqueous phase liquid
NBN	National Biodiversity Network
NGR	National Grid Reference
NNR	National Nature Reserve
NPPF	National Planning Policy Framework
NVZ	Nitrate Vulnerable Zone
ORC	Oxygen Releasing Compound
PACM	Potential Asbestos Containing Material
PAH	Polycyclic aromatic hydrocarbon
PHE	Public Health England
PPC	Pollution Prevention and Control
PPE	Personal Protective Equipment
PPG	Pollution Prevention Guidance
PPS	Planning Policy Statement
QRA	quantitative risk assessment
RPE	Respiratory Protective Equipment



RTV	Remedial Target Value
SAC	Special Areas of Conservation
SNCI	Site of Nature Conservation Importance
SPA	Special Protection Areas
SPZ	Source Protection Zone
SSSI	Sites of Special Scientific Interest
SVE	Soil Vapour Extraction
SVOC	Semi-Volatile Organic Compound
TPH	Total Petroleum Hydrocarbons
TPO	Tree Preservation Order
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WAC	Waste Acceptance Criteria
WFD	Water Framework Directive
WHBC	Welwyn Hatfield Borough Council
WML	Waste Management Licence

REFERENCES

Ref. 14.1: Environment Agency (2004), Model Procedures for the Management of Land Contamination, CLR 11, September 2004.

Ref. 14.2: Department for Environment, Food and Rural Affairs (DEFRA) (2012), Environmental Protection Act 1990: Part 2A Contaminated Land Statutory Guidance, April 2012.

Ref. 14.3: Department for Communities and Local Government (2012), National Planning Policy Framework (NPPF), March 2012.

Ref 14.4: Coal Authority (2017). Interactive Viewer. [online] Available at: <http://mapapps2.bgs.ac.uk/coalauthority/home.html> [Accessed: 23 November 2017].

Ref. 14.5: Welwyn Hatfield Borough Council (2017). Local map and information search. [online] Available at: <http://www.welhat.gov.uk/map> [Accessed: 23 November 2017].

Ref. 14.6: Public Health England (2017). UK maps of radon. [online] Available at: <http://www.ukradon.org/information/ukmaps> [Accessed: 23 November 2017].

Ref. 14.7: Environment Agency (2017). Flood map for planning. [online] Available at: <https://flood-map-for-planning.service.gov.uk/> [Accessed: 23 November 2017].

Ref. 14.8: Natural England (2017). MAGIC. [online] Available at: <http://www.natureonthemap.naturalengland.org.uk/> [Accessed: 23 November 2017].

Ref. 14.9: Historic England (2017). Map Search. [online] Available at: <https://historicengland.org.uk/listing/the-list/map-search?clearresults=true> [Accessed: 23 November 2017].

Ref. 14.10: Construction Industry Research and Information Association (CIRIA) (2001), CIRIA report C552, Contaminated Land Risk Assessment – A Guide to Good Practice

Ref. 14.11: Environment Agency (2001), Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention National Groundwater & Contaminated Land Centre report NC/99/73, F J Westcott, C M B Lean & M L Cunningham, May 2001.

Ref. 14.12: Construction Industry Research and Information Association (CIRIA) (1996), CIRIA report C132, A Guide for Safe Working on Contaminated Sites.

Ref. 14.13: Health and Safety Executive (HSE) (1991), HS(G)66 Protection of Workers and the General Public during Development of Contaminated Land.



Ref 14.14: UK Water Industry Research (2011). Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites, Ref 10/WM/03/21, January 2011.

Ref. 14.15: Water Regulations Advisory Scheme (2002). Information and Guidance Note 9-04-03. Laying Pipes in Contaminated Land. 2002.



15 CULTURAL HERITAGE

INTRODUCTION

15.1 This Chapter presents an assessment of the likely significant effects of the Proposed Development on built heritage assets.

15.2 This Chapter provides a description of the methods used in the assessment, followed by a description of the relevant baseline conditions of the Site and surrounding area. An assessment of the likely significant effects of the Development during the demolition and construction works and once the Proposed Development is completed and operational is then presented. Mitigation measures are identified where appropriate, to avoid, reduce or offset any adverse effects identified, together with an assessment of the significance of likely residual effects.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Assessment Methodology

15.3 This assessment follows best practice guidance produced by Historic England and policy contained in Section 12 of the National Planning Policy Framework (NPPF), Conserving and Enhancing the Historic Environment.

15.4 A Heritage Statement has been produced by KM Heritage to support the planning application. This demonstrated in policy terms the acceptability and merits of the Proposed Development in terms of the refurbishment and change of use of the Grade II Listed former Shredded Wheat Factory and the effect that the Development would have on off Site designated heritage assets. The assessment of the setting of Hatfield House was also informed by the visual assessment of the view towards the Site from Hatfield House undertaken as part of the townscape and visual assessment.

15.5 This assessment was informed by the baseline information and the evaluation of heritage assets contained within the Heritage Statement. The Heritage Statement can be found in **Appendix 15.1**.

15.6 The assessment of the significance of effects of the Proposed Development on heritage assets involved a three stage process:

- The identification of the value of the heritage asset;
- The identification of the magnitude of change (i.e. effect) to the heritage asset resulting from the Development; and
- The identification of the level of significance of the effect

15.7 The Heritage Statement sets out a detailed discussion on the historic development of the Site, the character, appearance and interest of the Grade II listed former Shredded Wheat Factory and presents a qualitative appraisal of the heritage value of the structures.

15.8 The appraisal of the heritage value is referred to as heritage significance in the Heritage Statement. The NPPF refers to the determination of the 'significance' of the heritage assets, meaning the importance or value of an asset. However, in the context of an EIA, the term 'significance' is used in relation to likely environmental effects. Therefore, to avoid confusion, when referring to the NPPF context in this Chapter, the term 'value' (rather than significance) is used to describe heritage assets.

Determining Heritage Value

15.9 The intrinsic value of each heritage asset can be defined as the sum of tangible and intangible values which make it important to society. This may consider age, aesthetic and the fabric of an asset as well as intangible qualities such as associations with historic people or events.

15.10 The appraisal of the heritage value of the various phases of the Grade II listed former Shredded Wheat Factory set out in the Heritage Statement was determined by KMHeritage in accordance with guidance from Historic England's 'Conservation Principles, Policies and Guidance' (2008). This recommends making separate assessments under the following categories of heritage value:

- Evidential Value: "Evidential value derives from the potential of a place to yield evidence about past human activity". The NPPF refers to this as archaeological interest.
- Aesthetic Value: "Aesthetic value derives from the ways in which people draw sensory and intellectual stimulation from a place". The NPPF refers to this as architectural and artistic interest.
- Historic Value: "Historical value derives from the ways in which past people, events and aspects of life can be connected through a place to the present".



- Communal Value: “Communal value derives from the meanings of a place for the peoples who relate to it, or for whom it figures in their collective experience or memory”.

15.11 The criteria for establishing the value of the heritage assets for each category are set out in Table 15.1

Value	Criteria Description
High	A feature, space or theme which is of importance at national or international level. These will tend to have a high cultural value and form a valuable element of a building or site.
Medium	A feature, space or theme which is important at a regional or national level. These will tend to have some cultural merit and form a valuable part of a building or site.
Low	A feature, space or theme which is of local or regional heritage value.
Negligible	A feature, space or theme which has no heritage value.

15.12 The heritage value of the heritage assets outside of the Site were determined based on the level of statutory designation of each asset which also accords with the description of heritage values in Table 15.1.

Determining magnitude of Change

15.13 The criteria for assessing the magnitude of change are set out in Table 15.2

Magnitude of Change	Description
Major	<p>The Proposed Development would cause a large change to existing conditions. Where this is beneficial this would mean significant improvement in the overall setting and character of heritage assets or revealing and/or enhancing important characteristics which were previously unknown or inaccessible.</p> <p>Where this is adverse this would mean significant damage to the overall setting and/or character of heritage assets. There would be a notable disruption to, or in some cases, complete destruction of, important features.</p>

Moderate	<p>The Proposed Development would cause a noticeable change to existing conditions. Where this is beneficial this would mean considerable improvement in the setting or overall character (eg. The creation of coherency) of the heritage asset.</p> <p>Where this is adverse this would mean negative alteration of the setting or overall character of the heritage asset, disturbing key features and detracting from the overall heritage value.</p>
Minor	<p>The Proposed Development would cause a small change to existing conditions. Where this is beneficial this would mean minor improvement to the setting or overall character of a heritage asset.</p> <p>Where this is adverse this would mean minor detracting to the setting or overall character of a heritage asset. Change of this magnitude may be acceptable if suitable mitigation is carried out.</p>
Negligible	<p>The Proposed Development would cause no discernible change to existing conditions.</p>

Significance Criteria

15.14 The significance of likely effects was determined by considering the combination of the value of the heritage assets and the predicted magnitude of the change to the baseline conditions resulting from the Development. To consider these in combination a matrix of significance was used to provide a transparent and objective assessment, as shown in Table 15.3

Value of Asset	Magnitude Of Change			
	Major	Moderate	Minor	Negligible
High	Substantial Significance	Substantial Significance	Moderate Significance	Insignificant
Medium	Moderate Significance	Moderate Significance	Minor Significance	Insignificant
Low	Moderate Significance	Minor Significance	Minor Significance	Insignificant
Negligible	Insignificant	Insignificant	Insignificant	Insignificant



Assumptions and Limitations

15.15 The existing conditions with respect to built heritage are presented within this Chapter as the baseline conditions. The baseline conditions presented are representative of future conditions in the absence of the Proposed Development (i.e. if the Proposed Development did not proceed) taking into consideration the extent of demolition recently permitted.



BASELINE CONDITIONS

Overview of Heritage Assets within the Site and Surrounding Area

15.16 Within the site is the Grade II listed former Shredded Wheat Factory, recognised to be of national importance and of special architectural and historic interest. The Shredded Wheat Factory complex was developed piecemeal through the middle of the 20th Century. The original part of the factory complex, built between 1924 and 1926, remains largely 'as built', including the main factory, boiler house and silos.

15.17 The original 1920s factory was, until recently, largely enclosed in views from Broadwater Road and Bridge Road by additions to the complex in the 1930s and 1950s. These have now been demolished.

