AIR QUALITY	
AUTHOR	Stantec
SUPPORTING APPENDIX	**ES Volume 2: Appendix: Air Quality** Annex 1: Glossary Annex 2: Legislation, Policy and Guidance Annex 3: EPUK / IAQM Guidance (2017) Screening Criteria Annex 4: IAQM Dust Guidance (2014) Approach Annex 5: Model Inputs and Results Processing Annex 6: Outline Emissions Mitigation Assessment Annex 7: Figures
KEY CONSIDERATIONS	Potential air quality effects include: • The effect of existing (baseline) concentrations of pollutants (nitrogen dioxide (NO_2) and fine particulate matter (PM_{10} and $PM_{2.5}$) at the site on sensitive human receptors introduced by the Proposed Development; • The suitability of the site for the proposed end-use, taking into account predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ within the site. The potential for significant effects as a result of emissions associated with the nearby railway line has also been considered. • The effect of construction dust on existing sensitive properties in the local area through loss of amenity (as a result of dust soiling) and deterioration of human health (as a result of concentrations of PM_{10}), both as a result of the Proposed Development in isolation and as a result of the Proposed Development in combination with nearby Committed Development (i.e. cumulative effects); • The effect of emissions of NO_2, PM_{10} and $PM_{2.5}$ from traffic generated by the Proposed Development as a result of enabling and construction activities on existing sensitive receptors in the local area, both as a result of the Proposed Development in isolation and as a result of the Proposed Development in combination with nearby committed development (i.e. cumulative effects); • The effect of emissions of NO_2, PM_{10} and $PM_{2.5}$ from traffic generated by the Proposed Development once the development is completed and operational on existing sensitive receptors in the local area, both as a result of the Proposed Development in isolation and as a result of the Proposed Development in combination with nearby committed development (i.e. cumulative effects). In relation to cumulative effects, the traffic data applied in the air quality assessment is from the Thanet Strategic Highway Model (TSHM). The air quality assessment therefore quantifies the cumulative impacts of Local Plan developments and associated highway infrastructure within Thanet with alternative full development assessment scenarios assessed both with and without the Columbus Avenue Extension (CAE) being delivered. In relation to the Manson Airport development, no significant cumulative air quality effects with the Local Plan were identified during the DCO Examination. Therefore, potential cumulative air quality effects from the Manston Airport DCO have not been considered further in this ES Chapter. An 'Emission Mitigation Assessment' has also been undertaken as required by local planning policy and guidance. This assessment includes calculating the emissions to air from vehicle movements associated with the Proposed Development and a corresponding 'damage cost' and the proposed mitigation has then been reviewed to identify if proportionate. There are a number of designated ecological sites located within the Study Area (the nearby Thanet Coast and Sandwich Bay Ramsar site and Special Area of Protection (SPA), the Outer Thames Estuary SPA, the Special Area of Conservation (SAC) and the Thanet Coast Site of Special Scientific Interest (SSSI)). However as detailed in **ES Volume 1, ES Chapter 11 Ecology and Biodiversity**, there are no designated features considered to be sensitive the effects of emissions to air within 200m of roads predicted to experience increases in traffic flows; therefore, the potential for likely significant effects at these sites has been screened out. In regard to energy demand and heating and power across the Proposed Development, it assumed that the development will be electric led from 2025. Earlier phases may still utilise gas heating where required, but individual gas boilers are not considered to represent a potential risk of air quality effects and have therefore not been considered further in this ES Chapter. The proposed mixed-use community hub includes an area proposed as Use Class E which due to its flexible nature could be used for the 'sale of food and drink for consumption (mostly) on the premises'. Odour associated with this land use has the potential to have effects on nearby sensitive properties. A kitchen odour risk assessment would be undertaken when further information is available at Reserved Mattes stage of this Phase, including the identification of an appropriate level of odour control. Following the implementation of the identified appropriate level of odour control, residual odour effects will be 'not significant'.
CONSULTATION	**Thanet District Council (TDC) EIA Scoping Opinion** The EIA Scoping Opinion is presented in **ES Volume 2, Appendix EIA Methodology: Annex 2**. The approach to the consideration of trends in background and baseline concentrations of pollutants and NO_2 in particular was discussed at a meeting with TDC on 28/02/20 and the following was agreed: *Baseline conditions reflecting the trend that NO_2 will decrease in future will form the basis of assessment of baseline conditions within the Air Quality ES Chapter. Reference to recently published findings (AQC 2019) is to be shared with TDC's Environmental Health Officer (EHO). The Air Quality ES Chapter is to make reference to the most recent published TDC air quality monitoring results within the Annual Status Report 2019 (https://www.thanet.gov.uk/info-pages/air-quality/) to verify existing baseline NO_2 levels with the surrounding area. The Air Quality ES Lead can discuss further with TDC's EHO upon request.* The Scoping Opinion confirmed acceptability of all other aspects of the air quality assessment.

