E1.11

ES Chapter 11 - Air Quality

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November 2025

THE CROWN ESTATE

East Hemel

11. Air Quality

11.1 Introduction

11.1.1 This Chapter of the Environmental Statement (ES) presents the findings of the Environmental Impact Assessment (EIA) work undertaken concerning potential impacts of the Development on air quality.

11.1.2 This Chapter:

- presents the environmental baseline established from desk studies;
- presents the potential environmental effects on air quality arising from the construction and operation of the Development;
- identifies any assumptions and limitations encountered in compiling the environmental information; and
- highlights any necessary monitoring and/or mitigation measures that could prevent, minimise, reduce or offset the possible environmental effects identified in the EIA process.

11.1.3 This Chapter is supported by the following appendices which are contained in **ES Volume 3**:

- **Appendix 11.1:** Planning policy and legislative context;
- **Appendix 11.2:** Road-traffic emissions assessment;
- **Appendix 11.3:** Dust mitigation measures;
- **Appendix 11.4:** Consultation; and
- **Appendix 11.5:** Figures, comprising:
    - Figure 11.1: Existing non-residential human health receptors;
    - Figure 11.2: Existing representative residential receptors;
    - Figure 11.3: Future human receptors;
    - Figure 11.4: Monitoring sites closest to the Development and affected roads
    - Figure 11.5: Ecological receptors;
    - Figure 11.6: AQMAs in proximity to the Development;
    - Figure 11.7: Project specific monitoring site locations;
    - Figure 11.8: Affected roads during the Works (EPUK and IAQM 2017 guidance);
    - Figure 11.9: Affected roads during the Completed and Operational Development (EPUK and IAQM 2017 guidance);
    - Figure 11.10: Affected roads during the Works (IAQM 2020 guidance); and

- Figure 11.11: Affected roads during the Completed and Operational Development (IAQM 2020 guidance).

11.1.4 This Chapter has been prepared by the Savills Air Quality team within the Environment and Infrastructure department.

11.2 Assessment Methodology and Significance Criteria

Relevant Guidance, Policy and Legislation

11.2.1 The methodology employed for the assessment of air quality in this Chapter of the ES has been developed using several relevant guidance documents, namely:

- EPUK and IAQM (2017): 'Land-Use Planning and Development Control: Planning for Air Quality'[1] ('the EPUK and IAQM 2017 guidance');
- IAQM (2024): 'Guidance on the assessment of dust from demolition and construction'[2] ('the IAQM 2024 guidance');
- Defra (2022): 'Local Air Quality Management - Technical Guidance (TG22)'[3];
- IAQM (2020): 'A guide to the assessment of air quality impacts on designated nature conservation sites'[4] ('the IAQM 2020 guidance'); and
- Standards for Highways (2024): 'Design Manual for Roads and Bridges, LA 105 – Air quality'[5] ('DMRB).

11.2.2 In addition to the above guidance documents, the methodology employed for the assessment of air quality has considered applicable international, national and local policy concerning air quality (**ES Volume 3: Appendix 11.1**).

11.2.3 The assessment of air quality presented in this Chapter can be categorised into the following categories:

- The assessment of dust during the Works; and
- The assessment of road traffic emissions, which can be further categorised into the following:
  - The assessment of road traffic emissions on human health receptors during the Works;
  - The assessment of road traffic emissions on human health receptors during operation;
  - The assessment of road traffic emissions on ecological receptors during the Works; and

[1]Environmental Protection UK (EPUK, now referred to as the Environmental Policy Implementation Community [EPIC]) and the Institute of Air Quality Management (IAQM), https://laqm.defra.gov.uk/assets/airqualityplanningguidance.pdf, accessed: 01/07/25
[2]IAQM (2024): Guidance on the assessment of dust from demolition and construction, https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf, accessed 01/07/25
[3] Defra (2022): Local Air Quality Management - Technical Guidance (TG22), https://laqm.defra.gov.uk/wp-content/uploads/2022/08/LAQM-TG22-August-22-v1.0.pdf, accessed 01/07/25
[4]IAQM (2020): A guide to the assessment of air quality impacts on designated nature conservation sites, https://www.iaqm.co.uk/text/guidance/air-quality-impacts-on-nature-sites-2020.pdf, accessed 01/07/25
[5] Standards for Highways (2024): Design Manual for Roads and Bridges, LA 105 – Air quality, https://www.standardsforhighways.co.uk/search/af7f4cda-08f7-4f16-a89f-e30da703f3f4, accessed 01/07/25

- The assessment of road traffic emissions on ecological receptors during operation.

Predicting Effects

11.2.4 Different methodologies have been applied to assess the air quality impacts of construction dust; road traffic emissions on human health receptors; and road traffic emissions on ecological receptors. It should be noted that whilst the proposals would allow for industrial activities to be located on the Site, the outline nature of the application means that there are no details of future occupiers or future activities by these occupiers. Therefore, the consideration of any point source emissions is not possible at this stage and would be addressed at reserved matters stage if required. With respect to the assessment of road traffic emissions on both human health and ecological receptors, dispersion modelling has been undertaken and the methodology employed to model air quality dispersion from road traffic sources is the same for both receptor types. To analyse the impacts of road traffic emissions (i.e. the output of the dispersion modelling), different methodologies have been applied for each respective receptor type. Details of the methodologies used are provided below.

Assessment of Dust

11.2.5 The purpose of this assessment is to identify the level of risk from dust and emissions associated with the construction activities and propose a suitable mitigation strategy to ensure negative impacts are controlled and minimised. Dust from construction processes contains a range of particle sizes, types and compositions. These can cause annoyance from soiling, and long-term exposure can potentially have morbidity or mortality effects. The emissions for consideration in this assessment are particulate matter: PM_{10} and $PM_{2.5}$.

11.2.6 Concentration-based limit values and objectives have been set for the PM_{10} and $PM_{2.5}$ suspended particle fraction, but no statutory or official numerical air quality criterion for deposited dust annoyance or nuisance has been set. Construction dust assessments have tended to be risk based, focusing on the appropriate measures to be used to keep dust impacts at an acceptable level.

11.2.7 Consistent with the IAQM 2024 guidance on the assessment of dust from demolition and construction, a risk-based assessment has been undertaken. The main steps are as follows:

- screen the need for a detailed assessment;
- define the potential dust emission magnitude;
- define the sensitivity of the areas;
- assess the risk of dust impacts during the demolition, earthworks, construction and trackout phases;
- recommend site-specific mitigation; and,
- determine significant effects.

11.2.8 The need for a detailed dust assessment is dependent on the presence of sensitive receptors within a certain distance of works. An assessment is required where there is a human receptor[6] within 250 m of the boundary of the Site and/or 50 m of the trackout route(s) used by construction vehicles on the public highway, up to 250 m from the site entrance(s). An assessment will be required where there is an ecological receptor[7] within 50 m of the boundary of the Site and/or 50m of the trackout route(s) used by construction vehicles on the public highway, up to 250 m from the Site entrance(s). **ES Volume 3, Appendix 11.5**, Figure 11.5: 'Ecological receptors' illustrates the location of ecological receptors in relation to the Development, showing several ecological receptors that meet the above criteria. Therefore, a dust assessment is required and provided below.

Magnitude of Impact

11.2.9 For the dust assessment, a site is allocated to a risk category based on the potential dust emission magnitude as well as the sensitivity of the area. As outlined in the guidance, potential definitions for dust emission magnitude for all four construction activities (i.e., demolition, earthworks, construction, trackout) are provided, as seen in **Table 11.1**.

[6] any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10} over a time period relevant to the Air Quality Objectives
[7] any sensitive habitat affected by dust soiling, whether by direct impacts on vegetation or aquatic ecosystems of dust deposition, or the indirect impacts on fauna (e.g. on foraging habitats). This may include statutory and non-statutory designated sites depending on their sensitivity to dust and reason for designation.

Table 11.1: IAQM Magnitude Criteria

Construction Activity	Dust Emission Magnitude		
	Large	Medium	Small
Demolition	Total building volume over 75,000 m^3, potentially dusty construction material (e.g. concrete), on-site crushing and screening, demolition activities > 12 m above ground level.	Total building volume between 12,000 to 75,000 m^3, potentially dusty construction material and demolition activities 6 to 12 m above ground level.	Total building volume less than 12,000 m^3, construction material with low potential for dust release (e.g. metal cladding or timber), demolition activities < 6 m above ground, demolition during winter months.
Earthworks	Total site area over 110,000 m^2, potentially dusty soil type (e.g. clay), >10 heavy earth moving vehicles active at any one time, formation of bunds > 6 m in height	Total site area between 18,000 to 110,000 m^2, moderately dusty soil type (e.g. silt), five to ten heavy earth moving vehicles active at any one time, formation of bunds 3 m to 6 m in height.	Total site area less than 18,000 m^2. Soil type with large grain size (e.g. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 3 m in height.
Construction	Total building volume over 75,000 m^3, activities include piling, on-site concrete batching, sand blasting.	Total building volume between 12,000 and 75,000 m^3, use of construction materials with high potential for dust release (e.g. concrete), activities include piling, on-site concrete batching.	Total building volume below 12,000 m^3, use of construction materials with low potential for dust release (e.g. metal cladding or timber).
Trackout	>50 HDV outwards movements in any one day, potentially dusty surface material (e.g. High clay content), unpaved road length > 100 m.	20 to 50 HDV outwards movements in any one day, moderately dusty surface material (e.g. High clay content), unpaved road length 50 – 100 m.	<20 HDV outwards movements in any one day, surface material with low potential for dust release, unpaved road length < 50 m.

Sensitivity of Receptors

11.2.10 The IAQM 2024 guidance notes that the following factors should be taken into account when considering the sensitivity of the area:

- the specific sensitivities of receptors in the area;
- the proximity and number of those receptors;
- in the case of PM_{10}[8], the local background concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of wind-blown dust.

[8] PM_{10} is referenced specifically as construction activities typically generate coarser dust (i.e. dust less than 10µm, but larger than 2.5µm)

11.2.11 **Table 11.2** sets out the IAQM 2024 guidance basis for categorising the sensitivity of people and ecological receptors to dust soiling effects and to the health effects of PM_{10}.

Table 11.2: IAQM Sensitivity Criteria

Receptor	Sensitivity		
	High	Medium	Low
Dust soiling	Users can reasonably expect enjoyment of a high level of amenity; or the appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.	Users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or the appearance, aesthetics or value of their property could be diminished by soiling; or the people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.	The enjoyment of amenity would not reasonably be expected; or property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.
Human health	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (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).	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (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).	Locations where human exposure is transient.
Ecological	Locations with an international or national designation and the designated features may be affected by dust soiling; or locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain.	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or locations with a national designation where the features may be affected by dust deposition.	Locations with a local designation where the features may be affected by dust deposition

Significance of Effect

11.2.12 As per the IAQM guidance, there are four types of activities on construction sites: demolition; earthworks; construction and trackout. To predict effects, the risk of unmitigated dust impacts must first be defined for each of the four construction activities. The risk of dust impacts ranges from negligible risk to high risk depending on the receptor sensitivity and dust emission magnitude, as shown in **Table 11.3** and **Table 11.4**.