15.18 Apart from the Grade II listed former Shredded Wheat Factory there are no heritage assets within the Site.

15.19 Adjacent to the south of the site is the Grade II listed former office block of the Roche Factory, a building that was constructed in the late 1930s. The southern part of the site nearest to the former Roche Products Factory Office building is currently vacant and derelict.

15.20 Further afield is the Grade I listed Hatfield House (along with its gardens, a Registered Park and Garden) located approximately 4.2km south of the site.

15.21 The Site is not located within a Conservation Area, however the Welwyn Garden City Conservation Area, covering the town centre, is located to the west of the Site beyond the East Coast Mainline railway lines and sidings and Howard Centre Mall.

Grade II Listed Former Shredded Wheat Factory

15.22 The full list description for the complex reads as follows:

"1925. Architect Louis de Soissons. Two concrete ranges, at right angles with links. Southern range consists of giant range of cylindrical concrete drums 15 bays long with flat oversailing capping with railings right over the whole top. Behind this is a plain attic storey with 28 plain windows with plain capping over. On one end elevation is a 3 bay projecting tower rising just above the main roof level.

At the west end of the range is a 2 bay wing with large windows, the southern bay of



3 storeys and the northern bay of 4. Adjacent is a 7 bay, 4 storey block, with large windows divided by narrow piers and small scale structural divisions between the storeys, making it almost wholly glass. Flat oversailing capping at roof level.”

15.23 Work began on the original three-storey Production Hall block fronting the railway line of the Shredded Wheat Factory in May 1924. The factory was built by the flat-slab construction method and was one of the first buildings where this technique was used. The Shredded Wheat Factory became almost a symbol of Welwyn Garden City, being one of the first new factories built there in a modern style – a dramatic contrast to the neo-Georgian used for the design of housing and civic buildings elsewhere in Welwyn Garden City.

15.24 The new factory began production in 1926. The design of the Shredded Wheat Factory was so unashamedly modern (especially with the white concrete silos) that it was perhaps the most avant-garde building in Britain at the time of its completion in 1925. The influence of American design at the factory was clear. The mammoth reinforced concrete elevators or silos were first built in Buffalo (the home of Shredded Wheat) in 1906.

15.25 Extensions took place to the factory between 1937 and 1939. These included a new single storey production hall fixed to the east of the multi-storey original production hall and an increase in the number of silos from 18 to 45. The new silos, whilst at first glance appearing to be fully integrated to the original ones are actually separate, independent, structures that simply ‘butt up against’ the originals. A conveyor system was also introduced. In 1937 a penthouse was added to the top of the main building in reinforced concrete.

15.26 Another extension in 1957 improved production and increased administrative facilities. The factory was extended again in 1959 and these extensions covered the whole site with buildings and obscured the silos from the view of the road that passes the factory.

15.27 In 1960 the company bought a further 5.5 acres and Cromac House was built for the research, sales development and warehousing departments. In the early 1960s renovations to the west elevation of the original factory building involving the addition of Seaporcel panels (green) were completed.

15.28 Production at the Site stopped in 2008 and since then the factory complex has been shut. Some of the original process flows for the production of Shredded Wheat and other products may be discerned in the existing layout, but essentially the northern half of the complex became derelict. The southern half is a cleared site. The northern part of the Site today



comprised the accumulation of the three main phases of development, with the majority of the land filled with buildings. Much of the original factory was hidden behind the later, less interesting buildings, including the 1930s production hall and the 1950s range of administrative offices along Bridge Road although these have now been demolished.

APPRAISAL OF HERITAGE VALUE

Grade II Listed Former Shredded Wheat Factory – 1920s Built Elements

Evidential Value: Low

15.29 This Site is not in a designated area, it is therefore unlikely that there will be any evidence of past human activity worthy of expert investigation lying below the site. However, we believe that the former Shredded Wheat factory has low evidential value.

Aesthetic Value: High

15.30 The original part of the Factory complex, designed by Louis de Soissons and built between 1924 and 1926 remains largely as built, including the main factory, boiler house, and first 18 wheat elevators (silos). Architecturally this element of the complex is regarded as being of the highest value for the following reasons:

- Designed by an architect of note, and particularly associated with Welwyn Garden City, Louis de Soissons showed with this factory, that he could design in the Moderne as well as neo-Georgian styles.
- Most of the original 1920s buildings remain largely complete, including details such as staircases, railings and the silo 'shoots'.
- The factory was built using a pioneering flat-slab construction method with American clients such as Shredded Wheat and Wrigley being the first to accept and use it in Britain from the mid 1920s.
- The architecture and materials reflected the clean and hygienic principles of the Shredded Wheat Company – regarded at the time as a 'model factory'. The sense of bright, light and airy spaces remains today within the original factory building.
- The monumental nature and form of the first 18 silos made these an instant landmark and required an innovative construction approach by Peter Lind & Co.



15.31 By virtue of the architectural style, the internal finishes, where these remain, are utilitarian and simple. As all of the buildings have been stripped of their content and machinery, where elements, such as the staircases, do remain these are of value as evidence of the former use of the buildings however their interest is lessened by their 'unconnected' nature.

Historic Value: High

15.32 As one of the first factories to be built in Welwyn Garden City, the former Shredded Wheat factory is historically important. The original 1924 to 1926 factory complex is of especially high importance historically for the following reasons:

- The factory was one of the first to be built in the newly designated 'industrial zone' in Welwyn Garden City.
- As well as locational benefits, Welwyn was chosen because the principles of the Garden City Movement matched those of the Shredded Wheat Company. The Company believed that food should be produced in an environment that was 'clean, healthy and pleasant' and it was felt that the new Garden City conformed to these ideals.
- The factory was built of historically pioneering construction methods as previously mentioned.

Communal Value: High

15.33 The Shredded Wheat factory complex has played a significant part in the physical and employment life of Welwyn Garden City since its inception in the 1920s. This significance is derived from a number of key factors:

- The Shredded Wheat factory was one of the first factories, and therefore large scale employers in the newly created Welwyn Garden City.
- Built in a new and 'avant-garde' architectural style, deemed so 'modern' that the factory appeared on cereal packets, delivery vans and printed publicity.
- The company encouraged staff to live healthily in a healthy environment, hence the original provision for open space and gardens around the factory. This was not lost totally until the 1950s.
- The silos are a local landmark visible for many miles.



- The factory complex has been part of the architectural landscape of Welwyn Garden City for nearly 90 years, located as it is, directly next to one of the principal link routes from East to West across the railway and next to the station.

15.34 Overall it is considered that the original 1920s built elements of the Grade II listed former Shredded Wheat Factory are of **high heritage value**.

Grade II Listed former Roche Products Factory Office Building

15.35 The Grade II Listed former office block to the Roche Products Factory was constructed in the late 1930s. The Roche Products Factory itself is now demolished and new residential development now surrounds the building to the West and South. To the North is the Southern part of the Site which is vacant and derelict. The building is considered to be of **high heritage value**.

Grade I Listed Hatfield House and Garden

15.36 Hatfield House is a country house set in a large park, known as the Great Park, on the eastern side of Hatfield, approximately 4.2km South of the Site. Hatfield House was built in 1611 by Robert Cecil, First Earl of Salisbury and Chief Minister to King James I and it is a prime example of Jacobean architecture. Hatfield House and Garden is considered to be of **high heritage value**.

Welwyn Garden City Conservation Area

15.37 The Welwyn Garden City Conservation Area was first designated in 1968 (with subsequent minor additions. The conservation area covers the main part of the Garden City to the east of the Mainline railway line which incorporates the main shopping centre and the important civic, cultural, leisure and community facilities as well as housing that formed part of the original plan. Even though the conservation area designation is only a local designation, the importance of Welwyn Garden City regionally and maybe nationally means that it is considered be of **medium heritage value**.

Summary of Heritage Value

15.38 The following table presents a summary of the value of heritage assets.

Heritage		Heritage	Value		
	Overall	Evidential	Aesthetic	Historic	Communal
Former Shredded Wheat Factory	High	Low	High	High	High
Roche Products Factory Office Building	High				
Welwyn Garden City Conservation Area	Medium				
Hatfield House	High				

LEGISLATION, PLANNING POLICY AND GUIDANCE

15.39 The legislation governing listed buildings and conservation areas is the Planning (Listed Buildings and Conservation Areas) Act 1990. In 2012, the Government published the National Planning Policy Framework (NPPF).

15.40 The NPPF says at Paragraph 128 that:

15.41 In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance.

15.42 A description and analysis of the heritage significance of the site is provided earlier in this report with a more detailed version found in the Heritage Statement.

15.43 The NPPF also requires local planning authorities to 'identify and assess the particular significance of any heritage asset that may be affected by a proposal (including by development



affecting the setting of a heritage asset) taking account of the available evidence and any necessary expertise. They should take this assessment into account when considering the impact of a proposal on a heritage asset, to avoid or minimise conflict between the heritage asset's conservation and any aspect of the proposal'.

15.44 At Paragraph 131, the NPPF says that:

In determining planning applications, local planning authorities should take account of:

- The desirability of sustaining and enhancing the significance of heritage assets and putting them to viable uses consistent with their conservation;
- The positive contribution that conservation of heritage assets can make to sustainable communities including their economic vitality; and
- The desirability of new development making a positive contribution to local character and distinctiveness.

15.45 Paragraph 132 advises local planning authorities that 'When considering the impact of a proposed development on the significance of a designated heritage asset, great weight should be given to the asset's conservation. The more important the asset, the greater the weight should be. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting'.

15.46 The NPPF says at Paragraph 133 'Good design ensures attractive, usable, durable and adaptable places and is a key element in achieving sustainable development. Good design is indivisible from good planning.' Paragraph 133 says:

'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 loss is necessary to achieve substantial public benefits that outweigh that harm or loss, or all of the following apply:

- The nature of the heritage asset prevents all reasonable uses of the site; and
- No viable use of the heritage asset itself can be found in the medium term through appropriate marketing that will enable its conservation; and
- Conservation by grant-funding or some form of charitable or public ownership is demonstrably not possible; and
- The harm of loss is outweighed by the benefit of bringing the site back into use.'