ASSESSMENT METHODOLOGY

8.1 The assessment methodology detailed in the following section has been applied to ascertain the potential impacts of emissions to air in order to identify their significance and compliance with policy and regulatory requirements (outlined in **ES Volume 2, Appendix Air Quality: Annex 2**), and whether or not additional mitigation is required.

8.2 This assessment first defines the 'Study Area' and summarises the baseline ambient air quality (for both 'current' and relevant future years within this Study Area. Following this, the potential impacts of the Proposed Development on the ambient air quality are assessed and their overall significance determined. An emission mitigation' assessment have also been undertaken as required by Local planning policy and guidance.

Study Area

8.3 The Study Area adopted for this assessment is as follows:

- for the construction dust risk assessment the Study Area (based on IAQM, 2014 guidance) is defined as compromising the area up to 350 m from the site boundary and 50 m from the route used by construction vehicles (up to 500 m from the site entrance(s));
- for construction road traffic emission assessment the Study Area (based on the EPUK / IAQM, 2017 guidance) is defined by roads (and sensitive receptors located in proximity to these roads) where development related traffic movements are predicted to exceed the screening criteria outlined in **ES Volume 2, Appendix Air Quality: Annex 3**; and
- for operational road traffic emissions assessment the Study Area (based on EPUK / IAQM, 2017 guidance) is defined by roads (and sensitive receptors located in proximity to these roads) where development related traffic movements are predicted by the TSHM predicted to exceed the screening criteria outlined in **ES Volume 2, Appendix Air Quality: Annex 3**.

Defining the Baseline

Current Baseline Conditions

8.4 Information on baseline air quality in the Study Area has been obtained by collating the results of monitoring carried out by Thanet District Council (TDC) and their Local Air Quality Management (LAQM) reports to identify potential Air Quality Management Areas (AQMAs). Background concentrations for the Study Area have been defined using the national pollution maps published by the Department for Environment, Food and Rural Affairs (DEFRA) which cover the whole country on a 1x1 km grid[1]. Any exceedances of the EU Limit Values along roads within the study area have been identified using the 2019 NO_2 Projections Data published by DEFRA.[2]

Evolution of the Baseline

8.5 Information on future baseline air quality in the Study Area has been obtained by defining background concentrations using DEFRA's national pollution maps and identifying any exceedances of the EU Limit Values

[1] *DEFRA (2020a) 'Background Mapping Data for Local Authorities - 2018' [online] Available at: https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018 Accessed: September 2020*

[2] *DEFRA (2020b). '2020 NO_2 Projections Data (2018 Reference Year)' Online, available at: https://uk-air.defra.gov.uk/library/no2ten/2020-no2-pm-projections-from-2018-data .*

along roads within the Study Area using the 2020 NO_2 Projections Data published by DEFRA[3]. Future baseline concentrations of pollutants have also been modelled at identified sensitive receptors using the ADMS-Roads atmospheric dispersion model (v5).

Impact Assessment Methodology

Site Suitability

Screening Assessments

Railway Impacts

8.6 The potential for significant effects as a result of emissions from the railway line located to the north of the site of new residents of the Proposed Development has been determined using the screening criteria outlined by the Local Air Quality Management Technical Guidance 2016[3]. This guidance outlines that there is only considered to be the potential for significant effects as a result of moving diesel locomotives in cases where:

- The railway line has heavy traffic of diesel passenger trains (as specified within the LAQM.TG(16) guidance); and
- There is relevant exposure within 30 m of the railway line; and
- Annual mean NO_2 concentrations are >25 µg/m^3.

Ambient Air Quality

8.7 A qualitative assessment to determine the ambient air quality within the Proposed Development taking into account baseline air quality conditions within and in close proximity to the site, and the proximity of sensitive locations within the Proposed Development to nearby sources of emissions.

Assumptions and Limitations

8.8 Assumptions and limitations associated with the assessment of site suitability are as outlined in Paragraphs 8.47 to 8.49.