Table 11.3: Risk of Dust Impacts – Demolition

		Magnitude of Impact		
		Large	Medium	Small
Sensitivity of Receptor	High	High Risk	Medium Risk	Medium Risk
	Medium	High Risk	Medium Risk	Low Risk
	Low	Medium Risk	Low Risk	Negligible

Table 11.4: Risk of Dust Impacts – Earthworks, Construction and Trackout

		Magnitude of Impact		
		Large	Medium	Small
Sensitivity of Receptor	High	High Risk	Medium Risk	Low Risk
	Medium	Medium Risk	Medium Risk	Low Risk
	Low	Low Risk	Low Risk	Negligible

11.2.13 The IAQM guidance states that significance of effect should be determined after consideration of the committed mitigation, which should be defined based on the magnitude of dust risk and sensitivity of receptors and secured through measures such as a Construction Environmental Management Plan (CEMP). The guidance provides recommended mitigation measures appropriate to different construction phases/activities and the pre-mitigation dust risk magnitude. The guidance indicates that the goal of identifying and securing implementation of these applicable and proportionate mitigation measures is to prevent significant effects from dust arising, which should normally be possible, and therefore the effect with committed mitigation in place will normally be determined as 'not significant'.

Assessment of Road Traffic Emissions

11.2.14 Traffic emissions during the Works and during the Completed and Operational Development have been scoped into the assessment of air quality as the anticipated AADT flows exceed the indicative criteria which require an air quality assessment, as per the EPUK and IAQM 2017 guidance for human health receptors, and the IAQM 2020 guidance for ecological receptors.

11.2.15 The assessment of road traffic emissions for emissions during both the Works and during the Completed and Operational Development follows the same methodology. For the assessment of road traffic emissions on human health receptors, this Chapter will follow the EPUK and IAQM 2017 guidance; and for the assessment of road traffic emissions on ecological receptors, this Chapter will follow the IAQM 2020 guidance, supplemented with the Design Manual for Roads and Bridges (DMRB) LA 105 – Air Quality, as advised by the project ecologists.

11.2.16 The significance of an effect is determined based on the magnitude of an impact and the sensitivity of the receptor affected by the impact of that magnitude. This section describes the criteria applied in this Chapter to characterise the magnitude of potential impacts and sensitivity of receptors.

Magnitude of Impact

Human Health

11.2.17 The magnitude of impact is considered to be the change in concentration relative to the Air Quality Assessment Level (AQAL). The AQAL may be an air quality objective (AQO), EU limit or target value, or an Environment Agency 'Environmental Assessment Level (EAL)'. For the purposes of this assessment, the AQAL is the AQO as prescribed by UK policy (**ES Volume 3: Appendix 11.2**) and presented in **Table 11.5** for reference.

Table 11.5: Summary of relevant objectives of the National Air Quality Strategy

Pollutant	Objectives	Concentration measured as
Nitrogen dioxide (NO2)	200 µg/m^3 not to be exceeded more than 18 times a year	1 hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM10)	50 µg/m^3 not to be exceeded more than 35 times a year	24 hour mean
	40 µg/m^3	Annual mean
Particulate Matter (PM2.5)	20 µg/m^3	Annual mean

11.2.18 Magnitude of impact, based on the change that the Development would have upon the resource/receptor, is considered within the range of major, moderate, minor, negligible and no change. Consideration is given to scale, duration and frequency of impact, and reversibility. For long term (annual mean) impacts the magnitude of impact descriptors are presented in **Table 11.6**.

Table 11.6: Impact Description for Individual Sensitive Human Receptors

Concentration with Development	% change in concentration relative to Air Quality Assessment Level (AQAL)			
	1%	2-5%	6-10%	>10%
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Concentration with Development	% change in concentration relative to Air Quality Assessment Level (AQAL)			
	1%	2-5%	6-10%	>10%

IAQM and EPUK notes to this table:

AQAL = Air Quality Assessment Level, which may be an air quality objective, EU limit or target value, or an Environment Agency 'Environmental Assessment Level' (EAL).

The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0%, i.e. less than 0.5% will be described as negligible.

The table is only designed to be used with annual mean concentrations.

Descriptors for individual receptors only; the overall significance is determined using professional judgement. For example, a 'moderate' adverse impact at one receptor may not mean that the overall impact has a significant effect. Other factors need to be considered.

When defining the concentration as a percentage of the AQAL, use the 'without scheme' concentration where there is a decrease in pollutant concentration and the 'with scheme' concentration for an increase.

The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposures less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approached and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL.

It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.

11.2.19 It is intended that the change in concentration relative to the AQAL (the Development contribution) is rounded to the nearest whole number. Therefore, any impact which is between 0.5% and 1.5% would be classified as a 1% change in concentration. An impact of less than 0.5% is described as negligible, irrespective of the total concentration.

Ecology

11.2.20 The EPUK and IAQM 2017 guidance states that it is not designed for assessing impacts on ecology. The IAQM 2020 guidance draws upon the Air Emissions Guidance screening criteria, which have been used to screen for potentially significant impacts. The Air Emissions Guidance states that where an impact is less than 1% of the long-term or 10% of the short-term Critical Level or Load, the impact can be screened out as 'insignificant'. For long-term impacts that exceed this threshold, if the total concentration is less than 70% of the long-term Critical Level or load the impact is 'not significant'. For short-term impacts significance is determined by the risk of exceeding the Critical Level or Load.

Sensitivity of Receptor

Human Health

11.2.21 The sensitivity of the receptor is indicated by the baseline long-term average concentration at that location. Receptors with a higher baseline concentration, with less headroom to exceedance an AQAL, are therefore considered to be more sensitive to changes in air quality concentrations.

Ecology

11.2.22 The sensitivity of each ecological receptor to air quality effects has been assessed (as required) in **ES Volume 2: Chapter 8: Ecology and Nature Conservation**.

Significance of Effect

Human Health

11.2.23 The EPUK and IAQM 2017 guidance has its own methodology to determine the significance of an effect, which is used in this air quality chapter. The guidance follows a similar approach to the assessment framework presented in **ES Volume 2, Chapter 2: EIA Methodology** in that the magnitude of an impact is considered in the context of the sensitivity of air quality at each receptor to determine the significance of effect. However, the matrix used to determine the significance of effect for air quality is the same as outlined in the EPUK and IAQM 2017 guidance.

11.2.24 The IAQM 2017 Planning Guidance, which is used to assess process emissions, states that impacts on air quality will have an effect on human health that can be judged as 'significant' or 'not significant'. Typically, this will be based on annual mean impacts. The guidance further states that impacts classified as 'moderate' or higher are generally considered to be significant for 'high' sensitivity receptors. However, the assessment of significance is principally left to professional judgement, and guidance is provided on the factors that need to be considered, namely:

- 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.

11.2.25 The human-health impact descriptors presented above in **Table 11.6** apply at individual receptors. The EPUK & IAQM 2017 guidance states that the impact descriptors:

"are not, of themselves, a clear and unambiguous guide to reaching a conclusion on significance. These impact descriptors are intended for application at a series of individual receptors. Whilst it maybe that there are 'slight', 'moderate' or 'substantial' impacts at one or more receptors, the overall effect may not necessarily be judged as being significant in some circumstances."

11.2.26 As such, the overall significance of effect is determined using professional judgement.

Ecology

11.2.27 The IAQM 2020 Ecology Guidance allows air quality practitioners to assess the magnitude of the impacts on designated habitat sites. The assessment of the magnitude of the impacts is presented in detail in **ES Volume 3, Appendix 11.2**. The significance of effect is to be assessed by a qualified ecologist. Therefore, the assessment of significance of air quality effects on designated habitat sites is presented in **ES Volume 2, Chapter 8: Ecology and Nature Conservation**.

Geographical Scope

Assessment of Dust Emissions

11.2.28 For the construction-phase dust assessment, the geographical scope is up to 250 m from the Site boundary and up to 50 m from roads within 250 m of the Site, based on the IAQM dust guidance (2024).

Assessment of Traffic Emissions

Human Health

11.2.29 LAQM.TG(22) describes the typical locations where air quality impacts should be considered: generally, the guidance suggests that it should be all locations "where members of the public are regularly present". This can include residences, businesses, schools, and leisure or recreational areas.

11.2.30 To assess air quality impacts on human health receptors, pollutant concentrations have been predicted at representative sensitive receptors, selected as the nearest residential properties and businesses to the road traffic network during both the Works and the Completed and Operational Development, where pollutant concentrations and/or changes in pollutant concentrations are anticipated to be greatest. They are therefore representative of all receptors within proximity and likely to be impacted by the Development. When selecting receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested and where there is a combined effect of several road links. **Table 11.7** provides the location of each receptor, whilst the following figures in **ES Volume 3, Appendix 11.5** illustrate the locations:

- Figure 11.1: Existing non-residential human health receptors;
- Figure 11.2: Existing residential human health receptors; and
- Figure 11.3: Introduced (future) receptors.

11.2.31 It should be noted that the volume of traffic generated during the Works is anticipated to be considerably lower than the total volume of traffic generated by the Completed and Operational Development. During the peak phase of the Works, there are seven links which exceed the EPUK and IAQM 2017 guidance thresholds, and two links which exceed the IAQM 2020 thresholds. Conversely, during the Completed and Operational Development, there are 54 links which exceed the EPUK and IAQM 2017 guidance thresholds, and 39 links which exceed the IAQM 2020 thresholds. Hence, the number of receptors in proximity to links which require dispersion modelling is

considerably lower during the Works than during the Completed and Operational Development; these receptors are marked with an asterisk in **Table 11.7.**

11.2.32 Future occupiers of the Development have also been included within the model for future years. For these receptors, transects have been drawn from each affected road to the furthest edge of proposed built development, consistent with the areas of built development provided in the Land Use Parameter Plan. Pollutant concentrations have been modelled at 50 m intervals along each transect, away from the affected road. These receptors are represented by receptors 164-207, where receptors 164-183 and 191-207 are along the transect associated with proposed residential development, receptors 184-190 are along the transect associated with proposed secondary school, and receptors 167-170, 175-183 and 191-200 are along transects associated with the proposed primary schools; further detail is provided in **Table 11.7**.

Table 11.7: Modelled Receptors Relevant to the Assessment of Human Health

Receptor ID	Description	Receptor Type	Coordinates		Height (m)
			X	Y	
1	Mountbatten Lodge	Assisted living / care	506378	206756	1.5
2	Dacorum Day Service (respite care for adults with learning difficulties)		506475	206795	1.5
3	St Mary's House		505723	207863	1.5
4	Lime Tree Manor		507064	207645	1.5
5	Cherry Tree Manor		506805	207634	1.5
6	Evelyn Shar House		507475	206985	1.5
7	St Mattews Care Home in Redbourn		510603	211773	1.5
8	Queensway House		506939	208391	1.5
9	Florence Longman House		505910	205294	1.5
10	St Pauls Care Centre		506059	207974	1.5
11	Colleycare Limited		505743	207709	1.5
12	Aydeyfield Community Centre (including Youth Booth Community Hub)	Community centre	506900	207429	1.5
13*	Apsley Community Centre		505729	205476	1.5
14	Services for Young People Hemel Hemsptead		506560	206714	1.5
15	The Aydeyfield School	Educational	507140	207172	1.5
16	Hobletts Manor Infants and Junior School		507236	207707	1.5
17	Fingerprints Pre-school		507884	207845	1.5
18	Lime Walk Primary School		506690	206304	1.5
19	Brookfield Academy		506599	207323	1.5
20	Little Oaks Pre School		506974	207450	1.5
21	Bees Knees Day Nursery and Pre-School		506621	208866	1.5
22	Hammond Academy		506695	209007	1.5
23*	Busy Bees in Apsley		505744	205481	1.5