15.47 Paragraph 134 says 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 securing its optimum viable use.'

15.48 Further advice within Section 12 of the NPPF urges local planning authorities to take into account the effect of an application on the significance of a non-designated heritage asset when determining the application. It says that 'In weighing applications that affect directly or indirectly non-designated heritage assets, a balanced judgement will be required having regard to the scale of any harm or loss and the significance of the heritage asset'.

15.49 Paragraph 137 of the NPPF advises local planning authorities to 'look for opportunities for new development within Conservation Areas and World Heritage Sites and within the setting of heritage assets to enhance or better reveal their significance. Proposals that preserve those elements of the setting that make a positive contribution to or better reveal the significance of the asset should be treated favourably'.

15.50 Paragraph 138 says that: Not all elements of a World Heritage Site or Conservation Area will necessarily contribute to its significance. Loss of a building (or other element) which makes a positive contribution to the significance of the Conservation Area or World Heritage Site should be treated either as substantial harm under paragraph 133 or less than substantial harm under paragraph 134, as appropriate, taking into account the relative significance of the element affected and its contribution to the significance of the Conservation Area or World Heritage Site as a whole.

Welwyn Hatfield Borough Council: Local Policy

15.51 The current planning policies for Welwyn Hatfield are set out in the statutory development plan which comprises: saved policies of the Welwyn Hatfield District Plan adopted 2005, the Hertfordshire Waste Core Strategy and Development Management Policies Document adopted 2012, Hertfordshire Minerals Local Plan adopted 2007, and the saved policies of the Hertfordshire Waste Local Plan adopted 1999.

15.52 A Local Plan is currently being prepared, which will replace the District Plan and will set out the planning framework for the Borough for the period up to 2031.

15.53 The saved policies of the District Plan of relevance include:



R27 Demolition of Listed Buildings: Listed Building Consent for the complete or partial demolition of any building of special architectural or historic interest will not be granted other than in the following exceptional circumstances.

- i. Clear and convincing evidence has been provided that it is not practicable to continue to use the building for its present or previous use and that no viable alternative uses can be found, and that preservation in some form of charitable or community ownership is not possible;
- ii. The physical condition of the building has deteriorated, to a point that it can be demonstrated that demolition is essential in the interests of public safety. A comprehensive structural report will be required to support this criterion;
- iii. demolition or major alteration will not be considered without acceptable detailed plans for the site's development. Conditions will be imposed in order to ensure a contractual obligation has been entered into for the construction of the replacement building(s) and/or the landscaping of the site prior to the commencement of demolition; and
- iv. where, exceptionally, consent is granted for the demolition or major alteration to a listed building, before any demolition or major alteration takes place, applicants will be required to record details of the building by measured drawings, text and photographs, and this should be submitted to and agreed by the Council.

D1 Quality of Design: The Council will require the standard of design in all new development to be of a high quality. The design of new development should incorporate the design principles and policies in the Plan and the Guidance contained in the Supplementary Design Guidance.

D2 Character & Context: The Council will require all new development to respect and relate to the character and context of the area in which it is proposed. Development proposals should as a minimum maintain, and where possible enhance or improve the character of the existing area.

D4 Quality of the Public Realm: The Council will expect new development where appropriate to either create or enhance public areas and the public realm.

15.54 As described earlier, the application has also been considered in accordance with guidance from Historic England's Conservation Principles, Policies and Guidance' (2005).



IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Likely Significant Effects

Demolition and Construction

15.55 As part of the previously consented scheme, the demolition of the parts of the former Shredded Wheat Factory that were constructed in the 1930s and 1950s has been, or shortly will be, completed. This has exposed elements of the original 1920s factory complex that will be repaired as part of the previous consent and does not form part of the permission being sought for this Development. In terms of the Proposed Development the direct effect of remaining demolition is considered to be **minor adverse** and of **moderate significance**.

Completed Development

The Original 1920s Former Shredded Wheat Factory

15.56 The works are outlined in detail in the Heritage Statement. The Proposed Development builds upon the principles established in the recently granted consent in order to enhance areas and facilitate new uses. As well as commercial, community and leisure uses within the former factory building, a new Energy Centre is proposed on the site of the former garages and it is proposed that the Boiler House and Grain House are converted into a unique Art/Museum Hub with multidisciplinary indoor and outdoor space.

15.57 Externally, it is proposed to introduce a ramp and stair along Reiss Walk to provide a main entrance into the new central atrium on the west elevation. This will provide more flexibility without impacting on the unencumbered views of this elevation.

15.58 Internally, the majority of the proposed subdivision is located on the ground floor. Partitions relate to the existing column grid to ensure the structural and architectural integrity of the building can still be read. This floor is also where, amongst other facilities the swimming pool will be located.

15.59 A degree of subdivision is vital to achieve the multitude of uses necessary to give the building a sustainable future. This scheme focusses the majority of the necessary subdivision on the ground floor.



15.60 On the upper floors, the full open plan nature of the spaces can be fully appreciated. The office spaces will be separated by the atrium space with full height glazed walls ensuring noise but not visual separation.

15.61 On the second floor art studios will be created at the southern end that will connect with the proposed art centre via a new glass bridge.

15.62 The central atrium space will contain a feature stair and lift core. The proposed atrium stair construction will be a contemporary blend of glass treads and metal runners in order to create an open and light environment. It will also minimise the visual impact internally, allowing occupiers and visitors to read the open office floor plate.

15.63 As consented in the previous permission, it is proposed that the facades of the building will be carefully restored and/or reinstated. It is also proposed that internally the building will receive an insulated lining in order to improve thermal efficiency.

15.64 The proposed glass bridge link between the Grain Store and Factory building has been inspired by that of the Royal Opera House in Covent Garden. It is proposed to add a modern twist to the building that is obviously an addition, but that does not detract from the architectural importance of the original building. Its purpose is to give the Arts Centre the capacity to expand from one building to the other – an important part of providing a sustainably flexible future for the listing buildings.

15.65 The effect of the proposed works to the Production Hall will be to restore and better reveal the most important historic and architectural elements of the building, whilst providing services, circulation and modern accommodation that will give the building a viable long term future.

15.66 Unlike the previously consented scheme, it is proposed to convert the Grain House and Silos into an Art/Museum Hub. It is proposed that the existing machinery still remaining in the Grain House will be renovated and cleaned to retain the building's industrial character and could be used within exhibitions as well as serving as a visual reminder of the history of the building.

15.67 The silos will be repaired and restored and the base of them opened up allowing the hollow space to be used for art installations. It is proposed that the building on top of the silos will be converted to a restaurant and bar with views across Welwyn Garden City.



15.68 The structure between the Grain House and Silos (previously consented for removal) will be retained – providing at ground floor, the entrance to the Arts Centre.

15.69 This use is a considerably more light-touch approach to that previously consented and will allow for the retention of much more historic fabric within these buildings. It will also allow for a fuller appreciation of the scale and nature of the space and should be regarded as a major heritage benefit in comparison to the previous scheme.

15.70 The former garages, previously consented for replacement, will still be replaced, and house a restaurant/café, facing out onto the newly created Goodman Square and also the Energy Centre – which will be glazed so that passers-by can look in and see the various parts of the plant at work. The energy centre will make use of the existing chimney.

15.71 Behind the new building will be a covered courtyard which will link to the silos and provide a more open indoor space to appreciate the scale of the adjacent silos.

15.72 This element of the Development is considered to result in a moderate change, which would be beneficial in nature, to a heritage asset of high value. In accordance with the significance criteria set out above, the effect on the Grade II listed former Shredded Wheat Factory once the development is completed is considered to be **beneficial** and of **substantial significance**.

Effect on Setting to the Original 1920 Former Shredded Wheat Factory

15.73 In heritage terms, the wider Proposed Development has been designed to ensure that the remaining listed structures are better revealed both architecturally and in terms of use and ensure that they become a key focal point of the masterplan.

15.74 The building heights and their distribution in the Proposed Development are broadly similar to those of the consented scheme, and to the north of the listed buildings are lower. Where it has been deemed necessary, an additional storey has been added to the proposed buildings along the western and eastern edges of the site – furthest from the listed buildings.

15.75 The importance of the dominance of the silos continues to be recognised, with new buildings being located so as to give selected views of the silos from strategic and carefully considered points around the site. Their pre-eminence will be fully respected.



15.76 The spaces around the listed buildings have been designed to give visitors, users and occupiers a better appreciation of the complex and the use of these spaces designed to create activity and vibrancy. This is an important benefit with the scheme, as much of the communal significance of the complex relates to the 'healthy living' approach promoted both by the founders of Shredded Wheat and the Garden City.

15.77 The proposed new Goodman Square adjacent to the Boiler House/Grain House and silos at the end of Hydeway will be a key public space linking the east and west of the town, with the listed structures forming the principal backdrop to the north.

15.78 The proposed Louis de Soissons Civic Building will be one of the first buildings seen by pedestrians approaching the new residential and cultural quarter from the town centre and train centre. The appointment of Louis de Soissons Architects to design it further provides a historical link between the past and the future.

15.79 The De Soissons Gardens to the eastern front of the Production Hall will reinstate a formal open space providing a suitable setting for the reinstated grand entrance to the building and restoring the integrity of the 'front' of the building back to its original place.

15.80 To the west of the listed former Production Hall, Reiss Walk will incorporate the historic railway lines and provide a hard landscaped access to this elevation of the listed building – appropriate to its industrial past – as well as a thoroughfare through the development.

15.81 Similar to the consented scheme, the visibility of the proposals from Grade I listed Hatfield House has been investigated and it has been concluded that the primary element of the Proposed Development that is visible are the already standing silos. It is therefore felt that the proposals will not have a detrimental impact on the views from the House.

15.82 The development is considered to result in a major change, which would be beneficial in nature, to a heritage asset of high value. In accordance with the significance criteria set out above, the effect on the Grade II listed former Shredded Wheat Factory once the development is completed is considered to be **beneficial** and of **substantial significance**.