Enabling and Construction

Enabling and Construction Dust Impacts

8.9 During enabling and construction, dust from on-site activities and off-site trackout by construction vehicles has the potential to impact on sensitive locations within the Study Area; the main potential impacts are loss of amenity (as a result of dust soiling) and deterioration of human health (as a result of elevated concentrations of PM_{10}).

8.10 The suspension of particles in the air is dependent on surface characteristics, weather conditions and on-site activities. Impacts have the potential to occur when dust generating activities coincide with dry, windy conditions, and where sensitive locations are located downwind of the dust source(s).

8.11 Separation distance is also an important factor. Large dust particles (greater than 30 µm), can be potentially responsible for most dust annoyance, will largely deposit within 100 m of sources. Intermediate particles (10-30 µm) can travel 200-500 m. Consequently, significant dust annoyance is usually limited to within a few hundred metres of its source. Smaller particles (less than 10 µm), which are the predominant fraction that can be potentially responsible for human health impacts largely remain airborne. However, the impact on the short-term concentrations of PM_{10} occurs over a shorter distance due to the rapid decrease in concentrations with distance from the source due to dispersion.

8.12 The assessment of the risk of potential construction dust impacts has been undertaken with reference to relevant guidance[4].

Screening Assessment

8.13 The first stage of the assessment involves screening to determine if there are sensitive receptors within threshold distances of the activities associated with the enabling and construction works of the scheme; defined as the Study Area. No further assessment is required if there are no receptors within the Study Area.

8.14 The Institute of Air Quality Management (IAQM) guidance[5] outlines that an assessment is only required in cases where:

- A 'human receptor' is located within:
- 350 m of the boundary of the site; OR
- 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s);
- An 'ecological receptor' is located within:
- 50 m of the boundary of the site; OR
- 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s);

Further Assessment

8.15 The risk of impacts associated with dust soiling and increases in concentrations of PM_{10} caused by the Proposed Development has been determined (following the IAQM guidance[4]) based on the dust emission class (or magnitude) for each activity arising from four activities in the absence of mitigation (enabling, earthworks, construction and trackout), the sensitivity of nearby receptors and the overall sensitivity of the area. The dust emission class (or magnitude) for each activity, receptor sensitivity and the overall sensitivity of the area are determined using the criteria outlined in **ES Volume 2, Appendix Air Quality: Annex 4** (based on the IAQM guidance) and professional judgement. The risk of dust impacts arising is a product of the relationship between the dust emission magnitude and the area sensitivity and is based on the criteria outlined in **Table A8.4.1 – 8.4.5** (based on the IAQM guidance[4]). The risk of impact is then used to determine the mitigation requirements.

8.16 The IAQM guidance recommends that no assessment of the significance of effects is made without mitigation in place, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations.

8.17 With appropriate mitigation in place, the IAQM guidance indicates that the residual effect dust emissions associated with enabling and construction activities can be classified as being 'not significant'.

8.18 The required measures to mitigate the risk of impacts associated with dust soiling and increases in concentrations of PM_{10} will be manged through the implementation of a Dust Management Plan (DMP) during enabling and construction. The requirement of which will be secured through an appropriately worded planning condition attached to the planning approval for the Proposed Development (if consented). These measures are set out within **ES Volume 1, Chapter 14 Mitigation and Monitoring Schedule** and described where appropriate within this ES Chapter**.**

Enabling and Construction Traffic Impacts

Screening Assessment

8.19 The potential for a significant effect on sensitive receptors within the Study Area as a result of emissions from enabling and construction traffic during the peak construction period generated by the Proposed Development has been determined qualitatively, taking into consideration the screening criteria outlined in the Environmental Protection UK (EPUK) / IAQM guidance[6] (see **ES Volume 2, Appendix Air Quality: Annex 3**), the anticipated routing of the generated construction traffic and the anticipated duration of impacts associated with the generated traffic.

8.20 If it is not possible to screen out the potential for significant impacts, then a detailed assessment will be undertaken (see Paragraphs 8.26 to 8.38).