Receptor ID	Description	Receptor Type	Coordinates		Height (m)
			X	Y	
24	Flower Pots Day Nursery Apsley	Representative existing residential receptors	505990	205169	1.5
25	Pro Learning Studio Preschool		507795	209320	1.5
26	Apsley lock Pre-School		506519	205029	1.5
27	Leverstock Green Playgroup		508355	206661	1.5
28	George Street Primary School and Nursery		505794	207813	1.5
29	Jupiter Primary School		506747	208342	1.5
30	West Herts College - Hemel Hempstead		505492	207596	1.5
31	Hemel Hempstead General Hospital	Health and medical	505826	206852	1.5
32	Circle Integrated Care - South and West Hertfordshire		505675	206713	1.5
33*	Lincoln House Surgery		505756	205435	1.5
34	Everest House Surgery		507086	207410	1.5
35	Breakspear Medical		505782	206657	1.5
36	Medicspot Clinic Hemel Hemsptead		506822	208481	1.5
37*	Representative residential receptors along the A4251 – London Road (link 125)	Representative existing residential receptors	505586	205613	1.5
38*			505608	205609	1.5
39*			505700	205489	1.5
40*			505722	205459	1.5
41			505852	205378	1.5
42			505900	205311	1.5
43			505947	205267	1.5
44			505958	205210	1.5
45*	Representative residential receptors along Durants Hill Road (link 135)		505736	205520	1.5
46*			505760	205548	1.5
47*			505859	205685	1.5
48*			505888	205767	1.5
49*	Representative residential receptors along Lawn Lane, east of Durants Hill Road (link 86)		505925	205766	1.5
50*			505917	205759	1.5
51			505969	205715	1.5
52			506028	205713	1.5
53	Representative residential receptors along Belswains Lane, north (link 87)		506077	205671	1.5
54			506104	205683	1.5
55			506279	205424	1.5
56			506295	205437	1.5
57			506566	205057	1.5
58	Representative residential receptors along St Albans Hill (link 92)		506094	205725	1.5
59			506108	205759	1.5
60			506235	205882	1.5
61			506219	205902	1.5
62			506355	206066	1.5
63			506437	206153	1.5
64			506653	206331	1.5

Receptor ID	Description	Receptor Type	Coordinates		Height (m)
			X	Y	
65			506782	206458	1.5
66			506932	206550	1.5
67	Representative residential receptors along A414 St Albans Road, west of Jarman Way (link 9)		505572	206439	1.5
68			505597	206409	1.5
69			505886	206589	1.5
70			505927	206568	1.5
71			506308	206803	1.5
72	Representative residential receptors along A414 St Albans Road, between Longlands and Leverstock Green Road (link 8)		507494	206895	1.5
73			507535	206864	1.5
74			507669	207019	1.5
75			507684	206979	1.5
76	Representative residential receptors along Longlands (link 49)		507445	206874	1.5
77			507471	206895	1.5
78			507114	207134	1.5
79			506821	207494	1.5
80			506852	207522	1.5
81	Representative residential receptors along Adeyfield Road, east (link 40)		506825	207573	1.5
82			507015	207630	1.5
83			507289	207704	1.5
84			507299	207670	1.5
85	Representative residential receptors along Leverstock Green Road, between Wood Lane End and Adeyfield Road (link 42)		507421	207699	1.5
86			507381	207652	1.5
87	Representative residential receptors along High Street Green (link 41)		507354	207743	1.5
88			507392	207754	1.5
89			507262	208020	1.5
90			507295	208021	1.5
91			507245	208356	1.5
92			507178	208418	1.5
93	Representative residential receptors along B487 Queensway, east of Jupiter Drive (link 27)		507109	208518	1.5
94			507128	208478	1.5
95			506925	208324	1.5
96			506740	208158	1.5
97			506680	208126	1.5
98	Representative residential receptors along B487 Queensway, west of Cattsdell (link 24)		506207	207900	1.5
99			506180	207856	1.5
100			505899	207777	1.5
101			505933	207760	1.5
102			505623	207702	1.5
103	Representative residential receptors along A4147 Link Road, east of Piccotts End Road (link 15)		506137	208842	1.5
104			506137	208872	1.5
105	Representative residential receptors along A4147 Link Road,		506593	209014	1.5
106			506800	209092	1.5
107			507043	209175	1.5

Receptor ID	Description	Receptor Type	Coordinates X	Coordinates Y	Height (m)
	between Cambrian Way and Redbourn Road (link 16)				
108	Representative residential receptors along A4147 Redbourn Road, south of Pennine Way (link 28)		507172	208955	1.5
109			507194	208718	1.5
110	Representative residential receptors along A4147 Swallowdale Lane (link 29)		507266	208626	1.5
111*	Representative residential receptor along A4147 Hemel Hempstead Road (link 101)		509752	206105	1.5
112*	Representative residential receptor along A4147 Hemel Hempstead Road (link 104)		510235	205978	1.5
113*	Representative residential receptor between A4147, A414 M1 spur and the M1		510724	206046	1.5
114*	Representative residential receptor along A414 M1 spur (link 107)		512426	205751	1.5
115*	Representative residential receptor along A4147 Hemel Hempstead Road (link 101)		509753	206105	1.5
116*	Representative residential receptors along A414 M1 spur (link 107)		514050	205253	1.5
117*	Representative residential receptor along A414 M1 spur (link 106)		513643	205268	1.5
118*	Representative residential receptor along M1 (link 3)		511057	205712	1.5
119*	Representative residential receptors along A414 M1 spur (link 107)		510854	206492	1.5
120*			510312	206786	1.5
121	Representative residential receptor along Scheme Road North S (link 120)		508917	209047	1.5
122	Representative residential receptors along Three Cherry Trees Lane, east of Admiral Avenue (link 31)		507888	209232	1.5
123			507830	209277	1.5
124	Representative residential receptors along B487 Redbourn Road, between A4147 and Shenley Road (link 17)		507186	209213	1.5
125			507235	209198	1.5
126			507681	209587	1.5
127			507703	209565	1.5
128			508132	209760	1.5
129			508130	209731	1.5

Receptor ID	Description	Receptor Type	Coordinates X	Coordinates Y	Height (m)
130	Representative residential receptors along B487 Redbourn Road between Shenley Road west and east (link 18)		508251	209826	1.5
131			508250	209781	1.5
132	Representative residential receptors along B487 Hemel Hempstead Road (link 19)		509017	210321	1.5
133			509180	210573	1.5
134			509427	210759	1.5
135	Representative residential receptors along Redbourn Road between Hemel Hempstead Road and St Albans Road/High Street (link 130)		509943	211398	1.5
136			510266	211598	1.5
137	Representative residential receptor along A5183 South of Harpenden Lane/Redbourn Lane (link 131)		511172	212407	1.5
138	Representative residential receptor along A5183 North of Harpenden Lane/Redbourn Lane (link 132)		510310	213419	1.5
139	Representative residential receptors along Dunstable Road, east of M1 J9 (link 133)		510087	213740	1.5
140			509873	213926	1.5
141	Representative residential receptors along A4147 Leverstock Green Way (link 97)		508089	207126	1.5
142			508128	207038	1.5
143	Representative residential receptor along A4147 Leverstock Green Road (link 123)		508158	206767	1.5
144	Representative residential receptor along A4147 Leverstock Green Way (link 97)		508074	206913	1.5
145	Representative residential receptors along A4147 Leverstock Green Road (link 123)		508159	206723	1.5
146			508513	206557	1.5
147			508588	206528	1.5
148			508878	206440	1.5
149			508816	206438	1.5
150	DB41	Monitoring site	505677	205513	2
151	DB42		505677	205513	2
152	DB43		505677	205513	2
153	DB48		505696	205509	2
154	DB50		505734	205519	2
155	DB51		505734	205519	2
156	DB52		505734	205519	2
157	DB53		505969	205726	2
158	DB54		505969	205726	2
159	DB55		505969	205726	2

Receptor ID	Description	Receptor Type	Coordinates X	Coordinates Y	Height (m)
160	DB56		505930	205740	2
161	DB57		505930	205740	2
162	DB58		505930	205740	2
163	SA142		510754	206091	2.3
164	50 m from road	Transect 1 (proposed residential receptor potentially affected by link 124)	509913	206383	1.5
165	100 m from road		509947	206420	1.5
166	150 m from road		509980	206457	1.5
167	50 m from road	Transect 2 (proposed residential receptor / primary school potentially affected by link 116)	509008	207435	1.5
168	100 m from road		509055	207453	1.5
169	150 m from road		509101	207471	1.5
170	200 m from road		509148	207490	1.5
171	50 m from road	Transect 3 (proposed residential receptor potentially affected by link 106)	510062	206457	1.5
172	100 m from road		510025	206423	1.5
173	150 m from road		509988	206390	1.5
174	200 m from road		509950	206356	1.5
175	50 m from road	Transect 4 (proposed residential receptor / primary school potentially affected by link 106)	509747	206853	1.5
176	100 m from road		509709	206820	1.5
177	150 m from road		509671	206787	1.5
178	200 m from road		509633	206754	1.5
179	250 m from road		509596	206722	1.5
180	300 m from road		509558	206689	1.5
181	50 m from road	Transect 5 (proposed residential receptor / primary school potentially affected by link 106)	509499	207191	1.5
182	100 m from road		509460	207160	1.5
183	150 m from road		509421	207128	1.5
184	50 m from road	Transect 6 (proposed secondary school potentially affected by the M1)	509493	209383	1.5
185	100 m from road		509444	209388	1.5
186	150 m from road		509394	209393	1.5
187	200 m from road		509344	209398	1.5
188	250 m from road		509294	209403	1.5
189	300 m from road		509245	209408	1.5
190	350 m from road		509195	209413	1.5
191	50 m from road	Transect 7 (proposed residential receptor / primary school potentially affected by M1)	509437	209020	1.5
192	100 m from road		509387	209024	1.5
193	150 m from road		509338	209029	1.5
194	200 m from road		509288	209034	1.5
195	250 m from road		509238	209039	1.5
196	300 m from road		509188	209044	1.5
197	350 m from road		509139	209049	1.5
198	400 m from road		509089	209054	1.5
199	450 m from road		509039	209059	1.5
200	500 m from road		508989	209064	1.5

Receptor ID	Description	Receptor Type	Coordinates		Height (m)
			X	Y	
201	50 m from road	Transect 8 (proposed residential receptor potentially affect by link 122)	508677	209983	1.5
202	50 m from road	Transect 9 (proposed residential receptor potentially affect by link 118, measuring westerly effect)	508371	209878	1.5
203	100 m from road		508415	209901	1.5
204	150 m from road		508460	209924	1.5
205	50 m from road	Transect 10 (proposed residential potentially affected by proposed link 118, measuring south-westerly effect)	508449	209910	1.5
206	100 m from road		508472	209866	1.5
207	150 m from road		508496	209822	1.5
208	Cumulative Scheme 9	Cumulative schemes	509875	211640	1.5
209	Cumulative Scheme 19		508959	210298	1.5
210	Cumulative Scheme 14		506123	208866	1.5
211	Cumulative Scheme 13		507991	207340	1.5

Ecology

11.2.33 As described above, with regard to ecological receptors, the IAQM 2020 guidance notes that a quantitative assessment of the air quality impacts on designated nature conservation sites is required if sensitive ecological receptors are located within 200m of roads affected by the Development. The IAQM 2020 guidance notes that the following DMRB LA 105 – Air Quality thresholds are commonly used to screen the need for a quantitative assessment: a change in AADT flows of 1000 vehicles or 200 heavy duty vehicles (HDVs). Hence, all sensitive ecological receptors which satisfy the aforementioned criteria during each of the Works and the Completed and Operational Development, have been included within the geographical scope of this assessment. The location of each receptor is provided in **Table 11.8**, whilst **ES Volume 3: Appendix 11.5**, Figure 11.5: Ecological receptors illustrates the locations. Some of the individual receptors modelled do not correspond to a particular habitat, these receptors are located along the transect between the road and habitat, and hence, are not representative of the habitats to be assessed. These receptors have been labelled as 'N/A' in **Table 11.8.**

11.2.34 As described above, there are considerably fewer affected links during the Works than during the Completed and Operational Development. Hence, there are fewer receptors in proximity to affected roads during the Works; these receptors are marked with an asterisk in **Table 11.8** and comprise those associated with 'HPI woodland - Marchmont Pond area': receptors 284-291.