Effect on the Setting of the Grade II former Roche Products Factory Office Building

15.83 The southern part of the site nearest to the Roche Products Factory Office building is currently vacant and derelict. The Development to the south of the Site would involve the

provision of residential units with associated landscaping. It is considered that this would result in a long-term improvement to the setting of the Grade II Roche Products Factory Office compared with the baseline conditions.

15.84 This is considered to be a minor change, which would be beneficial in nature to a heritage asset of high value. In accordance with the significance criteria set out above, the effect is therefore considered to be **beneficial** and of **moderate significance**.

Effect on the Setting of Hatfield House

15.85 Viewpoints 19a, 19b and 19c in Appendix 11.3 shows the views from the Grade I Listed Hatfield House towards the Site for both the baseline situation and with wireline outline to show the massing of the Development.

15.86 In the baseline conditions, the view from Hatfield House towards the Site provides a distant view with the existing former Shredded Wheat factory buildings just discernible above the trees. Once the Development is completed it is considered that the scale of visual change in the view would be negligible with the Development also just perceptible in the long-distance view.

15.87 This is considered a negligible change to a heritage asset of high value. In accordance with the criteria set out above, the effect is therefore considered to be insignificant.

Effect on the Setting of the Welwyn Garden City Conservation Area

15.88 In terms of the impact on the Welwyn Garden City Conservation Area, the proposals will be negligible and will not affect the special character of the area. The railway line provides (and always has done) a very definite divide from east to west, and the back of the Howard Centre creates a dominant 'back' to the town centre. Just as the Proposed Development has been designed to respect the setting of the listed buildings from the site itself, this approach was also taken when considering how it will be seen from glimpsed views from the conservation area.

15.89 This is considered a negligible change to a heritage asset of medium value. In accordance with the criteria set out above, the effect is therefore considered to be insignificant.



ASSESSMENT OF CUMULATIVE EFFECTS

15.90 Whilst there are a number of other schemes identified in close proximity to the Site, there will be no cumulative effects with regards heritage.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Demolition and Construction

15.91 Before any demolition or alteration works are undertaken in the former Shredded Wheat Factory building recording would be undertaken to preserve a record of the structures to be lost. The details of the building recording would be agreed with WHBC in advance and carried out in accordance with that agreement. This would be secured by means of an appropriately worded planning condition. The likely residual effect of the partial demolition of the Grade II Listed former Shredded Wheat factory would be **adverse** and of **moderate significance**.

Completed Development

15.92 In terms of the setting of the Grade II listed former Shredded Wheat Factory, no mitigation is required and the likely residual effect on the setting of the retained structures of the factory would be **beneficial** and of **substantial significance**.

15.93 With regards the setting of the Grade II listed Roche Products Factory office building, no mitigation is required and the likely residual effect on its setting would therefore be **beneficial** and of **moderate significance**.

15.94 In terms of the setting of the Grade I listed Hatfield House, no mitigation is required and the likely residual effect on its setting would therefore be **insignificant**.

15.95 With regards the setting of the Welwyn Garden City Conservation Area, no mitigation is required and the likely residential effect on its setting would be **insignificant**.



SUMMARY

15.96 The likely effects of the Development on built heritage within the Site and surrounding area have been assessed. The assessment has been carried out in accordance with the legislation, policy and guidance provided at a national and local level.

15.97 The Site contains the former Shredded Wheat factory which is Grade II listed and recognised to be of national importance and of special architectural and historic interest. The Shredded Wheat Factory complex was developed piecemeal through the middle of the 20th century. The original part of the factory complex, built between 1924 and 1926, remains largely 'as built' including the main factory, boiler house and silos. Later additions were made to the factory in the 1930s and 1950s but these have been demolished.

15.98 The original 1920s factory building and silos embody the greatest heritage value, being of pioneering construction and 'moderne' design.

15.99 Immediately to the south of the site is a grade II listed office building of the Roche Products factory, the factory itself now demolished. Approximately 4.2km to the south-east of the site is the grade I listed Hatfield House and Gardens. The Site is close to the Welwyn Garden City Conservation Area.

15.100 The Development would involve some alterations to the 1920s factory structures to insert new uses into the original buildings. Building recording would be undertaken prior to demolition, which would include written and photographic information to preserve a permanent record of the structures.

15.101 Key views of the retained original factory buildings and silos have been created through careful design of the rest of the development. New public open spaces would be provided to provide a suitable setting for the reinstated grand entrance to the former Shredded Wheat Factory and link the east and west of the town, with the listed structures forming the principal backdrop.

15.102 The development would improve the setting of the Grade II listed former Roche Products Factory Office Building by replacing the currently vacant and derelict land to the south of the site with new residential development and landscaping.



15.103 The Conservation Area has a clearly defined eastern boundary along the railway line. The back of the Howard Centre (and the railway line) provides a hard physical backdrop ensuring that the development would have change to its setting.

15.104 The Site is just discernible in the view from Grade I listed Hatfield House with the silos visible at a distance. As such, there would be negligible change to the view from Hatfield House towards the Site once the development is completed.



16 SOCIO-ECONOMICS

INTRODUCTION

16.1 This Chapter presents an assessment of the likely significant socio-economic effects of the Proposed Development on the existing socio-economic conditions within the local and wider surrounding area.

16.2 This Chapter provides a description of the methods used in the socio-economic assessment and a description of the relevant baseline conditions of the Site and surrounding area. This is followed by an assessment of the likely significant effects of the Proposed Development during the construction works and once the Proposed Development is completed and operational. The potential cumulative effects of the Proposed Development with other consented schemes nearby, are also considered. Mitigation measures are identified, where appropriate, to avoid, reduce or offset any adverse effects and an assessment of the likely residual effects presented.

16.3 This Chapter addresses employment generation and housing provision. A separate Education and Healthcare Impact Assessment Report has been prepared by EPDS which considers the potential effects of the Proposed Development with regards to education and healthcare.

ASSESSMENT METHODOLOGY AND SIGNIFICANCE CRITERIA

Assessment Methodology

16.4 There are no published standards or technical guidelines that set out a preferred methodology for assessing the likely socio-economic effects of a development. However, there are a series of commonly used methodologies to quantify economic effects both during the construction of a development and following its completion. Other established qualitative techniques are frequently adopted to assess the social effects of a development. The following section outlines the approach used to conduct this assessment. Where possible, the likely significant socio-economic effects are quantified, but where this is not possible, a qualitative assessment is provided using professional judgement.



Establishing Baseline Conditions

16.5 The baseline socio-economic conditions have been established through the interpretation of national recognised research and survey information, including:

- 2011 Census data;
- NOMIS Labour Market Profile (2017);
- Department of Communities and Local Government Indices of Multiple Deprivation (2015);
- WHBC Housing and Homeless Strategy (2013-2018);
- WHBC Strategic Housing Market Assessment Partial Update, 2015;
- WHBC Local Plan Consultation Document, 2015; and
- Welwyn Hatfield District Plan (2005).

16.6 The study area was determined based on the consideration of the Proposed Development, location of the Site and at the spatial extent appropriate to the geographical area. The local study area was considered to be within Welwyn Garden City.

Assessment of Likely Socio-economic Effects

Construction: Employment Generation

16.7 The first step in estimating job creation during construction was to calculate gross direct job years. This was done by dividing the total estimated construction cost by £59,166 which is the estimated gross output per construction worker. Estimated gross output per construction worker was calculated from East of England construction employment numbers (the average for the 12 months including and preceding June 2017) (Ref. 16.1) and the East of England's construction industry output (all work, over the 12 months including and preceding June 2017) (Ref. 16.2). 'Job years' were then converted into Full Time Equivalent (FTE) posts whereby one permanent FTE job equates to 10 person-years of employment.

Completed Development: Employment Generation

16.8 Standard density ratios were derived from the methodology set out within the Homes and Communities Agency's (HCA's) Employment Densities Guide 2nd Edition (2010) (Ref. 16.3) and 3rd Edition, (2015) (Ref. 16.4). The standard density ratios were applied to the proposed commercial floor areas. This allowed a calculation of direct employment generation at full



occupancy for the completed. Using this HCA guidance, the following employment density ratios have been assumed for the commercial uses proposed:

- Use Class A1 retail use: 20m² per FTE job;
- Use Class A3 / A4 / A5 restaurants, cafes and bars and hot food takeaways: 20m² per FTE job (restaurants and cafes);
- Use Class B1 offices: 12m² per FTE job (General Office - Professional Services);
- Use Class D1 community space / health care / crèche: 36m² per FTE job; and
- Use Class D2 gym / dance / fitness studio: 65m² per FTE job (Fitness centre – mid market).

16.9 The Employment Densities Guide 3rd Edition (2015) makes no reference to Use Class D1. Use Class D1 employment generation was therefore calculated using the employment density given in the Employment Densities Guide 2nd Edition (2010). Use class A5 has been assumed to be the same as A3 / A4 as no reference is made to this use class in either Density Guide.

16.10 Employees gaining employment through the operational development could be drawn from a catchment area which extends beyond Welwyn Garden City. Many of the benefits of the Proposed Development would remain within Welwyn and Hatfield area, however, it is assumed that some employees live beyond the City and therefore some indirect and induced benefits would accrue across a wider area.

16.11 The employment leakage outside of the Welwyn Garden City area and employment displacement were also assessed, in order to identify the net direct employment of the completed Development. Displacement is the extent to which the benefits of the Proposed Development may be offset by reductions of output or employment elsewhere. A figure of 25% was used to calculate the displacement and 10% was assumed for leakage, both of which are in line with English Partnerships Guidance^{16.5}.

16.12 Indirect and induced effects of the completed Development have also been calculated. Indirect employment effects include employment growth as a result of the purchase of goods and services by residents and businesses located in the Proposed Development. Induced employment from the completed Development would be generated by the consumption expenditures of those directly and indirectly employed by businesses located at the Proposed Development. A composite multiplier at the regional level was used to assess the effect of both the indirect and induced employment multipliers. A multiplier effect of 1.5 was used as the East

of England is considered to have 'average supply linkages'. This is in line with the English Partnerships Guidance (Ref. 16.5).

Completed Development: Housing Provision

16.13 Professional judgement was used to undertake a qualitative assessment of the provision of new homes and the contribution to local housing targets. This assessment has taken into account existing housing quality and housing requirements identified by WHBC.