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[3] *DEFRA (2018a), Local Air Quality Management Technical Guidance (TG16), Available online, https://laqm.defra.gov.uk/documents/LAQM-TG16-February-18-v1.pdf*

4 Institute of Air Quality Management (2014). 'Assessment of Dust from Demolition and Construction', IAQM, London

[5] IAQM (2014) *Guidance on the Assessment of Dust from Demolition and Construction*

[6] *EPUK / IAQM (2017) Land-use Planning & Development Control: Planning for Air Quality (V1.2)*

Completed Development

Operational Road Traffic Impacts

Screening Assessment

8.21 The potential for a significant effect on sensitive receptors within the Study Area as a result of emissions from traffic generated by the Proposed Development has been determined based on the screening criteria outlined in the EPUK / IAQM guidance (see **ES Volume 2, Appendix Air Quality: Annex 3**) which includes consideration of the volume and composition of operational traffic generated by the Proposed Development and existing local air quality conditions (i.e. the presence of any declared AQMAs).

8.22 In relation to ecological receptors, a detailed (quantitative) air quality assessment of impacts is required if there are sensitive habitats (within designated sites) within 200 m of a road with a 'potentially significant change'. If there are no designated sites containing sensitive habitats within 200 m of the affected road, then no further assessment is required.

8.23 The 'potentially significant change' could be associated with realignment (i.e. increased proximity to receptors), changes to speed (>10 kph). or flow. Applied screening criteria for changes in road traffic flows due to the Proposed Development are as follows:

- A change of light-duty vehicle (LDV) flows of more than 50 annual average daily traffic (AADT) or heavy-duty vehicle (HDV) flows of 10 AADT for sensitive habitats within Habitat Regulations Sites or SSSIs; and
- A change of LDV flows of more than 1000 AADT or HDV flows of more than 100 AADT for sensitive habitats within National Nature Reserves (NNRs) and local nature sites (i.e. ancient woodland, Local Wildlife Sites and Local Nature Reserves (LNRs)).

8.24 Changes in traffic flows below these criteria are considered to not have the potential to result in significant air quality impacts in isolation.

8.25 If it is not possible to screen out the potential for significant impacts, then a detailed assessment will be undertaken (see Paragraphs 8.26 to 8.38).

Detailed Assessment

8.26 Concentrations of pollutants (NO_2, PM_{10} and $PM_{2.5}$) have been predicted for a range of representative worst-case locations of relevant human exposure, primarily at sensitive existing residential properties within the Study Area both with and without the Proposed Development.

8.27 In order to account for the implications of the delivery of the 'Columbus Avenue Extension' (CAE), a separate scenario has assessed where this link is not within the TSHM.

8.28 Concentrations have also been predicted at monitoring sites operated by TDC for 2018 in order to verify the modelled results. **ES Volume 2, Appendix Air Quality: Annex 5** provides further details on the verification method.

8.29 Emissions from road vehicles and their resultant impact at receptor locations have been predicted using the ADMS-Roads dispersion model (v5). The model requires the user to provide various input data, including traffic flows (in Annual Average Daily Traffic (AADT format)), vehicle composition (i.e. the proportion of Heavy Duty Vehicles (HDVs)), road characteristics (including road width and gradient) and average vehicle speed.

8.30 The AADT flows and the proportions of HDVs for roads within the Study Area have been provided by the Project's transport consultants (Transport Planning Associates) extracted from the TSHM for the transport model base year of 2018, interim year of 2025 (pre-opening of southern link road) and 2031 (the assumed full traffic generation from the Proposed Development). Traffic data used in this assessment are summarised in **ES Volume 2, Appendix Air Quality: Annex 7**.

8.31 The model also requires meteorological data and 2018 meteorological data from the Manston meteorological station, which are considered suitable for this area. **ES Volume 2, Appendix Air Quality: Annex *5*** provides further details on the model inputs.

8.32 Traffic emissions of NOx, PM_{10} and $PM_{2.5}$ have been calculated using the Emission Factor Toolkit (EFT) v10[7], which utilises NO_x emission factors taken from the European Environment Agency (EEA) COPERT 5.3 emission tool. The traffic data were entered into the EFT to provide emission rates for each of the road links entered into the model.

8.33 Road vehicular emissions are primarily associated with the exhaust emissions but also include particles generated from abrasion (of tyres, brakes and road). The EFT allows users to calculate road vehicle pollutant emission rates for NO_x, PM_{10} (exhaust and brake, tyre and road wear), and $PM_{2.5}$ (exhaust and brake, tyre and road wear) for a specified year, road type, vehicle speed and vehicle fleet composition.