Table 11.8: Sensitive Ecological Receptors

Receptor ID	Distance from Affected Road (m)	Ecological Receptor	Coordinates		Height (m)
			X	Y	
212	25	N/A	509298	206286	1.5
213	50		509310	206308	1.5

Receptor ID	Distance from Affected Road (m)	Ecological Receptor	Coordinates		Height (m)
			X	Y	
214	75		509322	206330	1.5
215	100		509334	206352	1.5
216	125		509346	206374	1.5
217	150	Westwick Row Wood LWS & HPI (woodland)	509358	206396	1.5
218	175		509370	206418	1.5
219	200		509382	206440	1.5
220	25	Holy Trinity Church, Leverstock Green LWS (grassland)	508534	206521	1.5
221	50		508531	206496	1.5
222	75		508528	206471	1.5
223	100		508525	206446	1.5
224	25	HPI woodland parcels along B487 south of Redbourn village	510388	211636	1.5
225	50	N/A	510381	211660	1.5
226	75		510375	211684	1.5
227	100	Redbourn Common LWS	510368	211708	1.5
228	125		510361	211732	1.5
229	150		510355	211756	1.5
230	175		510348	211780	1.5
231	200		510342	211804	1.5
232	25	Ver Valley (by Chequer Lane) LWS	510808	211734	1.5
233	50		510821	211713	1.5
234	75		510835	211692	1.5
235	100		510849	211671	1.5
236	125		510862	211650	1.5
237	150		510876	211629	1.5
238	175		510889	211608	1.5
239	200		510903	211587	1.5
240	25	N/A	509510	210849	1.5
241	50		509528	210832	1.5
242	75		509546	210815	1.5
243	100	Nicky Way Dismantled Railway LWS	509564	210797	1.5
244	125	HPI woodland on-site (EH North)	509582	210780	1.5
245	150		509600	210763	1.5
246	25	Nicky Way Dismantled Railway LWS	508792	209955	1.5
247	50		508811	209971	1.5
248	75		508830	209987	1.5
249	100		508849	210003	1.5
250	125		508868	210020	1.5
251	150		508887	210036	1.5
252	175		508906	210052	1.5
253	200		508925	210068	1.5
254	25	N/A	507766	209336	1.5
255	50	HPI woodland near Spencers Park play area, south of railway line	507765	209361	1.5
256	75		507764	209386	1.5
257	100		507763	209411	1.5

Receptor ID	Distance from Affected Road (m)	Ecological Receptor	Coordinates		Height (m)
			X	Y	
258	125		507762	209436	1.5
259	150		507761	209461	1.5
260	25	HPI woodland - Pratt's Dell (Three Cherry Trees Lane)	508074	209055	1.5
261	50		508075	209080	1.5
262	75		508076	209105	1.5
263	100		508077	209130	1.5
264	25	N/A	507538	209479	1.5
265	50		507523	209500	1.5
266	75		507509	209520	1.5
267	100		507494	209540	1.5
268	125		507480	209560	1.5
269	150	Woodhall Wood LWS, AWI and HPI	507465	209581	1.5
270	175		507450	209601	1.5
271	200		507436	209621	1.5
272	25	N/A	507130	208838	1.5
273	50		507105	208832	1.5
274	75		507081	208827	1.5
275	100		507057	208821	1.5
276	125	Yew Tree Wood AWI and HPI	507032	208816	1.5
277	150		507008	208810	1.5
278	175		506984	208804	1.5
279	200		506959	208799	1.5
280	25	Widmore Wood LWS, AWI and HPI	507365	208625	1.5
281	50		507378	208603	1.5
282	75		507390	208581	1.5
283	100		507402	208559	1.5
284*	25	HPI woodland - Marchmont Pond area	508344	207460	1.5
285*	50		508354	207437	1.5
286*	75		508365	207415	1.5
287*	100		508375	207392	1.5
288*	125		508386	207369	1.5
289*	150		508396	207347	1.5
290*	175		508407	207324	1.5
291*	200		508417	207301	1.5
292	25	N/A	510961	205584	1.5
293	50		510939	205573	1.5
294	75		510917	205561	1.5
295	100	Potters Crouch Plantation LWS	510894	205550	1.5
296	125		510872	205538	1.5
297	150		510850	205526	1.5
298	175		510828	205515	1.5
299	200		510806	205503	1.5
300	25	N/A	511109	205344	1.5
301	50		511132	205354	1.5
302	75	Appspond Wood LWS, ancient woodland	511155	205365	1.5
303	100		511177	205375	1.5

Receptor ID	Distance from Affected Road (m)	Ecological Receptor	Coordinates		Height (m)
			X	Y	
304	125		511200	205385	1.5
305	150		511223	205396	1.5
306	175		511246	205406	1.5
307	200		511268	205417	1.5
308	25	HPI woodland - south of A414 opposite Madams Wood (Birch Wood LWS)	511535	205762	1.5
309	50		511524	205739	1.5
310	75		511514	205717	1.5
311	100		511503	205694	1.5
312	125		511493	205671	1.5
313	150		511482	205649	1.5
314	175		511471	205626	1.5
315	200		511461	205604	1.5
316	25	Birch Wood (nr Potters Crouch) LWS, AWI	511803	205717	1.5
317	50		511816	205739	1.5
318	75		511829	205760	1.5
319	100		511842	205781	1.5
320	125		511855	205802	1.5
321	150		511869	205824	1.5
322	175		511882	205845	1.5
323	200		511895	205866	1.5
324	25	Park Wood (near Chiswell Green) LWS, AWI	512754	205600	1.5
325	50		512751	205625	1.5
326	75		512748	205650	1.5
327	100		512745	205674	1.5
328	25		512735	205514	1.5
329	50		512737	205489	1.5
330	75		512740	205465	1.5
331	100		512742	205440	1.5
332	125		512744	205415	1.5
333	150		512747	205390	1.5
334	175		512749	205365	1.5
335	200		512751	205340	1.5
336	25	Long Spring (Potters Crouch) LWS	512072	205567	1.5
337	50		512082	205545	1.5
338	75		512092	205522	1.5
339	100		512102	205499	1.5
340	125		512112	205476	1.5
341	150		512122	205453	1.5
342	175		512132	205430	1.5
343	200		512143	205407	1.5
344	25	Prae Wood LWS & HPI	511544	206210	1.5
345	50		511546	206235	1.5
346	75		511548	206260	1.5
347	100		511550	206285	1.5
348	125		511552	206310	1.5
349	150		511554	206335	1.5

Receptor ID	Distance from Affected Road (m)	Ecological Receptor	Coordinates		Height (m)
			X	Y	
350	175		511556	206360	1.5
351	200		511558	206385	1.5
352	25	HPI woodland - north of A414 opposite St Julians Wood	513755	205390	1.5
353	50		513766	205413	1.5
354	75		513776	205435	1.5
355	100		513786	205458	1.5
356	25	N/A	514125	205139	1.5
357	50		514113	205118	1.5
358	75		514100	205096	1.5
359	100	St Julians Wood HPI, near Chiswell Green	514088	205074	1.5
360	125		514075	205053	1.5
361	150		514062	205031	1.5
362	175		514050	205009	1.5
363	200		514037	204988	1.5

Temporal Scope

11.2.35 Air quality impacts during the Works and during the Completed and Operational Development have been assessed. As the application is not for a time-limited permission and there is no end-of-life stage defined, decommissioning effects have not been assessed.

11.2.36 For the Works, modelled traffic data has been provided for the year 2030, which corresponds to the year in which construction-phase traffic is at its highest, in-combination with the elements of the Development which are anticipated to be operational by 2030.

11.2.37 For the Completed and Operational phase, modelled traffic data has been provided for the first year of full occupation (2044), with first occupations occurring in 2030. In order to not underestimate the air quality impacts of the Development, an emissions year of 2028 has been used to model air quality at sensitive human and ecological receptors. The year 2028 was the initial first year of occupation provided by the project construction advisors, however this has since been revised to 2030. As vehicle fleet mix is projected to improve year on year with the increased uptake of electric vehicles, the use of the 2028 emissions year represents a conservative approach. This assumption is discussed further in the Assumption and Limitations section below. To provide further context of future emissions and impacts from the Development when determining significance, the same traffic data has been modelled with emissions factors for the year 2035.

Consultation

11.2.38 Consultation with SADC and DBC was undertaken during the EIA scoping process. Overall, both councils were in broad agreement with the proposed scope of works. However, a request was made for a detailed methodology report for air dispersion modelling, which should be consulted on and agreed with SADC. Due to the EIA programme and iterative approach to transport modelling, and consequently to the air quality assessment, it was not possible to provide a detailed methodology report to SADC prior to assessment.

11.2.39 On the above basis, a consultation draft version of **ES Volume 3, Appendix 11.2**: **Road Traffic Emissions Assessment** was shared with SADC in October 2025 once final transport data had been received and sensitive receptors consequently identified. This was considered sufficient in place of a separate detailed methodology report as the consultation draft version of **ES Volume 3, Appendix 11.2** contains a detailed methodology section.

11.2.40 SADC shared the consultation draft version of **ES Volume 3, Appendix 11.2** with its appointed a third-party air quality consultant, Ricardo, to provide a technical response on air quality matters on behalf of the Council. Ricardo then produced and shared an 'updated scoping opinion report', containing updates to the original comments made. Overall, Ricardo was in agreement with the methodology employed for the air quality assessment. However, it noted three outstanding comments:

- The version of ADMS-Roads should be updated if the opportunity arises, but this will not change the outcome of the assessment;
- Details of the emissions factors used should be provided in the report; and
- A sensitivity test should be carried out to understand the difference between emissions calculated using 2019 emissions factors and 2021 emissions factors.

11.2.41 All comments received during consultation have been addressed within this Chapter and its supporting Appendices. A summary of the sensitivity test undertaken is provided in **ES Volume 3, Appendix 11.2** and further detail of consultation and details of how and where comments have been addressed is outlined in **ES Volume 3, Appendix 11.4: Air Quality Consultation**.

Assumptions and Limitations

11.2.42 All air quality assessment tools, whether models or monitoring measurements, have limitations. The choices that the practitioner makes in setting-up the model, choosing the input data, and selecting the baseline monitoring data will have an impact on the data produced.

11.2.43 The atmospheric dispersion model itself has limitations, due to a model inherently being a simplified version of the real situation: however, it uses a sophisticated set of mathematical equations to approximate the complex physical and chemical atmospheric processes taking place as a pollutant is released and as it travels to a receptor.

11.2.44 Each of the data inputs for the model will also have some uncertainty associated with them. Where it has been necessary to make assumptions, these have mainly been made towards the upper end of the range informed by an analysis of relevant, available data to provide a conservative worst-case assessment.

11.2.45 The atmospheric dispersion model used for this assessment, ADMS-Roads (Version 5.0.1.3), has been validated by its supplier and is widely used by professionals in the UK. It should be noted that Version 5.0.1.3 of ADMS-Roads was the latest available when air-dispersion modelling was undertaken. A site-specific verification (calibration) provides additional certainty and is particularly important when air quality levels are close to exceeding the

objectives / limit values. Details of the model verification undertaken and any assumptions and limitations specific to the model inputs and outputs are provided in **ES Volume 3, Appendix 11.2**.