Significance Criteria

16.14 As there are no formalised technical guidance or criteria available to assess the significance of socio-economic effects, likely effects are assessed by considering the following factors, using professional judgement:

- the duration of the activity that effects a resource or receptor, which is considered either as short-term (typically those associated with the construction period) or long-term (typically those associated with the completed Development).
- the geographical extent, which considers the appropriate policy / administrative boundary or geographical area of influence within which an effect occurs.
- the magnitude of an effect, which is quantified, where possible.

16.15 The significance of each effect is determined on the basis of the expected results against the following criteria:

- Insignificant – the Proposed Development would result in no perceptible change to, or a variation within normal baseline conditions, of a socio-economic resource or receptor;
- Minor Significance - the Proposed Development would result in a short, small or highly localised change to a socio-economic resource or receptor;
- Moderate Significance – the Proposed Development would result in a moderate, more widely demonstrable change to a socio-economic resource or receptor, which would typically be experienced beyond the local scale, and if adverse, could be considered a key factor in the decision-making process; or
- Substantial Significance – the Proposed Development would result in a geographically extensive, or substantial change to a socio-economic resource



or receptor, and if adverse would likely represent a key factor in the decision-making process.

Assumptions and Limitations

16.16 The assessment is based on a total of 1,454 residential units and 12,993 sq m of commercial space.

16.17 A standard estimated build cost of £2,100 per m² has been used to calculate the estimated job creation during construction.

16.18 Except where specifically stated, the existing conditions with respect to socio-economics are presented within this Chapter as the baseline conditions. It is considered unlikely that the existing conditions will change significantly in the short term (during the proposed construction period) or longer term (once the Proposed Development would be completed). The baseline conditions presented are therefore representative of future conditions in the absence of the Proposed Development (i.e. without Development proceeding).



LEGISLATION, PLANNING POLICY AND GUIDANCE

National Planning Framework, 2012:

- The Government is committed to securing economic growth in order to create jobs and prosperity, building on the country's inherent strengths, and to meeting the twin challenges of global competition and of a low carbon future. To help achieve economic growth, local planning authorities should plan proactively to meet the development needs of business and support an economy fit for the 21st century.
- The framework encourages local authorities to plan a mix of housing based on current and future demographic trends, market trends and the needs of different groups in the community. Paragraph 47 of the NPPF requires local authorities to seek to ensure that their Local Plans meet the full Objectively Assessed Housing Need (OAHN) of the area for market and affordable housing, and identify a five year supply of deliverable sites to meet the identified need.
- The Government is committed to securing economic growth in order to create jobs and prosperity. The framework encourages local authorities to facilitate flexible working practices such as the integration of residential and commercial uses within the same unit. Planning policies should avoid the long-term protection of sites allocated for employment use where there is no reasonable prospect of a site being used for that purpose.

WHBC Local Plan Post Submission, 2016:

- **Policy SP7 Type and Mix of Housing:** Should seek to deliver a wide choice of homes and help create inclusive and mixed communities, identifying the size, type and tenure of housing that is likely to be required. A mix of housing will therefore need to be provided over the plan period to reflect demographic trends and the needs of different groups in the community.
 - **Policy SP3 Settlement Strategy and Green Belt boundaries:** New development will be located in and around the two towns of Welwyn Garden City and Hatfield where accessibility to transport networks and public transport is good and the greatest potential exists to maximise accessibility to job opportunities, shops, services and other facilities, and to create new neighbourhoods with supporting infrastructure.
 - **Policy SP 8:** The Council will support economic prosperity, encourage inward investment and the creation of a range jobs.
-



Welwyn Garden City Housing & Homeless Strategy (2013): The council have identified five key priority areas:

- Supply of Affordable Housing;
- Raising standards in the private sector particularly Houses in Multiple Occupation (HMOs);
- Making best use of housing in the Borough;
- Prevention of homelessness; and
- Meeting the needs of older people and other vulnerable groups.

BASELINE CONDITIONS

Local Area Context

16.19 The Site is located within Welwyn Garden City in the administrative area of WHBC. The Site was historically in industrial and factory uses including for the production of cereal at the Northern end of the Site. The Site is currently vacant with Phase 1 due to commence in Summer 2018.

16.20 The Site is within a five minute walk of the town centre and its associated amenities, and adjacent to Welwyn Garden City Railway station, which has regular trains to London and Cambridge.

Economy and Labour Market

Economic Activity and Employment

16.21 Table 16.2 presents the economically active and unemployment rates for Welwyn Hatfield Borough (WHB), East of England and Great Britain, for the period July 2016 to June 2017. This provides an indication of the potential labour supply available. Equivalent information at ward level is not available.



Table 16.2 – Economic Activity and Employment Rates, (July 2016 to June 2017) (Ref 16.6)

Economic Activity	WHB (numbers)	WHB (%)	East of England (%)	Great Britain (%)
Economically active*	68,200	84.2	80.2	78.0
In Employment*	66,000	81.4	77.0	74.4
Employees*	55,800	68.8	65.5	63.4
Self Employed*	9,900	12.1	11.2	10.6
Unemployed#	2,600	3.8	3.9	4.6

Notes: * numbers are for those aged 16 and over, % are for those aged 16-64

numbers and % are for those aged 16 and over. % is a proportion of economically active

16.22 The percentage of economically active people in WHB is higher than the East of England and Great Britain averages. 3.8% of the population in WHB were unemployed during 2016, this is below both the regional and national averages.

16.23 The Indices of Multiple Deprivation (IMD) are the government's official measure of economic and social deprivation in England reported in English Indices of Deprivation 2010. The IMD comprise a group of 38 statistical indicators, used to rank levels of deprivation in 2,482 neighbourhoods known as Lower Super Output Areas (LSOAs) in England.

16.24 With regard to employment deprivation the online Deprivation Map (Ref 16.7) shows that LSOAs falling within WHB provide WHB with a ranking of 233 out of 326 Local Authority districts in England (where 1 is the most deprived). However, the Site is located within LSOA Welwyn Hatfield 007A, which is ranked as 3,133 out of 32,844 LSOAs, thus placing it within the 10% most deprived LSOAs in England with regard to employment deprivation.

Key Employment Sectors

16.25 The number of employee jobs by industry within WHB and percentage totals for WHB, East of England and Great Britain are shown in Table 16.3.

16.26 The wholesale and retail industry employs a quarter of all WHBC employees, which is a higher percentage than the East of England and Great Britain. The smallest employer is the

financial and insurance industry with just 0.8%, which is well below the national and regional averages.

Table 16.3 – Employee Jobs by Industry, 2016 (Ref 16.8)

Industry	WHB (employee jobs)	WHB (%)	East of England (%)	Great Britain (%)
Manufacturing	3,500	4.4	8.0	8.1
Water Supply; Sewerage, Waste Management and Remediation Activities	1,500	1.9	0.7	0.7
Construction	4,000	5.0	5.5	4.6
Wholesale and Retail Trade; Repair of Motor Vehicles and Motorcycles	20,000	25.0	16.8	15.3
Transportation and Storage	3,500	4.4	5.1	4.9
Accommodation and Food Service Activities	3,500	4.4	6.6	7.5
Information and Communication	4,000	5.0	3.9	4.2
Financial and Insurance Activities	600	0.8	2.4	3.6
Real Estate Activities	700	0.9	1.4	1.6
Professional, Scientific and Technical Activities	7,000	8.8	8.7	8.6
Administrative and Support Service Activities	7,000	8.8	11.3	9.0
Public Administration and Defence; Compulsory Social Security	3,000	3.8	3.5	4.3
Education	7,000	8.8	9.1	8.9
Human Health and Social Work Activities	9,000	11.2	11.8	13.3
Arts, Entertainment and Recreation	1,000	1.2	2.7	2.5
Other Service Activities	3,500	4.4	2.0	2.1

Housing Characteristics

Housing Quality

16.27 The Council carried out a Private Sector Stock Condition Survey in 2008 as part of the WHBC Housing and Homeless Strategy (Ref 16.9) and this illustrated that the private sector housing stock in Welwyn Garden City is considered to be in a much poorer condition than the Council stock. Approximately 23% of private sector homes in the WHBC administrative area did not meet the national Decent Homes Standard. However, this is better than the national average of 27%.

Housing Requirements

16.28 According to the Strategic Housing Market Assessment (SHMA) Partial Update 2015 (Ref. 16.10) the population in Welwyn Garden City is expected to grow by around 23,000, equivalent to annual population growth of approximately 1,210 or 1%. This exceeds the projected growth rate of 0.6% per annum for England. The council have re-assessed the need for new housing in the Borough, and identified a need for 625 dwellings per annum, equivalent to 12,500 additional dwellings by 2031.

16.29 The population in WHB is ageing. According to the WHBC Housing and Homelessness Strategy (Ref. 16.9) there will be 23,700 people aged over 65 by 2029, making up 16% of the total population. The proportion of those people aged 80 or over is expected to increase by 2,900 people making up 6% of the total population.

16.30 There will therefore be an increase demand for a range of housing to meet the housing requirements of the elderly. The SHMA estimates that there will be a need for 31 additional bed-spaces each year (up until 2031) to meet the needs for additional care home accommodation, amounting to an additional 620 care home places (Ref. 16.10).

16.31 As stated in Policy CS3 (Settlement Strategy and Green Belt boundaries) in the proposed Local Plan, the council intends to continue to prioritise the use of previously developed land over greenfield land and will set out an approach to the phasing of sites over the plan period (Ref. 16.11).



16.32 The Council are also encouraging sustainable transport methods such as walking and cycling to minimise the need to use of private cars. Policy SP4 (Travel and Transport) of the proposed Local Plan aims to minimise the need to travel by directing growth to those areas with good transport networks and which are well served by jobs, services and facilities (Ref. 16.11).

IDENTIFICATION AND EVALUATION OF KEY EFFECTS

Construction

Employment Generation

16.33 Consideration of the construction works is best considered at the regional level (East of England) due to the mobile nature of this type of employment. Using the approach presented in paragraph 16.10, it is estimated that 6,056 years of construction employment would be created by the Proposed Development, equating to 605 FTE jobs per year for the four year duration of construction. These are jobs which would be directly created by the Proposed Development and also those created along the supply chain, through the provision of goods and services to the construction process.