8.34 The EFT provides pollutant emission rates for 2018 through to 2030 and takes into consideration the following information available from the National Atmospheric Emissions Inventory (NAEI):

- fleet composition data for motorways, urban and rural roads in London and rest of the UK;
- fleet composition based on European emission standards from pre-Euro I to Euro 6(a-d)/VI;
- scaling factors reflecting improvements in the quality of fuel and some degree of retrofitting; and
- technology conversions in the national fleet.

8.35 The EFT emission rates are therefore primarily based on the age of the vehicles (in terms of their Euro class) and the fuel that they use (i.e. petrol, diesel or electric) and therefore in general terms exhaust emissions of pollutants decrease over time, as new vehicles replace older vehicles and as the emissions performance of vehicles is generally taken to improve over time.

8.36 Over recent years there has been considerable attention on the emissions from vehicle exhausts, particularly 'real-world driving emissions' (RDE) and the disparity with laboratory based 'Euro class' type approvals. It is therefore important to note the EFT includes NOx and PM speed emission coefficient equations for Euro 5 and 6 vehicles taken from the European Environment Agency (EEA) COPERT 5.3 emission calculation tool, reflecting emerging evidence on the real-world emission performance of these vehicles.

8.37 It is widely acknowledged that predictions of future reductions in pollutants concentrations were over-estimated (pre EFT 8), however recent studies indicate that EFT 9 reflected trends in monitored data and was slightly pessimistic in its prediction of future decreases in NOx emissions (Air Quality Consultants Ltd., 2020b); it is therefore considered that EFT10 provides an appropriate tool for quantifying vehicle emissions in current and future years.

8.38 Generally, concentrations of air pollutants in the UK are anticipated to decrease in the coming years; as such, in most cases, the earlier the year that is assessed, the more worst-case the assessment is. The enabling and construction works associated with the development is phased over 12-years with first occupation likely to be in 2023 (based on the indicative construction programme) and the site is not anticipated to be fully occupied until at least 2034.

8.39 Therefore, in order to take account of uncertainties relating to future year vehicle emissions and background pollutant concentrations, to provide a conservative assessment, the 'full development' scenario has been assessed utilising 2025 emission factors and background concentrations combined with traffic data from 2031 (which includes all Local Plan developments and full Proposed Development flows). This is considered a conservative assumption of emissions in the future as it represents a worst-case scenario in terms of road traffic generated from the Proposed Development against emissions factors and background concentrations in 2025. As described above, concentrations of air pollutants in the UK are anticipated to decrease in the coming years therefore comparing the increase in road traffic emissions against 2025 emissions factors and background concentrations presents a robust worst-case assessment.

8.40 Therefore, an assessment of an interim year of 2025 road traffic emissions against 2025 emission factors and background concentrations is not considered relevant as potential effects would expected to be less than those presented within the complete build out of the Proposed Development by 2031. This is also considered relevant in regard to operational flows during this year in combination with anticipated construction road traffic.

8.41 If a detailed assessment of impacts at ecological receptors is required, in addition to the EFT, emissions of ammonia (NH_3) will be calculated using the Calculator for Road Emissions of Ammonia (CREAM) tool[8] .

8.42 The ADMS Roads model will be used to calculate concentrations of NOx and NH_3 at a range of transects at increasing distances from the adjacent road network and the nitrogen (and acid) deposition calculated using

[7] *DEFRA(2020c). 'Emissions Factor Toolkit (Version 10.1)' Online, available at: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html*

[8] *Air Quality Consultants (2020). 'Calculator for Road Emissions of Ammonia (CREAM) v1A.' Available at: https://www.aqconsultants.co.uk/resources*

deposition velocities for grassland habitats of 1.5mm/s for NO_2 and 2mm/s for NH_3, and for taller vegetation such as trees of 3mm/s for NO_2 and 30mm/s for NH_3.

Embedded (Primary) Mitigation

8.43 The Proposed Development will also comprise the construction of a strategic link road that will connect the site to Acol Lane, Park Lane and B2050 (Manston Road) in the south through to Minnis Road in the north. It is anticipated that the construction of the strategic link road will be undertaken in two phases:

- The southern section of the strategic link road (to the east of the A28 (Canterbury Road) connecting to Acol Hill and B2050 (Manston Road) will be constructed in sequence with Phases 1A, 1B and 2A in order to aid site logistics and ensure this section of the strategic link road is complete for the occupation of houses associated with Phases 1A, 1B and 2A; and
- The northern section of the strategic link road (to the west of the A28 (Canterbury Road) connecting to Minnis Road) (hereafter referred to as the NLR) will be constructed in sequence with Phases 2B, 3 and 4 in order to aid site logistics and ensure this section of the strategic link road is complete for the occupation of houses associated with Phases 2B, 3 and 4.