11.2.46 An important assumption made within the model inputs is that whilst 2044 road traffic data has been used to represent the maximum vehicle traffic generated by the completed and operational development, an emissions year of 2044 has not been used. This is because emission factors for vehicles are expected to improve year on year in accordance with Government policies that all new cars and vans must be zero emissions by 2035. In order to avoid underestimating the air quality impacts from road traffic emissions for any existing receptors in proximity to the Development, or within the Development itself, an emissions year of 2028 has instead been used. The year 2028 was the initial first year of occupations (which has now been revised to 2030) and therefore represents a conservative approach.

11.2.47 In reality, operational traffic AADTs are likely to be much lower in the first year of occupation than those used in the model, due to the phase nature of the construction programme. Hence, the impacts of the Development on annual mean pollutant concentrations are likely to be an overestimated for the opening-year assessment. As explained above, the same traffic data has been modelled with emissions factors for the year 2035 to provide further context of future emissions and impacts from the Development when determining significance.

11.3 Relevant Baseline Conditions

Existing Baseline Conditions

11.3.1 As previously mentioned, the Development is located almost entirely within the administrative area of SADC with only small areas of predominantly public highway located within DBC. As such, baseline air quality information in the area surrounding the Development considers areas within the jurisdiction of both SADC and DBC.

11.3.2 The background concentration often represents a large proportion of the total pollution concentration, so it is important that the background concentration selected for the assessment is realistic.

11.3.3 For this assessment, the background air quality has been characterised by drawing on information from the following public sources:

- Defra background maps, which show estimated pollutant concentrations across the UK in 1km grid squares[9]; and

[9] Defra (2024): Background Mapping data for local authorities – 2021. [Online] Available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021, accessed 30/06/2025

- Published results of local air quality monitoring in the 2025 Air Quality Annual Status Report (ASR) for St Albans District Council (SADC)[10] and the 2024 ASR for Dacorum Borough Council (DBC)[11].

11.3.4 In addition to the above public sources, a six-month, project-specific diffusion tube survey was undertaken. The results of this survey have also informed the baseline air quality assessment. More detail is provided below in Paragraph 11.3.11.

Annual Status Reports

11.3.5 The main source of air pollution within St Albans is from vehicular emissions and the main pollutant of concern is Nitrogen Dioxide (NO_2). SADC undertook non-automatic (passive) monitoring at 50 sites during 2024. Despite four out of 50 passive monitoring locations in St Albans City and District recording an increase in annual mean NO_2 concentrations between 2023 to 2024, there were no exceedances of the annual mean NO_2 objective recorded at any monitoring site in 2024.

11.3.6 Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. SADC have one declared AQMA (St Albans AQMA No. 1) which is located approximately 4.1 km to the east of the Development (**ES Volume 3: Appendix 11.5**, **Figure 11.6**). This was originally declared due to exceedances of the annual mean NO_2 and PM_{10} 24-hour mean air quality objectives. There have been no recorded exceedances of NO_2 in the AQMA since 2019. SADC does not currently undertake any monitoring of PM_{10} or $PM_{2.5}$, however, the measures put in place to reduce NO_2 emissions are anticipated to also reduce emissions of PM_{10} and $PM_{2.5}$.

11.3.7 In 2023, DBC undertook passive monitoring of NO_2 at 68 sites, measuring only 1 exceedance (45.8 µg/m^3) in NO_2 annual mean concentrations at monitoring site DB1 (Queensway and Old Town High Street; formerly monitoring site DC5). This monitoring site is located approximately 3.4km west of the Development. Between 2021 (the first year in which air quality was monitored at this site) and 2023, measured annual mean NO_2 concentrations at DB1 decreased by 7.5%.

11.3.8 There are two AQMAs declared in DBC: AQMA 1 – Lawn Lane, Hemel Hempstead, and AQMA 2 – London Road, Apsley, located approximately 2.9 km and 3.1 km southwest of the Development respectively (**ES Volume 3, Appendix 11.5, Figure 11.6**). Both AQMAs were declared on the 1$^{st\ of}$ June 2012 due to exceedances of the NO_2 annual mean air quality objective. No exceedances were recorded in 2023 within the two AQMAs, however, they are yet to fall below the percentile required by Defra to consider revocation across the entire AQMA.

11.3.9 **Table 11.9** details the monitored NO_2 concentrations for the years 2019-2023 for monitoring sites closest to the Development, and in proximity to roads on which AADT exceed the EPUK and IAQM (2017) and IAQM (2020) guidance thresholds. As shown, the NO_2 annual mean concentrations in the most recent year are all below the

[10] St Albans City and District Council (2025): 2025 Air Quality Annual Status Report (ASR). [Online] Available at: https://www.stalbans.gov.uk/sites/default/files/Environmental%20Services/Air%20Quality%20Annual%20Status%20Report%202025.pdf, accessed 23/10/2025

[11] Dacorum Borough Council (2024): 2024 Air Quality Annual Status Report (ASR). [Online] Available at: https://www.dacorum.gov.uk/home/environment-street-care/environmental-health/air-quality, accessed 30/06/2025

annual AQO of 40 µg/m^3 at roadside and urban background monitoring sites close to the Development and along links affected by the Development.

Table 11.9: Monitored Annual Mean NO_2 Concentrations

Site ID	Site type	X	Y	Annual Mean NO_2 Concentrations (µg/m^3)					
				2019	2020	2021	2022	2023	2024
SA142	Roadside	510754	206091	30.4	19.6	20.6	20.8	24.4	15.0
DB3	Roadside	505587	207686	-	-	28.7	28.5	25.6	-
DB4	Roadside	505587	207685	-	-	-	-	17.2	-
DB5	Roadside	505683	207699	-	-	-	-	22.6	-
DB8	Roadside	507848	208000	-	-	27.3	26.4	22.6	-
DB9	Urban Background	507774	207313	-	-	15.4	16.0	13.5	-
DB10	Roadside	507880	207170	-	-	29.2	26.8	26.2	-
DB11	Roadside	507716	207047	-	-	25.7	25.1	22.3	-
DB12	Roadside	508013	207155	-	-	17.3	16.3	15.8	-
DB41	Roadside	505677	205513	48.6	48.6	37.6	36.8	33.9	-
DB42	Roadside	505677	205513	48.3	47.1	38.5	37.9	35.3	-
DB43	Roadside	505677	205513	48.3	49.9	36.1	35.8	33.2	-
DB44	Roadside	505737	205443	-	-	30.0	30.3	27.7	-
DB45	Roadside	505737	205443	-	-	30.7	31.7	25.7	-
DB46	Roadside	505737	205443	-	-	30.1	30.3	27.3	-
DB47	Roadside	505770	205430	-	-	26.1	24.8	21.5	-
DB48	Roadside	505696	205509	-	-	28.7	27.6	24.4	-
DB49	Roadside	505797	205436	-	-	29.6	29.4	25.8	-
DB50	Roadside	505734	205519	26.2	27.6	22.3	21.8	22.3	-
DB51	Roadside	505734	205519	27.5	26.6	22.0	23.5	20.0	-
DB52	Roadside	505734	205519	28.0	28.8	22.9	21.0	20.4	-
DB53	Roadside	505969	205726	28.5	39.6	24.1	23.2	20.9	-

Site ID	Site type	X	Y	Annual Mean NO_2 Concentrations (µg/m³)					
				2019	2020	2021	2022	2023	2024
DB54	Roadside	505969	205726	29.2	29.8	24.9	22.4	19.7	-
DB55	Roadside	505969	205726	29.4	29.4	26.5	22.1	21.6	-
DB56	Roadside	505930	205740	48.7	52.1	35.8	32.7	33.4	-
DB57	Roadside	505930	205740	48.6	51.0	36.0	24.7	33.2	-
DB58	Roadside	505930	205740	48.3	49.3	35.1	36.2	32.1	-
DB63	Roadside	505870	205715	-	-	-	-	18.5	-

11.3.10 Six monitoring sites recorded annual mean NO_2 concentrations above 75% of the AQO, namely sites: DB41, DB42, DB43, DB56, DB57 and DB58. However, annual mean NO_2 concentrations recorded at all of these sites decreased by at least 27% between 2019 and 2023, showing a significant reduction relative to pre-pandemic levels.

Project Specific Survey

11.3.11 A six-month, project-specific diffusion tube survey was undertaken by Temple Air Quality Consultants, running from March 2024 to September 2024, at eight key locations across the Site (**ES Volume 3, Appendix 11.5**, **Figure 11.7**) to monitor NO_2 concentrations and compare the obtained data to the relevant air quality standards, along with any changes in concentrations relating to transport emissions.

11.3.12 Diffusion tubes are an indicative monitoring method with an uncertainty of approximately ±25%. They are tubes containing the chemical reagent triethanolamine (TEA) to absorb the pollutant to be measured from ambient air. The diffusion tubes were supplied and analysed by Gradko International Limited (Gradko), a United Kingdom Accreditation Service certified laboratory accredited to the AIR Proficiency Testing Scheme. The tubes were prepared with a known volume of 20% TEA in acetone.

11.3.13 **Table 11.10** details the monitored NO_2 concentrations from the six-month, project-specific diffusion tube survey. As shown, the NO_2 annual mean concentrations in the most recent year are all below the annual AQO of 40 µg/m³ at roadside and urban background monitoring within the Site.

Table 11.10: NO_2 Concentrations from the Six-Month, Project-Specific Diffusion Tube Survey

Site ID	Site Type	X	Y	Height	Distance from Kerb (m)	Annualised Mean NO_2 Concentrations (µg/m³)
MP1	Background	510510	206101	1	N/A	17.2
MP2	Background	509138	206728	2.3	N/A	9.85

Site ID	Site Type	X	Y	Height	Distance from Kerb (m)	Annualised Mean NO_2 Concentrations ($\mu g/m^3$)
MP3	Roadside	508068	207205	2.19	1.0	25.71
MP4	Roadside	508956	207599	2.07	4.1	30.82
MP5	Roadside	508925	207644	2.1	3.8	31.91
MP6	Roadside	508946	208635	2.1	2.0	15.57
MP7	Background	508451	209678	2	N/A	10.45
MP8	Roadside	509630	211021	2.34	1.2	22.22

11.3.14 LAQM.TG(22) states that the 1-hour NO_2 objective of 200 $\mu g/m^3$ is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 $\mu g/m^3$. This is the case for all monitoring sites across the administrative areas of both DBC and SADC, and at all monitoring sites of the six-month, project-specific diffusion tube survey.

Future Baseline Conditions

11.3.15 Future air quality baseline conditions are expected to improve, particularly with ongoing improvements to the vehicle fleet in the UK. Defra provides background concentration maps to assist local authorities in undertaking their air quality review and assessments. The most recent 2021 reference year background maps are based on the monitoring and meteorological data for 2021 and present projected concentrations for years 2021 to 2040.

11.3.16 Defra publishes background concentration data in the form of 1x1 km grid files of background concentrations for each local authority, per pollutant. The Development and the road network affected by the Development (i.e. those on which the change in AADT exceeds the EPUK and IAQM (2017), and IAQM (2020) guidance) span 33 grid squares across the administrative areas of SADC and DBC. As such, a separate 1x1 km grid file was downloaded for each local authority, containing NO_2, PM_{10} and $PM_{2.5}$ concentrations. **Table 11.11** presents the average projected background NO_2, PM_{10}, $PM_{2.5}$ concentrations for the years 2025 and 2028, for the 33 grid squares within which the Development and the road network affected by the Development are located.