16.34 A proportion of jobs may also 'leak' outside the region. Taking into account the predicted employment generation detailed above, and having regard to the fact that a proportion of jobs may likely 'leak' outside the region, the likely temporary beneficial effect on employment levels in the region during demolition and construction is predicted to be insignificant.

Completed Development

Employment Generation

16.35 Utilising guidance detailed in paragraph 16.12, the likely gross direct job creation from the Proposed Development, when completed and at full occupancy, is presented in Table 16.4.



Table 16.4 Gross Direct FTE Employment Generation from the Completed Development

Use class	Proposed Area NIA or GIA (m2)	Employment Density (m ² per FTE)	Gross FTE jobs
A1 – Retail Use	1051	20	53
A3 / A4 / A5 - Restaurant / Cafés and Bars / Pubs	1162	20	58
B1 - Office	4723	12	394
D1 - Community space, health centre, and crèche	2680	36	74
D2 - Gym / Dance / Fitness Studio	2976	65 (midmarket)	46
Total			625

16.36 The Proposed Development is estimated to generate 625 gross direct jobs. This figure does not include jobs generated as result of the residential units, such as site management and, as such, represents a conservative estimate.

16.37 The net direct employment generation from the Proposed Development would be 422 FTE jobs, as shown in Table 16.5. The net figure takes into account leakage and displacement effects.



Table 16.5: Net Direct FTE Employment Generation from the Completed Development

Use Class	Gross Direct FTE Employment	Leakage (Jobs)	Total after leakage	Displacement	Net Direct FTE Employment
A1 – Retail Use	53	10%	48	25%	36
A3 / A4 / A5 - Restaurant / Cafés and Bars / Pubs / hot food takeaway	58	10%	52	25%	39
B1 - Office	394	10%	355	25%	266
D1 - Community space, health centre, and crèche	74	10%	67	25%	50
D2 - Gym / Dance / Fitness Studio	46	10%	41	25%	31
Total					422

16.38 Finally, the total number of jobs created by the Proposed Development is calculated by considering indirect and induced job creation, as shown in Table 16.6.



Table 16.6: Net Indirect and Induced FTE Employment Generation from the Completed Development

Use Class	Net Direct FTE Employment	Regional Multiplier	Indirect and Induced Net FTE Employment	Total net FTE Employment
A1 – Retail Use	36	1.5	18	54
A3 / A4 / A5 - Restaurant / Cafés and Bars / Pubs / hot food takeaway	39	1.5	20	59
B1 - Office	266	1.5	133	399
D1 - Community space, health centre, and crèche	50	1.5	25	75
D2 - Gym / Dance / Fitness Studio	31	1.5	16	47
Total				634

16.39 The Proposed Development is therefore estimated to generate a total net employment of 634 FTE jobs within the region; 422 of which would be generated locally.

16.40 There are approximately 2,600 unemployed people in WHB and the Site is located in an area that is in the 10% most employment deprived in England. It is envisaged that the Proposed Development will provide new jobs for people residing within WHB.



16.41 Taking into account the above, including existing employment and unemployment levels within WHB, it is considered the Proposed Development, when completed, would likely give rise to a long-term, beneficial effect of minor significance on employment.

Housing Delivery

16.42 The Proposed Development will deliver 1,454 new homes which will contribute to the overall housing delivery target in WHB of 12,500 additional dwellings by 2031.

16.43 The residential units within the Proposed Development would be built to both the Nationally Described Space Standards and Building Regulations Part M Cat 2 (equivalent to Lifetime Homes Standards). Wheelchair units have been designed to comply with Building Regulations Part M cat 3. Building the Proposed Development to these standards would ensure the provision of high quality housing stock in WHB, which is capable of accommodating residents' needs regardless of their age / household structure.

16.44 The location of the Proposed Development is highly accessible and would address the WHBC District Plan objective of reducing the use of private cars and directing growth to those areas with good transport networks and which are well served by jobs, services and facilities.

16.45 Taking all the above into account, the likely effect on the housing provision within WHB is considered to be long-term, beneficial and of moderate significance.

ASSESSMENT OF CUMULATIVE EFFECTS

16.46 Table 16.7 presents other nearby developments which have been considered for potential cumulative effects with the Proposed Development.

Table 16.7: Consideration of Potential Cumulative Effects with Other Developments

Site Name	Distance from the Site (km)	Description	Potential Cumulative effects with the Proposed Development
Rank Xerox Ltd, Bessemer Road, Welwyn Garden City, AL7 1HE	375m north of Site	Various applications of office to residential use.	Potential for cumulative beneficial effect for supply chain businesses in construction phase.
Pall Mall Distribution Site	Adjacent to Site (west)	Part of the Broadwater Road West allocation site. Mixed use provision.	<p>Potential for cumulative beneficial effect for supply chain businesses in construction phase.</p> <p>Potential for cumulative beneficial effect on local economy during operational phase due to businesses being located in close proximity.</p>
Mercury House, 1 Broadwater Road, Welwyn Garden City, AL7 3BQ	Adjacent to Site (east)	Change of use from B1 office to C3 residential, construction of roof and side extensions, creation of 43 residential apartments and cycle storage compound. Permission Granted.	Potential for cumulative beneficial effect for supply chain businesses and construction employment in construction phase.
Former Argos Direct Distribution Depot, 1 Bessemer Road, Welwyn	Adjacent to Site (north)	Erection of two industrial / distribution buildings comprising of commercial uses. Permission Granted.	<p>Potential for cumulative beneficial effect for supply chain businesses in construction phase.</p> <p>Potential for cumulative beneficial effect on local economy during operational</p>



Garden City, AL7 1HF			phase due to businesses being located in close proximity.
Land East of Bessemer Road	Adjacent to Site (northeast)	Regeneration of the Site to provide a new retail Aldi food store with associated parking, servicing and landscaping.	No potential cumulative effect identified.

16.47 There is potential for cumulative beneficial effects to occur with regards to the construction supply chain and the local economy resulting from the combination of the Proposed Development and the other nearby proposed developments, as presented in Table 16.7. These effects are uncertain and but are unlikely to be significant.

16.48 No potential cumulative effects are identified in relation to housing delivery. The Proposed Development will result in a moderate beneficial effect on housing delivery and this will combine with other nearby residential developments and contribute to meeting the housing delivery target in WHB of 12,500 additional dwellings by 2031.

ENHANCEMENT, MITIGATION AND RESIDUAL EFFECTS

Construction

Employment Generation

16.49 No mitigation measures would be required in respect of employment generation and the likely residual effect of the Proposed Development would therefore remain insignificant.

Completed Development

Employment Generation

16.50 No mitigation is required and no enhancement measures are identified. The residual effect from job creation would therefore remain beneficial and of minor significance.



Housing Delivery

16.51 No mitigation is required and no enhancement measures are identified. The residual effect on local housing provision would therefore remain beneficial and of moderate significance.

SUMMARY

16.52 There are no published standards or technical guidelines that set out a preferred methodology for assessing the likely socio-economic effects of a development. A series of commonly used methodologies to quantify economic effects both during the construction of a development and following its completion have therefore been adopted for the socio-economic assessment. Other qualitative techniques are also frequently adopted to assess the social effects of a development. Where possible, the likely significant socio-economic effects have been quantified, but where this is not possible, a qualitative assessment is provided using professional judgement.

16.53 The baseline socio-economic conditions have been established through the interpretation of national, recognised research and survey information.

16.54 The socio-economic assessment has identified that 605 FTE jobs would be generated by the Proposed Development during the four year construction phase. These jobs include those directly created by the Proposed Development at the Site and those created along the supply chain through the provision of goods and services to the construction process.

16.55 Once completed, the Development is predicted to generate 634 new FTE jobs within the region; 422 of which would be generated locally. It is envisaged that some of the new jobs would be filled by residents of the local area and this would contribute to reducing unemployment in WHB.

16.56 The provision of 1,454 residential dwellings would positively contribute to the housing targets within WHB. The proposed dwellings would be built to Nationally Described Space Standards and Building Regulations Part M Cat 2 (equivalent to Lifetime Homes Standards). Wheelchair units have been designed to comply with Building Regulations Part M cat 3. Delivering dwellings to these standards would ensure the provision of high quality private housing stock.



16.57 The location of the Proposed Development is highly accessible and would address the WHBC District Plan objective of reducing the use of private cars and directing growth to those areas with good transport networks and which are well served by jobs, services and facilities.

16.58 There is potential for cumulative beneficial effects to occur with regards to the construction supply chain and the local economy resulting from the combination of the Proposed Development and other nearby proposed developments considered. These effects are unlikely to be significant. No potential cumulative effects are identified in relation to housing delivery. The potential for beneficial cumulative effects is uncertain. Due to this uncertainty, the potential for cumulative effects has not been included in Table 16.8.

Table 16.8: Socio-Economic Summary Table

Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
Construction jobs created	Temporary, short term	Insignificant beneficial	None	Insignificant beneficial
Total net FTE jobs created	Permanent, long term	Minor beneficial	None	Minor beneficial
Delivery of new homes	Permanent, long term	Moderate beneficial	None	Moderate beneficial

REFERENCES

- Ref 16.1** Nomisweb (2017); Workforce jobs by industry (SIC 2007) – seasonally adjusted (June 2017) <https://www.nomisweb.co.uk/reports/lmp/gor/2013265926/report.aspx#tabwfjobs> accessed on 20/11/17
- Ref 16.2** ONS (2017); Output in the construction industry, release date 10th November 2017. Table 6 Construction output: Value non-seasonally adjusted current prices by region <https://www.ons.gov.uk/businessindustryandtrade/constructionindustry/datasets/outputinthecostructionindustry> Accessed on 20/11/17
- Ref 16.3** Homes and Communities Agency (2010); Employment Densities Guide, 2nd Edition.
- Ref 16.4** Homes and Communities Agency (2015); Employment Densities Guide, 3rd Edition.
- Ref 16.5** English Partnerships (2008); 'Additionality Guide: A Standard Approach to Assessing the Additional Impacts of Projects', 3rd Edition, English Partnerships, London.
- Ref 16.6** Nomisweb (2017), Employment and unemployment, 2017
- Ref 16.7** Indices of Deprivation Explorer (2015), <http://dclgapps.communities.gov.uk/imd/idmap.html> Accessed on: 17/11/2017
- Ref 16.8** Nomisweb (2016), Employee job by Industry, 2016
- Ref 16.9** Welwyn Hatfield Borough Council (2013) Housing and Homeless Strategy, 2013-2018
- Ref 16.10** Welwyn Hatfield Borough Council, (2015) Strategic Housing Market Assessment Partial Update
- Ref 16.11** Welwyn Hatfield Borough Council (2016); Local Plan Proposed Submission

17 CONCLUSIONS

17.1 This Chapter contains the conclusions of the Environmental Statement (ES). The ES has examined the potential impacts associated with the Proposed Development during both the construction and operational phases.