Table 11.11: Defra Projected Background Concentrations

Grid Square		2025 Concentration (µg/m³)			2028 Concentration (µg/m³)		
X	Y	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
505500	205500	10.19	13.03	7.65	8.97	12.74	7.39
505500	206500	10.55	12.92	7.73	9.25	12.63	7.48
505500	207500	9.80	12.34	7.55	8.63	12.06	7.30
506500	205500	9.46	12.67	7.82	8.38	12.38	7.56
506500	206500	10.18	12.95	7.86	8.93	12.67	7.60
506500	207500	9.65	12.40	7.61	8.54	12.12	7.36
506500	208500	9.48	12.31	7.53	8.40	12.03	7.28
506500	209500	8.87	12.18	7.39	7.90	11.90	7.14
507500	206500	9.81	12.85	7.86	8.61	12.56	7.60
507500	207500	10.23	12.73	7.69	9.02	12.45	7.44
507500	208500	11.73	12.68	7.53	10.65	12.40	7.28
507500	209500	11.82	12.20	7.40	10.86	11.92	7.15
508500	206500	9.73	12.81	7.64	8.49	12.53	7.39
508500	207500	10.67	13.06	7.58	9.32	12.78	7.33
508500	209500	9.57	13.01	7.33	8.55	13.11	7.08
508500	210500	8.85	13.40	7.24	7.93	13.12	7.00
509500	206500	10.58	15.27	7.62	9.03	15.37	7.37
509500	207500	15.36	16.19	8.10	12.61	16.27	7.85
509500	209500	11.79	15.46	7.67	10.03	15.55	7.42
509500	210500	11.33	15.50	7.64	9.67	15.59	7.39
509500	211500	11.10	15.34	7.62	9.48	15.43	7.37
509500	213500	10.77	15.20	7.47	9.18	15.29	7.22
510500	205500	10.17	14.16	7.40	8.69	14.25	7.16
510500	206500	12.13	15.38	7.69	10.13	15.47	7.44

Grid Square		2025 Concentration (µg/m³)			2028 Concentration (µg/m³)		
X	Y	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
510500	211500	8.99	14.05	7.46	7.92	14.16	7.21
510500	213500	8.90	13.57	7.26	7.83	13.67	7.01
511500	205500	10.72	14.72	7.52	9.10	14.82	7.27
511500	206500	9.19	13.58	7.25	7.99	13.30	7.01
511500	215500	8.46	12.85	7.23	7.56	12.95	6.98
512500	205500	9.55	14.59	7.46	8.27	14.69	7.22
513500	205500	9.94	13.83	7.68	8.65	13.94	7.43
514500	204500	10.21	14.30	7.72	8.87	14.02	7.47
514500	205500	10.52	13.69	7.88	9.16	13.81	7.63
Average		**10.31**	**13.67**	**17.58**	**8.99**	**13.57**	**7.33**

11.4 Likely Effects of the Development and their Significance

Embedded Mitigation

11.4.1 During the Works, there are several inherent mitigation measures, as explained in **ES Volume 2, Chapter 6: The Works**. A Construction Environmental Management Plan (CEMP) to address hours of working, noise, vibration, dust, light spill, wheel washing and control of runoff would be prepared. It is anticipated that the implementation of the CEMP will be a condition of the planning permission and that it will be regularly monitored.

11.4.2 Based on the construction phase assessment, the CEMP would set out the IAQM 2024 recommended mitigation measures for a 'high risk' site, which will be implemented to mitigate dust risk. These recommended mitigation measures are set out in **ES Volume 3, Appendix 11.3**.

11.4.3 In addition, the proposed design of the Development, sets back sensitive land uses, such as residential development and schools, 50 m away from heavily trafficked roads, such as the M1 and the A414, as illustrated in the Land Use Parameter Plan.

The Works

Assessment of Dust

Screening

11.4.4 As previously mentioned, a detailed assessment is required where there is a human receptor within 250m of the Site boundary and/or 50m of the trackout routes, or an ecological receptor within 50m of the Site boundary, up to 250m from the Site entrance(s). The Development meets both criteria, and a dust risk assessment is therefore required.

Dust Emissions Magnitude

11.4.5 For the purposes of this assessment, the scale of magnitude of dust emissions has conservatively been identified as 'large' due to the scale of the Development.

Sensitivity of Area

11.4.6 For the purposes of this assessment, the sensitivity of the area has therefore been classified as 'high' due to the proximity of receptors in proximity to the Development.

Risk of Dust Impacts

11.4.7 As shown in **Table 11.12**, all construction related activities were assigned high risk classifications in order to reference mitigation measures for the worst-case scenario and apply those measures which constitute good or best practice. These mitigation measures are provided in **ES Volume 3, Appendix 11.3**.

Table 11.12: Dust Impact Risk

		Risk		
		Earthworks	Construction	Trackout
Potential impact	Dust soiling	High Risk	High Risk	High Risk
	Human health	High Risk	High Risk	High Risk
	Ecological	High Risk	High Risk	High Risk

Significance of Effect

11.4.8 The IAQM recommended mitigation measures appropriate to a high-risk site will be set out in the CEMP, as described in paragraph 11.3.15 above. Provided this mitigation is implemented, the residual construction dust effects will not be significant. The IAQM dust guidance states that:

"For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'".

11.4.9 The IAQM dust guidance recommends that significance is only assigned to the effect after the activities are considered with mitigation in place.

11.4.10 Overall, it is predicted that the large impact on the high sensitivity receptor would result in a negligible effect once the recommended (and inherent) IAQM mitigation measures are implemented, which is not significant.

Assessment of Road Traffic Emissions on Human Health

11.4.11 Full details of the road traffic assessment, including model results, are provided in **ES Volume 3, Appendix 11.2**.

11.4.12 As described above, the following scenarios were modelled in relation to the construction phase assessment:

- 2030 construction year without Development – future baseline and traffic growth from committed developments, the cumulative developments noted within Chapter 2, and local plan development, excluding Site traffic; and
- 2030 construction year with Development – future baseline, traffic growth from committed developments, the cumulative developments noted within Chapter 2, and local plan development, and peak construction traffic, in-combination with the elements of the Development which are anticipated to be operational by 2030.

Assessment of NO_2 Concentrations

11.4.13 For the 2030 model scenarios representing the Works, with the exception of one human receptor (receptor 113), the modelled road traffic emissions for NO_2 are well below the AQO of 40 µg m^{-3}. The modelled annual mean NO_2 concentration at receptor 113 with and without Development is 105% of the AQO during the Works. Receptor 113 is a representative residential receptor between A4147, A414 M1 spur and the M1, and hence experiences relatively high NO_2 concentrations. It should also be noted that the modelled annual mean NO_2 concentration at receptor 113 with and without Development is an overestimation. This is because the model adjustment factor decreased from 7.0021 to 5.3187 upon reverification.

11.4.14 Following the EPUK and IAQM 2017 guidance: taking into account both the percentage change in annual mean NO_2 concentrations caused by development traffic, and the percentage of the AQO for annual mean NO_2 concentrations comprised by modelled NO_2 concentrations at each receptor with Development traffic, 'negligible' air quality impacts are anticipated at all of the receptors modelled during the Works.

11.4.15 As explained in paragraph 11.2.24, impacts classified as 'slight' or lower are generally considered to be not significant for 'high' sensitivity receptors. Hence, during the Works, the impacts of the Development on NO_2 concentrations are considered not to be significant at all human receptors.

Assessment of $PM_{2.5}$ Concentrations

11.4.16 For the 2030 model scenarios representing the Works, with the exception of one human receptor (receptor 113), the modelled road traffic emissions for $PM_{2.5}$ are well below the AQO of 20 µg m^{-3}. The modelled annual mean $PM_{2.5}$ concentration at receptor 113 with and without Development is 85% of the AQO during the Works. As explained above, receptor 113 is a representative residential receptor between A4147, A414 M1 spur and the M1, and hence experiences relatively high $PM_{2.5}$ concentrations. Similar to above, it should be noted that the modelled annual mean $PM_{2.5}$ concentration at receptor 113 with and without Development is an overestimation as the adjustment factor generated during verification reduced upon reverification.

11.4.17 Following the EPUK and IAQM 2017 guidance: taking into account both the percentage change in annual mean $PM_{2.5}$ concentrations caused by development traffic, and the percentage of the AQO for annual mean $PM_{2.5}$ concentrations comprised by modelled $PM_{2.5}$ concentrations at each receptor with Development traffic, 'negligible' air quality impacts are anticipated at all of the receptors modelled during the Works.

11.4.18 As explained in paragraph 11.2.24, impacts classified as 'slight' or lower are generally considered to be not significant for 'high' sensitivity receptors. Hence, during the Works, the impacts of the Development on $PM_{2.5}$ concentrations are considered not to be significant at all human receptors.

Assessment of PM_{10} Concentrations

11.4.19 For the 2030 model scenarios representing the Works, with the exception of one human receptor (receptor 113), the modelled road traffic emissions for PM_{10} are well below the AQO of 40 µg m^{-3}. The modelled annual mean PM_{10} concentration at receptor 113 with and without Development is 79% of the AQO during the Works. Receptor 113 also experiences high PM_{10} concentrations due to its location, as explained above. Again, it should be noted that the modelled annual mean PM_{10} concentration at receptor 113 with and without Development is an overestimation as the adjustment factor generated during verification reduced upon reverification.

11.4.20 Following the EPUK and IAQM 2017 guidance: taking into account both the percentage change in annual mean PM_{10} concentrations caused by development traffic, and the percentage of the AQO for annual mean PM_{10} concentrations comprised by modelled PM_{10} concentrations at each receptor with Development traffic, 'negligible' air quality impacts are anticipated at all of the receptors modelled during the Works.

11.4.21 As explained in paragraph 11.2.24, impacts classified as 'slight' or lower are generally considered to be not significant for 'high' sensitivity receptors. Hence, during the Works, the impacts of the Development on PM_{10} concentrations are considered not to be significant at all human receptors.

Assessment of Road Traffic Emissions on Ecological Receptors

11.4.22 Ecological receptors were identified based on habitats within 200 m of a road on which changes in AADT exceed the IAQM 2020 thresholds of 1000 AADT or 200 HDVs. Only one habitat meets the above criteria, namely: "HPI woodland - Marchmont Pond area". Lower and upper critical loads for this habitat were provided by the project ecologists, equal to 10 and 15 kg N/ha/yr, respectively.

11.4.23 With regard to the assessment of potential air quality impacts on ecological receptors during the Works, a 200 m transect was drawn perpendicular to the links on which the changes in AADT exceed the IAQM 2020 thresholds, and individual receptors were modelled at 25 m intervals along this transect.

11.4.24 In line with the IAQM 2020 guidance, predicted environmental concentrations (PEC) were calculated with and without the Development through dispersion modelling. PEC comprise both the predicted NO_2 concentrations and resultant nitrogen deposition rate. NO_2 concentrations were converted to dry nutrient nitrogen (N) deposition rates (kg N/ha/yr) by applying the conversion rate for forests and similar habitats for woodland ecological receptors (1 µg/m^3 of NO_2 = 0.29 kg N/ha/yr) provided within DMRB LA 105 – Air Quality. The process contribution (PC) for the Development was calculated by subtracting the 'without project' PEC from the 'with project' PEC.

11.4.25 The IAQM 2020 guidance states that *"the calculated maximum PC as a percentage of the relevant critical load/level, is used to determine whether impacts will have an insignificant effect or, conversely, may be large enough to warrant further evaluation by an ecologist."* The guidance states that an increment of 1% or less of the relevant long term critical load should be considered inconsequential. During the Works, the calculated maximum PC does not exceed 1% of the critical load at all ecological receptors representative of HPI woodland - Marchmont Pond area. Therefore, the air quality impacts on ecological receptors during the Works can be considered inconsequential.

The Completed and Operational Development

11.4.26 Full details of the road traffic assessment, including model results, are provided in **ES Volume 3, Appendix 11.2**.

11.4.27 As described above, the following scenarios were modelled in relation to the completed and operational phase assessment:

- 2028 future year without development – future baseline and traffic growth from committed developments, the cumulative developments noted within Chapter 2, and local plan development, excluding site traffic; and
- 2028 future year with development – future baseline, traffic growth from committed developments, the cumulative developments noted within Chapter 2, and local plan development, and site completion (2044 traffic data).
- 2035 future year without development – future baseline and traffic growth from committed developments, the cumulative developments noted within Chapter 2, and local plan development, excluding site traffic; and
- 2035 future year with development – future baseline, traffic growth from committed developments, the cumulative developments noted within Chapter 2, and local plan development, and site completion (2044 traffic data).

Assessment of Human Health

Assessment of NO_2 Concentrations

11.4.28 For the 2028 model scenarios, with the exception of one human receptor (receptor 113), the modelled road traffic emissions for NO_2 are well below the AQO of 40 µg m^{-3}. The modelled annual mean NO_2 concentration at receptor 113 'with Development' is 122% of the AQO in 2028. This is relatively high due to the same reasons as stated above, and in reality, is lower as the adjustment factor generated during verification reduced upon reverification.

11.4.29 Following the EPUK and IAQM 2017 guidance: taking into account both the percentage change in annual mean NO_2 concentrations caused by development traffic, and the percentage of the AQO for annual mean NO_2 concentrations comprised by modelled NO_2 concentrations at each receptor with development traffic, 'negligible' air quality impacts are anticipated at 90% of the receptors modelled in 2028. For the 15 receptors at which quality impacts are anticipated to be higher than 'negligible', 'slight' impacts are anticipated at 13 receptors, a 'moderate' impact is anticipated at one receptor (146) and a 'substantial' impact is anticipated at one receptor (113).

11.4.30 As explained in paragraph 11.2.24, impacts classified as 'slight' or lower are generally considered to be not significant for 'high' sensitivity receptors. Hence, in 2028, the impacts of the Development on NO_2 concentrations are considered not to be significant at all human receptors apart from 146 and 113 (**ES Volume 3, Appendix 11.5, Figure 11.2**). However, the assessment of significance is principally left to professional judgement, and guidance is provided on the factors that need to be considered, namely:

- 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.

11.4.31 As explained above, one of the limitations of the model is that traffic data for the year 2044 was used with an emissions year of 2028. This was done to avoid underestimating the air quality impacts from road traffic emissions for any existing receptors in proximity to the Development, or within the Development itself. However, operational traffic AADTs are likely to be much lower in 2028 than those used in the model, and hence the impacts of the Development on annual mean NO_2 concentrations in the 2028 model scenario are likely to be an overestimation. Therefore, significance should not be assessed based solely on 2028 model results.

11.4.32 To support this, receptor 113 is a residential receptor situated between three heavily trafficked roads, the M1 motorway, the A414 and the A4147. In 2028, the modelled baseline NO_2 concentration (without Development) at receptor 113 is 45.84 µg m^{-3}, which is also above the relevant AQO. Monitoring site SA142 (Site ID: 163) (**ES Volume 3, Appendix 11.5, Figure 11.4**) is located in proximity to receptor 113, also between the M1 motorway, the A414 and the A4147. As shown in **Table 11.9**, monitored NO_2 concentrations were 24.4 µg m^{-3} in 2023, which suggests that the model is likely to have substantially overpredicted NO_2 concentrations at receptor 113.

11.4.33 According to the indicative construction programme, by the end of 2035, the majority of B8 warehouse units, two primary schools and the secondary school will be constructed and able to operate, and the residential units in

South P1 will be constructed and able to occupy. Therefore, another model was run based on 2044 traffic data, using an emissions factor year of 2035 to provide further analysis, and to enable significance to be determined more robustly. This is still considered a conservative approach given that operational traffic AADT in 2035 will be lower than the modelled AADT, representative of 2044, once the Development is fully operational.

11.4.34 Using an emissions factor year of 2035, combined with traffic data for the year 2044, the changes in NO_2 concentrations as a result of the Development at receptors 113 and 146 are anticipated to be 'negligible' and 'slight', respectively. This is because, at both receptors, the percentage change in annual mean NO_2 concentrations is less than 10% and the modelled NO_2 concentrations for receptors 113 and 146 are 25.86 μg/m^3 and 10.81 μg/m^3, respectively, and hence, are considerably below the relevant AQO. As explained in paragraph 11.2.24, impacts classified as 'slight' or lower are generally considered to be not significant for 'high' sensitivity receptors. On this basis, the operational impacts of the Development on annual mean NO_2 concentrations at all receptors, including receptors 113 and 146, are considered to be not significant.

Assessment of $PM_{2.5}$ Concentrations

11.4.35 For the 2028 model scenarios, with the exception of one human receptor (receptor 113), the modelled road traffic emissions for $PM_{2.5}$ are well below the AQO of 20 μg m^{-3}. The modelled annual mean $PM_{2.5}$ concentration at receptor 113 'with Development' is 98% of the AQO in 2028. This is relatively high due to the same reasons as stated above, and in reality, is lower as the adjustment factor generated during verification reduced upon reverification.

11.4.36 Following the EPUK and IAQM 2017 guidance: taking into account both the percentage change in annual mean $PM_{2.5}$ concentrations caused by development traffic, and the percentage of the AQO for annual mean $PM_{2.5}$ concentrations comprised by modelled $PM_{2.5}$ concentrations at each receptor with development traffic, 'negligible' air quality impacts are anticipated at 99% of the receptors modelled in 2028. For the two receptors at which air quality impacts are anticipated to be higher than 'negligible', a 'slight' impact is anticipated at one receptor (146), and a 'moderate' impact is anticipated at one receptor (113).

11.4.37 As explained in paragraph 11.2.24, impacts classified as 'slight' or lower are generally considered to be not significant for 'high' sensitivity receptors. Hence, in 2028, the impacts of the Development on $PM_{2.5}$ concentrations are considered to be not significant at all receptors apart from receptor 113. However, the assessment of significance is principally left to professional judgement as explained above.

11.4.38 Also explained above, in reality, operational traffic AADTs are likely to be much lower in 2028 than those used in the model. This means that the impacts of the Development on annual mean $PM_{2.5}$ concentrations in the 2028 model scenario are likely to be an overestimation. Therefore, significance should not be assessed based solely on 2028 model results.

11.4.39 For the same reasons as above, a model was run based on 2044 traffic data, using an emissions factor year of 2035 to provide further analysis, and to enable significance to be determined more robustly. This is considered to be

conservative given that operational traffic AADT in 2035 will be lower than the modelled AADT, representative of 2044, once the Development is fully operational.

11.4.40 Using an emissions factor year of 2035, combined with traffic data for the year 2044, the changes in $PM_{2.5}$ concentrations as a result of the Development at receptors 113 are anticipated to be 'slight'. This is because, at receptor 113, the percentage change in annual mean $PM_{2.5}$ concentrations is 3% and the modelled $PM_{2.5}$ concentrations at receptor 113 is 18.81 µg/m^3, and hence, is below the relevant AQO. As explained in paragraph 11.2.24, impacts classified as 'slight' or lower are generally considered to be not significant for 'high' sensitivity receptors. On this basis, the operational impacts of the Development on annual mean $PM_{2.5}$ concentrations at all receptors, including receptors 113, are considered to be not significant.

Assessment of PM_{10} Concentrations

11.4.41 For the 2028 model scenarios, with the exception of one human receptor (receptor 113), the modelled road traffic emissions for PM_{10} are well below the AQO of 40 µg m^{-3}. The modelled annual mean PM_{10} concentration at receptor 113 'with Development' is 92% of the AQO in 2028. This is relatively high due to the same reasons as stated above, and in reality, is lower as the adjustment factor generated during verification reduced upon reverification.

11.4.42 Following the EPUK and IAQM 2017 guidance: taking into account both the percentage change in annual mean PM_{10} concentrations caused by development traffic, and the percentage of the AQO for annual mean PM_{10} concentrations comprised by modelled PM_{10} concentrations at each receptor with development traffic, 'negligible' air quality impacts are anticipated at 99% of the receptors modelled in 2028. For the two receptors at which air quality impacts are anticipated to be higher than 'negligible' (113 and 146), 'slight' impacts are anticipated at both.

11.4.43 As explained in paragraph 11.2.24, impacts classified as 'slight' or lower are generally considered to be not significant for 'high' sensitivity receptors. On this basis, the operational impacts of the Development on annual mean PM_{10} concentrations at all receptors, are considered to be not significant.

Site Suitability

11.4.44 The assessment of site suitability has been undertaken using traffic AADT data for the year 2044 and an emissions factor year of 2028 to be conservative. This presents the same limitations as with the assessment of operational traffic emissions on existing receptors, such that the values presented are likely to be an overestimation of NO_2, $PM_{2.5}$ and PM_{10} emissions.

11.4.45 Regarding the suitability of the Site for new sensitive receptors introduced by the Development (**ES Volume 3, Appendix 11.5, Figure 11.3**) NO_2, $PM_{2.5}$ and PM_{10} concentrations for representative sensitive receptors have been predicted within the Site. The predicted annual mean concentrations of NO_2, $PM_{2.5}$ and PM_{10} in 2028 are well below the annual mean objectives at all modelled receptors. The highest modelled emissions are anticipated at receptors 184 and 191, which relate to representative receptors located 50 m away from the M1 motorway. The concentrations for these receptors are provided in

11.4.46 **Table** 11.13.

11.4.47 As shown in **Table 11.13**, at receptor 184, modelled annual mean NO_2, $PM_{2.5}$ and PM_{10} concentrations are 34.08 µg m^{-3}, 13.61 µg m^{-3} and 26.03 µg m^{-3}, respectively. At receptor 191, modelled annual mean NO_2, $PM_{2.5}$ and PM_{10} concentrations are 34.04 µg m^{-3}, 13.59 µg m^{-3} and 26.00 µg m^{-3}, respectively. As per the Land Use Parameters Plan, receptors 184 and 191 are not actually located within the areas designated for residential or school use classes but are along the transect associated with these types of development. Hence, at the detailed design stage, the Development would be designed such that sensitive receptors are located at least 50 m away from the M1motorway, as illustrated in the Land Use Parameters Plan accompanying this application. This would ensure that air quality is acceptable for all sensitive uses. It should be noted that if any sensitive receptors, such as residential development, are proposed within this distance, this should be supported by a further air quality assessment.

11.4.48 Based on the above, it is judged that sensitive receptors introduced to the Site by the Development will experience good air quality, and that the Site is suitable for the Development. On this basis, the potential for significant effects can be screened out as being 'not significant'.

Table 11.13: Modelled Annual Mean NO_2, PM_{10} and $PM_{2.5}$ Concentration within the Site

Receptor ID	Coordinates X	Coordinates Y	Transect	Distance from road (m)	NO_2 annual mean concentrations (µg/m³)	$PM_{2.5}$ annual mean concentrations (µg/m³)	PM_{10} annual mean concentrations (µg/m³)
184	509493	209383	Transect 6 (proposed secondary school potentially affected by the M1)	50	34.08	13.61	26.03
191	509437	209020	Transect 7 (proposed residential receptor / primary school potentially affected by M1)	50	34.04	13.59	26.00

Impacts on Cumulative Schemes

11.4.49 To assess the potential air quality impacts of the Development for new sensitive receptors introduced by proposed Cumulative Schemes, the agreed list of Cumulative Schemes was considered. Representative receptors were modelled at the edge of the red line boundary for each Cumulative Scheme located along links on which the AADT exceeded the EPUK and IAQM 2017 thresholds (**ES Volume 3: Appendix 11.5**, Figure 11.3). The coordinates of each representative receptor, cumulative scheme number and description of development are presented in **Table 11.14** for each Cumulative Scheme assessed.