17.2 The conclusions from each topic assessed in the ES are provided below.

Development Programme and Construction

17.3 This Chapter identifies that the construction period would be approximately four years and the effects of the Proposed Development would be managed through the development of a project and site-specific Construction Environmental Management Plan (CEMP). The CEMP would outline methods for contractor and general public liaison, hours of work, methods to deal with complaints, and outline management practices to control dust, traffic and access, waste, water resources, ecological and archaeological effects, ensuring a high level of control throughout the construction works.

17.4 The procedures within the CEMP would ensure the delivery of a high level of environmental control throughout the construction phase, thereby minimising the potential for adverse effects.

Transport and Access

17.5 An assessment of the likely significant effects of the Proposed Development with respect to transport has been undertaken.

17.6 The HGV trips associated with the construction phase will be spread throughout the day, as they will be made up of materials deliveries, off-site disposal and other trips related to the management of the construction process. The daily traffic flow associated with the site construction traffic is considered to be relatively low and the change in magnitude for severance is considered to be negligible adverse for all links assessed.

17.7 The construction vehicles would use existing or newly constructed vehicle accesses from Bridge Road and Broadwater Road. Both these are main arterial routes with standard footways available either on one or both sides of the carriageway. The change in magnitude for fear and intimidation is considered to be negligible adverse for all links assessed.



17.8 It is anticipated that there would be minimal flows associated with construction during the peak hours and the change in magnitude of the site access junctions for driver delay, pedestrian delay and pedestrian amenity are considered to have a magnitude of negligible adverse.

17.9 The daily traffic flow associated with the construction traffic is likely to be minimal when compared to the operational phase and as with all major construction sites it is anticipated that in addition to the CLP, a CEMP will be secured through a suitable planning condition. It is considered that the change in magnitude for accidents and safety is negligible adverse for all links assessed.

17.10 The development will deliver significant highway improvement works to Bridge Road and Broadwater Road as well as off-site highway improvements to increase operational capacity at a number of roundabouts remote from the site. All highway works will be delivered by means of a Section 278 Agreement with the local highway authority. The S278 technical approval will include a requirement for a traffic management plan to ensure safe working practices within the highway as well as minimal disruption to pedestrian and cycle movements. On this basis, appropriate management is considered to result in a negligible adverse change in magnitude for fear and intimidation for all links assessed. During the construction of the highway improvement works the effect on driver delay is considered to have be minor adverse but pedestrian/cyclist delay and pedestrian/cyclist amenity are considered to have a magnitude of negligible adverse.

17.11 Once operational, the significance of the change in traffic magnitude on severance would be Moderate adverse on the Broadwater Road and Bridge Road corridors. There is no change in fear and intimidation between the baseline and with development scenarios (excluding Broadwater Road and Bridgewater Road improvement works) on the links considered.

17.12 Additional traffic is likely to lead to further delay on the local highway network. The effect on driver delay on the junctions considered would be Major / Moderate adverse.

17.13 The effect on pedestrian delay is considered as minor / negligible adverse on the Bridge Road and Broadwater Road corridors. The effect on pedestrian delay at the Bridge Road/Broadwater Road junction would be Moderate adverse.



17.14 The increase in pedestrian and cycle trips on Bridge Road, Broadwater Road and the footbridge over the railway would result in Moderate adverse pedestrian/cyclists delay on the links and junctions considered.

17.15 Following the implementation of a number of mitigation and enhancement measures the residual impact of the Proposed Development is considered to be minor / negligible adverse during both the construction and operational phases. The residual impact of the off-site highway improvement works is considered to be minor adverse during the construction phase and minor / negligible positive during the operational phase.

Air Quality

17.16 An air quality impact assessment has been undertaken to assess both construction and operational effects associated with the Proposed Development.

17.17 An assessment of the potential effects during the construction phase identified that releases of dust and particulate matter are likely to occur during site activities. Through good site practice and the implementation of suitable mitigation measures, the effect of dust and particulate matter releases may be effectively mitigated and the resultant effects are considered to be negligible.

17.18 Dispersion modelling has been carried out to assess the impact of the operational development on local air quality. The assessment has shown that NO₂ and PM₁₀ concentrations are predicted to be below the relevant objective limits throughout the study area and within the Site itself. The results indicated that the impact of the emissions arising from the traffic generated by the Proposed Development and emissions from the proposed energy generating plant is negligible. The impact with regards new exposure is also considered to be negligible, therefore the Site is considered to be suitable for the proposed use with regards to air quality.

Noise and Vibration

17.19 The effects of noise and vibration from the construction and use of the Proposed Development has been assessed. Throughout, the assessment has been undertaken with reference to British Standards and national and international guidance on noise and vibration impacts.

17.20 The assessment has found that the noise effects at the closest residential properties during construction of the Proposed Development will be a moderate adverse effect as a worst



case during certain phases of the construction programme. However, the effects will be temporary in nature and limited to receptors closest to the construction works. The adoption of the mitigation measures outlined in this chapter would reduce this effect for typical working conditions but remain as a moderate adverse effect as a worst case.

17.21 There will be negligible noise effects associated with the predicted increases in construction road traffic sources as a result of the Proposed Development.

17.22 Noise sensitive receptors along the road network serving the Proposed Development will experience a discernible increase in noise levels as a result of the predicted increase in vehicle movements. However, the magnitude of the effects will not exceed any recognised or statutory objectives and, as such, the effects are predicted to be minor even for the most affected receptors.

17.23 The effect associated with future fixed and mechanical plant installations is also considered to be potentially adverse. However, a proportional level of mitigation measures secured via Conditions of Use will ensure that the effect is significantly reduced.

17.24 It is anticipated that there will be no other permanent noise or vibration effects.

17.25 Consequently, the Proposed Development and measures outlined to mitigate any significant noise effects are considered to be both practical and effective in limiting the adverse effects of noise. They are also proportionate and consistent with other such development projects in similar suburban settings.

17.26 It is, therefore, concluded that both existing and future residents of the Proposed Development at or around the Site will be protected from the dominant sources of noise, assuming appropriate mitigation measures are included within the development to achieve appropriate internal noise levels.

17.27 As such, it is considered that noise and vibration effects do not present a constraint to the granting of planning permission for a residential-led development at the Site.

Townscape and Visual Amenity

17.28 The Site is located on the eastern edge of Welwyn Garden City town centre, separated by the East Coast Mainline railway. The Site is located within the industrial zone of Welwyn



Garden City on the grounds of the former Shredded Wheat factory. It contains Grade II Listed buildings of the former Shredded Wheat factory, of which the silos and production hall form a visual landmark and contribute to within the surrounding townscape character, provide a sense of place and form some of the oldest industrial development within Welwyn Garden City.

17.29 The Site features an existing pedestrian connection running east/west through the Site along Hyde Way, which connects over the railway via a pedestrian footbridge towards Welwyn Garden City town centre. Due to the decline in industry and manufacturing over the last century the Site has fallen into disrepair and dereliction, affecting the quality of the Site and immediate townscape setting.

17.30 The majority of views into the Site are from roads, railway station and pedestrian routes adjacent to, or in very close proximity to the Site. Opportunities for views of the Site from a distance of greater than a few hundred metres are limited to the tops of the silos, as for the most part the Site is visually screened by layers of existing intervening built form and vegetation. A long distance view, through intervening vegetation towards the tops of the silos and chimney, is currently experienced by receptors visiting Hatfield House and Gardens (a Registered Historic Park and Garden and Grade I listed building).

17.31 During demolition and construction, there would inevitably be a visual intrusion to the local townscape and views from locations close to the Site as a result primarily of large construction plant and machinery, including tower cranes, and the presence of partially completed built form of the Proposed Development. There would be also temporary disruption to the public access along Hyde Way. However, this situation is unavoidable for the redevelopment of the Site and would only be temporary in nature.

17.32 A small proportion of existing trees and vegetation would be removed during demolition and construction but this would also be offset by the significant amount landscaping incorporated as part of the Proposed Development. Once new planting has established, the landscape proposals would increase the vegetation coverage, diversity and amenity value within the Site.

17.33 The design of the Proposed Development is a culmination of an extensive consultation process with WHBC, Historic England and many other statutory and non-statutory stakeholders as part of an iterative design process. The Proposed Development would regenerate a parcel of former industrial, brownfield, derelict land of low townscape quality that contains valued Grade II Listed buildings. The Proposed Development would introduce new high quality built form and enhance the sense of place.

17.34 The Proposed Development would ensure the long term prominence and monumentality of the original 1920s elements of the Grade II Listed former Shredded Wheat Factory through their retention and refurbishment. The Proposed Development would introduce a number of community uses, including play provision, and would deliver new public realm, green open space and highway improvements. These result in the integration of the Proposed Development in the wider setting of Welwyn Garden City.

17.35 The design of the Proposed Development in its wider context was assessed using 21 different viewpoints, which were selected in consultation with WHBC and Historic England.

17.36 For pedestrians in the immediate area of the Site, on Broadwater Road, Bridge Road and on the Network Rail footbridge into the Site, the Proposed Development would positively enhance the visual quality, experience and approach creating a welcoming, safe and visually inviting townscape. People using Welwyn Garden City railway station would also experience an improvement to their views towards the Site.