Table 11.14: Cumulative Schemes Assessed

Receptor ID	Coordinates X	Coordinates Y	Cumulative Scheme	Description of Development
208	509875	211640	Cumulative Scheme 9	Outline application (access) - Erection of up to 95 dwellings, including 40% affordable dwellings and 5% self-build and custom build dwellings, public open space, landscaping, and associated infrastructure.
209	508959	210298	Cumulative Scheme 19	Outline application for residential-led mixed use development comprising up to 1,500 new dwellings, a 3 form entry primary school, a local centre, mobility hub, open space, amenity space. All matters reserved except for access junctions to B487 and Holtsmere End Lane

Receptor ID	Coordinates		Cumulative Scheme	Description of Development
	X	Y		
210	506123	208866	Cumulative Scheme 14	Outline planning for up to 350 dwellings, land for 5 gypsy & traveller pitches. Vehicular access from A4147, public open space including extension to Margaret Lloyd Park and associated landscaping, infrastructure and drainage. Detailed approval for access arrangements
211	507991	207340	Cumulative Scheme 13	Construction of 234 apartments and 1,486 sqm of commercial floor space, provided in three main buildings ranging from 5 to 9 storeys on two podiums, with associated car parking, landscaping, amenity space and service areas

11.4.50 This assessment has been undertaken using traffic AADT data for the year 2044 and an emissions factor year of 2028 to be conservative. **Table 11.15** shows the predicted NO_2, $PM_{2.5}$ and PM_{10} concentrations for sensitive receptors representative of cumulative schemes on which the Development could potentially cause air quality impacts. As shown, predicted annual mean concentrations of NO_2, $PM_{2.5}$ and PM_{10} are well below the annual mean objectives at all modelled receptors.

Table 11.15: Potential impacts on cumulative schemes

Receptor ID	Coordinates		Cumulative Scheme	NO_2 Annual Mean Concentrations ($\mu g/m^3$)	$PM_{2.5}$ Annual Mean Concentrations ($\mu g/m^3$)	PM_{10} Annual Mean Concentrations ($\mu g/m^3$)
	X	Y				
208	509875	211640	Cumulative Scheme 9	14.10	8.36	17.12
209	508959	210298	Cumulative Scheme 19	22.16	10.98	20.52
210	506123	208866	Cumulative Scheme 14	17.74	9.87	16.88
211	507991	207340	Cumulative Scheme 13	20.86	10.45	18.11

11.4.51 Based on the above, it is judged that sensitive receptors introduced by Cumulative Schemes to the area affected by the Development will experience good air quality, and that the Site is suitable for the Development. On this basis, the potential for significant effects can be screened out as being 'not significant'.

Ecological Receptors

11.4.52 Ecological receptors to assess during the Completed and Operational Development were identified in collaboration with the project ecologists, based on habitats within 200 m of a road on which changes in AADT exceed the IAQM 2020 thresholds of 1000 AADT or 200 HDVs (**ES Vol 3: Appendix 11.5, Figure 11.5**). Upper and lower critical loads for each habitat were provided by the project ecologists.

11.4.53 With regard to the assessment of potential air quality impacts on ecological receptors, transects of up to 200 m in length were drawn perpendicular to the links on which the changes in AADT exceed the IAQM 2020 thresholds, and individual receptors were modelled at 25 m intervals along each transect.

11.4.54 In line with the IAQM 2020 guidance, predicted environmental concentrations (PEC) were calculated with and without the Development through dispersion modelling. NO_2 concentrations were predicted and converted to dry nutrient nitrogen (N) deposition rates (kg N/ha/yr) by applying the conversion rate for forests and similar habitats for woodland ecological receptors (1 µg/m^3 of NO_2 = 0.29 kg N/ha/yr), and the conversion rate for grassland and similar habitats for grassland ecological receptors (1 µg/m^3 of NO_2 = 0.14 kg N/ha/yr), provided within DMRB LA 105 – Air Quality. The process contribution (PC) for the Development was calculated by subtracting the 'without project' PEC from the 'with project' PEC.

11.4.55 For the 2028 model scenarios, the calculated maximum PC does not exceed 1% of the critical load at nine habitats but exceeds 1% of the critical load at 14 habitats. At the nine habitats in which the calculated maximum PC does not exceed 1% of the critical load, air quality impacts can be considered inconsequential. However, for the 14 habitats in which the PC exceeds 1%, air quality impacts cannot be considered inconsequential and further analysis is provided below.

11.4.56 As explained above, in reality, operational traffic AADTs are likely to be much lower in the opening year than those used in the model. This means that the annual mean NO_2 concentrations, nitrogen deposition rates and PCs presented in the 2028 model scenario are likely to be an overestimation. Therefore, significance should not be assessed based solely on 2028 model results.

11.4.57 For the same reasons as above, a model was run based on 2044 traffic data, using an emissions factor year of 2035 to provide further analysis, and to enable significance to be determined more robustly. This is considered to be conservative given that operational traffic AADT in 2035 will be lower than the modelled AADT, representative of 2044, once the Development is fully operational.

11.4.58 Using an emissions factor year of 2035, combined with traffic data for the year 2044, the PC as a percentage of the critical load for each ecological receptor has decreased at all receptors. Further, the number of habitats in which the calculated maximum PC exceeds 1% of the critical load has decreased to four habitats, namely:

- HPI woodland - Marchmont Pond area;
- Birch Wood (nr Potters Crouch) LWS, AWI;
- Park Wood (near Chiswell Green) LWS, AWI; and

- HPI woodland - north of A414 opposite St Julians Wood.

11.4.59 In each of the above habitats, the PC exceeds 1% of the critical load only at modelled ecological receptors located 25 m from an affected road; at distances of 50 m or more from an affected road, the PC does not exceed 1% of the critical load. Hence, of the four habitats in which the PC exceeds 1% of the critical load, air quality impacts can be considered as inconsequential at distances of 50 m or more from an affected road.

11.5 Additional Mitigation / Enhancement and Likely Residual Effects of the Development and their Significance

The Works

Assessment of Dust

11.5.1 No significant adverse effects are predicted and so no additional mitigation is required beyond the dust control measures to be contained within the CEMP (of which dust mitigation measures are provided within **ES Volume 3: Appendix 11.4**), which is considered to be embedded design mitigation.

11.5.2 No further mitigation is considered to be required and so the residual effect would be **negligible** once the recommended IAQM mitigation measures are implemented, which is **not significant**.

Assessment of Road Traffic Emissions

11.5.3 No significant adverse effects are predicted and so no additional mitigation is required. The residual effect would remain **negligible**, which is not significant.

The Completed and Operational Development

11.6 No significant adverse effects are predicted and so no additional mitigation is required. The residual effect would remain **negligible / slight**, which is **not significant**.

11.7 Likely Residual Cumulative Effects and their Significance

The Works

Assessment of Dust

11.7.1 During the Works, there is the potential for cumulative effects where there are other sources of dust located within 500 m of the Development (the IAQM indicative maximum radius of effects for an individual construction site being 250 m). There is also the potential for cumulative effects at receptors within 100 m of roads used by traffic generated during the Works. Cumulative scheme 19 is immediately adjacent to the Site and so has the potential to

influence construction dust and emissions. Should the Development be under construction at the same time as this development, there is a risk of increased impacts due to the combination of dust emissions. However, it is expected that other construction sites within close proximity to the Development would adhere to the same level of mitigation and good practice as those set out in **ES Volume 3: Appendix 11.3**. Furthermore, the recommended mitigation measures for the Development include the requirement to "hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised". The purpose of this measure is to specifically address the potential for unacceptable cumulative effects.

11.7.2 With the implementation of appropriate mitigation measures by the Development and by any nearby construction sites, overall cumulative effects are expected to be **not significant**.

Assessment of Road Traffic Emissions

11.7.3 The impact of traffic during the Works is expected to remain **not significant**. This is because the cumulative effect of committed development is already included within traffic data provided, and so the air quality impacts already account for cumulative effects.

The Completed and Operational Development

11.7.4 The impact of operational-phase traffic is expected to remain **not significant**. This is because the cumulative effect of committed development is already included within traffic data provided, and so the air quality impacts already account for cumulative effects.

11.8 Conclusions

11.8.1 Historically, the air quality in the area of the Site and along roads affected by the Development has been relatively poor compared to the AQO for NO_2, particularly along Lawn Lane, Hemel Hempstead, and London Road, Apsley. However, monitoring undertaken by SADC, and DBC shows that air quality has improved between 2019 and 2023, showing a significant improvement relative to pre-pandemic levels.

11.8.2 Further, a six-month, project-specific air quality survey was undertaken in the immediate vicinity of the Site in 2024. This survey shows that air quality is relatively good around the Site, although slightly more constrained immediately adjacent to the A414. Future air quality baseline conditions are expected to continue to improve, particularly with ongoing improvements to the vehicle fleet in the UK.

11.8.3 The main effect on local air quality during demolition and construction relates to nuisance that can be caused by dust. Nuisance caused from dust, however, would only likely be experienced by people living or using premises closest to the Site and only for a temporary period. A range of measures to minimise or prevent dust have been identified and should be implemented to minimise the effect on the neighbouring community.

11.8.4 To assess the effect of road traffic emissions during the Works on local air quality, computer modelling has been carried out to predict the effect of future traffic-related exhaust emissions and the likely changes in local air quality following the completion of the Development. The effect of the Development on local air quality has been predicted for a large number of existing sensitive locations surrounding the Site. Two scenarios were modelled:

- 2030 peak construction traffic, in combination with first operational traffic – without the Development; and
- 2030 peak construction traffic, in combination with first operational traffic – with the Development.

11.8.5 These model scenarios were run to account for uncertainty in the projected decline in key pollutant concentrations that forms the basis of approved assessment methods. It is predicted that construction of the Development would result in an imperceptible deterioration in air quality at all of the existing sensitive locations.

11.8.6 Computer modelling has been carried out to predict the effect of future traffic-related exhaust emissions and the likely changes in local air quality following the completion of the Development. The effect of the Development on local air quality has been predicted for a number of existing sensitive locations surrounding the Site and for future sensitive locations within the Site. Four scenarios were modelled:

- 2028 future year without the Development;
- 2028 future year with the Development;
- 2035 future year without the Development; and
- 2035 future year with the Development.

11.8.7 These model scenarios were run to account for uncertainty in the projected improvement in key pollutant concentrations that forms the basis of approved assessment methods.

11.8.8 It is predicted that the Development would result in only a small or imperceptible deterioration in air quality at all of the existing sensitive locations. At all locations assessed, there are not expected to be any exceedances of the UK air quality objectives.

11.8.9 For the sensitive uses within the Development itself: the residential dwellings and proposed schools, the UK air quality objectives are met. Although below the air quality objective, air quality is relatively poor in proximity to the M1 motorway, which is not unusual given the very high traffic flows on this motorway. As such, at the detailed planning stage, Development should be designed such that sensitive receptors are located at least 50 m away from the M1 motorway, as illustrated in the Land Use Parameter Plan accompanying this outline application. This would ensure that air quality is acceptable for all sensitive uses. If any sensitive receptors, such as residential development, are proposed within this distance, this should be supported by a further air quality assessment.