17.37 For users of the Peartree Heritage Trail in close proximity to the Site the Proposed Development would result in the removal of their permanent sequential view of the extensive Listed Buildings within the Site as they travel along the trail (following removal of all but the 1920s listed buildings). However, framed views of the retained 1920s Listed Buildings would be opened up at key points.

17.38 For a small proportion of residential receptors, directly adjacent to the Site's southern boundary, the Proposed Development would introduce built form that would be an improvement on the existing view of the derelict Site but that would restrict a proportion of their middle ground and distant views.

17.39 Views in the near distance would include glimpses of the additional built form of the Proposed Development but generally these would not result in a significant change to these views. Similarly, visitors and tourists to Hatfield House with long distance views towards the Site would experience a reduction in the visible extent of the silos at the Site following the demolition of those added in the 1930s and later. However, this would not be a significant change to the view of Welwyn Garden City from this location as only glimpsed views of the silos through existing vegetation currently exist.



Ecology & Nature Conservation

17.40 The ecological baseline value and likely significant effects resulting from the development were assessed in accordance with guidelines published by CIEEM. An ecological assessment of the Site was undertaken in 2015 and subsequently updated in 2017.

17.41 The Site is dominated by buildings and hardstanding with trees located primarily at the Site perimeter. Scrub, grassland, ephemeral / short perennial, bare / re-colonising ground and ruderal habitat is also present within the north-west and south of the Site. The Site currently contains limited ecological interest with habitats that are largely of negligible or limited local ecological value.

17.42 The existing buildings have negligible to low suitability for roosting bats and four trees are suitable for roosting bats. During demolition of buildings and removal of the trees with bat roost potential, pre-works checks and watching briefs would be employed. In the unlikely event that bats are encountered during these works, works would immediately cease and a suitably qualified ecologist would provide advice. This would ensure that no harm would come to any bats that may be roosting within the buildings or trees.

17.43 A single pair of peregrine falcon was recorded nesting at the Site during spring 2014. The silo walkway structure that was used for the nesting site would be retained within the Proposed Development. To avoid disturbance of these birds during demolition and construction, a mitigation strategy has been developed. This aim is to discourage peregrine falcon from nesting at the silo and instead encourages nesting at a temporary site which has already been provided by the Applicant away from the silo in the southern portion of the Site. In addition, a permanent nesting box / ledge will be installed as part of the renovation work on the retained silo, ensuring a long-term nesting opportunity for peregrine falcons within the Site.

17.44 Other mammals and nesting birds within the Site will be safeguarded during clearance and construction works through the implementation of standard avoidance and mitigation measures. Long-term, opportunities for these groups, including hedgehog, will be maintained and enhanced at the Site through the provision of suitable habitat and sheltering / nesting opportunities such as hedgehog domes and bird boxes.

17.45 A small population of slow-worm has previously been translocated out of the Site and the Site is now considered sub-optimal for this species. Any slow-worm that have recolonised the Site will be safeguarded during clearance and construction works by a habitat manipulation



exercise and ecological supervision of sensitive clearance. Residual opportunities for slow-worm will be maintained and enhanced by the inclusion and ongoing management of suitable habitat within landscape proposals and the provision of enhancements such as artificial refugia / hibernacula.

17.46 The majority of existing trees forming the north-western boundary of the Site are to be retained as part of the proposals. Invasive plants at the Site such as Japanese knotweed will be eradicated as part of the Proposed Development. These areas, and other locations within the Site will be supplemented with new tree planting, including native trees of local provenance and known value to wildlife.

17.47 The ecological value of the Site would be improved as a result of habitat creation and ecological enhancement measures such as wildflower-rich grassland and marginal planting, provision of bird and bat nesting and roosting opportunities, provision of hedgehog and reptile sheltering opportunities and the creation of new habitat types such as aquatic habitats and living walls / roofs.

Water Quality, Hydrology and Flood Risk

17.48 From reviewing the baseline conditions within and surrounding the Site, groundwater and foul drainage and mains water supply are considered to be the key receptors in terms of the Proposed Development. For groundwater, this is due to the Site being situated on a Principal Aquifer and within an SPZ Zone 3. For foul drainage and mains water supply, the high sensitivity classification is due to the local drainage infrastructure not having the capacity for the Proposed Development without mitigation and consultation with Thames Water is ongoing. Surface water is considered to be medium sensitivity as the Site is located within the 'Mimram' catchment which has a 'Moderate' ecological status. Flood risk and drainage are considered to be low sensitivity receptors as the Site is located in Flood Zone 1 and is not in a critical drainage area.

17.49 The key effect during the construction phase is the potential for the remobilisation of contaminants at the Site. However, with suitable mitigation measures, the residual effect is considered to be negligible. Water demand and foul demand are considered to be the key potential effects during the operational phase of the Proposed Development. However, with suitable mitigation measures put in place, the residual effects are considered to be minor adverse for water demand and foul demand.



17.50 The Proposed Development will include Sustainable Drainage Systems (SuDS), as detailed within the Flood Risk Assessment and Drainage Strategy report. The system seeks to reduce the rate of surface water runoff in accordance with local policy. This runoff rate would be lower than the current natural rate of surface water runoff during extreme events.

17.51 In conclusion, given the location and nature of the receptors, the overall environmental effect of the Proposed Development in relation to water resources and flood risk following mitigation measures is considered to be negligible to minor adverse. All residual effects are negligible with the exception of surface water drainage (minor beneficial) and water/foul demand (minor adverse).

Soils, Geology and Contaminated Land

17.52 An assessment of ground conditions and contamination has been undertaken using the findings of a desk based study and various intrusive site investigations undertaken at the Site over many years.

17.53 An assessment of the potential impacts during the construction phase has been carried out. This has shown that during this phase of the Proposed Development, land contamination is unlikely to worsen during site activities. Through good site practice and the implementation of suitable mitigation measures such as Personal Protective Equipment (PPE) and implementing techniques as part of the Construction Environmental Management Plan (CEMP), any potential temporary impact may be effectively mitigated, and the resultant impacts are neutral.

17.54 The site investigations identified significant contamination of the groundwater underlying the Site and localised soil contamination around the former Polycell Factory (now demolished). Remediation measures have been used to address this former source of contamination and groundwater testing has established that levels of contamination have significantly decreased within groundwater as a result. Widespread, or significant contamination has not been identified elsewhere within the Site, however site investigation has not been completed across the entire Site. An additional phase of site investigation works commenced in September 2017.

17.55 The residual impact of the Proposed Development on land contamination is negligible/neutral during both the construction and operational phases.



Cultural Heritage

17.56 The likely effects of the Development on built heritage within the Site and surrounding area have been assessed. The assessment has been carried out in accordance with the legislation, policy and guidance provided at a national and local level.

17.57 The Site contains the former Shredded Wheat factory which is Grade II listed and recognised to be of national importance and of special architectural and historic interest. The Shredded Wheat Factory complex was developed piecemeal through the middle of the 20th century. The original part of the factory complex, built between 1924 and 1926, remains largely 'as built' including the main factory, boiler house and silos. Later additions were made to the factory in the 1930s and 1950s but these have been demolished.

17.58 The original 1920s factory building and silos embody the greatest heritage value, being of pioneering construction and 'moderne' design.

17.59 Immediately to the south of the Site is a grade II listed office building of the Roche Products factory, the factory itself now demolished. Approximately 4.2km to the south-east of the Site is the grade I listed Hatfield House and Gardens. The Site is close to the Welwyn Garden City Conservation Area.

17.60 The Development would involve some alterations to the 1920s factory structures to insert new uses into the original buildings. Building recording would be undertaken prior to demolition, which would include written and photographic information to preserve a permanent record of the structures.

17.61 Key views of the retained original factory buildings and silos have been created through careful design of the rest of the development. New public open spaces would be provided to provide a suitable setting for the reinstated grand entrance to the former Shredded Wheat Factory and link the east and west of the town, with the listed structures forming the principal backdrop.

17.62 The development would improve the setting of the Grade II listed former Roche Products Factory Office Building by replacing the currently vacant and derelict land to the south of the site with new residential development and landscaping.



17.63 The Conservation Area has a clearly defined eastern boundary along the railway line. The back of the Howard Centre (and the railway line) provides a hard physical backdrop ensuring that the development would have change to its setting.

17.64 The Site is just discernible in the view from Grade I listed Hatfield House with the silos visible at a distance. As such, there would be negligible change to the view from Hatfield House towards the site once the development is completed.

Socio-Economics

17.65 There are no published standards or technical guidelines that set out a preferred methodology for assessing the likely socio-economic effects of a development. A series of commonly used methodologies to quantify economic effects both during the construction of a development and following its completion have therefore been adopted for the socio-economic assessment. Other qualitative techniques are also frequently adopted to assess the social effects of a development. Where possible, the likely significant socio-economic effects have been quantified, but where this is not possible, a qualitative assessment is provided using professional judgement.

17.66 The baseline socio-economic conditions have been established through the interpretation of national, recognised research and survey information.

17.67 The socio-economic assessment has identified that 605 FTE jobs would be generated by the Proposed Development during the four year construction phase. These jobs include those directly created by the Proposed Development at the Site and those created along the supply chain through the provision of goods and services to the construction process.

17.68 Once completed, the Development is predicted to generate 634 new FTE jobs within the region; 422 of which would be generated locally. It is envisaged that some of the new jobs would be filled by residents of the local area and this would contribute to reducing unemployment in WHB.

17.69 The provision of 1,454 residential dwellings would positively contribute to the housing targets within WHB. The proposed dwellings would be built to Nationally Described Space Standards and Building Regulations Part M Cat 2 (equivalent to Lifetime Homes Standards). Wheelchair units have been designed to comply with Building Regulations Part M cat 3.



Delivering dwellings to these standards would ensure the provision of high quality private housing stock.

17.70 The location of the Proposed Development is highly accessible and would address the WHBC District Plan objective of reducing the use of private cars and directing growth to those areas with good transport networks and which are well served by jobs, services and facilities.

17.71 There is potential for cumulative beneficial effects to occur with regards to the construction supply chain and the local economy resulting from the combination of the Proposed Development and other nearby proposed developments considered. These effects are unlikely to be significant. No potential cumulative effects are identified in relation to housing delivery. The potential for beneficial cumulative effects is uncertain.