8.44 For the purposes of this assessment, the southern section of the strategic link road (hereafter referred to as the SLR) is to commence construction prior to the commencement of construction of Phases 1A, 1B and 2B and will be operational by Year 4 of the construction and phasing programme.

8.45 For the purposes of this assessment, the NLR is to commence construction in Q3 of Year 2 and will be operational by Year 8 of the construction and phasing programme.

8.46 The SLR and NLR will divert traffic movements (both existing and future growth) from the A28 through the centre of Birchington on Sea and are therefore considered as embedded (primary) mitigation as the TSHM includes the SLR and NLR within the highway infrastructure which will be brought forward as part of the Proposed Development.

Assumptions and Limitations

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

8.48 There has been an acknowledged disparity between national road transport emissions projections and measured annual mean concentrations of nitrogen oxides (NOx) and NO_2 for many years. Recent monitoring has shown that reductions in concentrations are now being measured in many parts of the country[9], however, there is still some uncertainty regarding the rate at which emissions will reduce in the future and therefore some consideration must be given the accuracy of any projection and to appropriately respond to this.

8.49 The full development scenario assessment has been based on 2025 emission factors and background concentrations, whilst utilising traffic flows for 2031 and full development traffic which will not be fully occupied until 2034. The model has been verified against 2018 monitoring data. This is considered to provide an appropriately conservative assessment taking into account the uncertainties regarding future vehicle emission factors.

Emissions Mitigation Assessment

8.50 An Emissions Mitigation Assessment has been undertaken in accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance[10]. The assessment comprises the assessment of emissions generated by a development, which is then used to inform proportionate mitigation.

8.51 In the case of the Proposed Development, the assessment comprises the calculation of transport related emissions associated with the development per year, which is then used to determine damage costs for NO_x and PM_{10} over a five year period. The total damage costs calculated are taken to be indicative of the scale of mitigation measures to reduce emission and exposure to air pollutants.

8.52 An outline of the proposed mitigation measures (both embedded and secondary) has been provided; however indicative costs cannot be fully defined at this stage for comparison to the calculated damage costs.

Methodology for Defining Effects

Receptors and Receptor Sensitivity

Construction Dust Impacts

8.53 The sensitivity of human health and ecological locations to impacts from construction dust are defined by the IAQM guidance[7] and set out in **ES Volume 2, Appendix Air Quality: Annex 4.**

Ambient Air Quality and Proposed Development-Generated Road Vehicle Emissions

8.54 Relevant sensitive human receptor locations are places where members of the public might be expected to be regularly present over the averaging period of the NAQOs (see Table 8.1), as outlined by the LAQM.TG(16) guidance[3] and set out in Table 8.2.

Table 8.1 Relevant Air Quality Objectives

Pollutant	Averaging Period	NAQO	Source
NO_2	1-hour mean	200 µg/m^3 not to be exceeded more than 18 times a year	NAQO and EU limit value
	Annual mean	40 µg/m^3	NAQO and EU limit value
PM_{10}	24-hour mean	50 µg/m^3 not to be exceeded more than 35 times a year	NAQO and EU limit value
	Annual mean	40 µg/m^3	NAQO and EU limit value
$PM_{2.5}$	Annual mean	25 µg/m^3	Stage 1 limit value by 2015 - NAQO and EU limit value
	Annual mean	20 µg/m^3	Stage 2 limit value by 2020 - EU Directive

Table 8.2 Relevant Public Exposure

Averaging Period	NAQOs should apply at:	NAQOs don't apply at:
Annual mean	All locations where members of the public might be regularly exposed For example: Building façades of residential properties, schools, hospitals, care homes etc	Façades of offices or other places of work where members of the public do not have regular access Hotels, unless people live there as their permanent residence Gardens of residences Kerbside sites Any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean NAQO would apply, together with hotels and gardens of residences	Kerbside sites Any other location where public exposure is expected to be short term
1-hour mean	All locations where the annual mean and 24 and 8-hour mean NAQOs apply as well as: Kerbside sites Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more. Any outdoor locations where members of the public might reasonably be expected to spend one hour or longer.	Kerbside locations where the public would not be expected to have regular access

[9] *Air Quality Consultants Ltd. (2019). 'Nitrogen Dioxide and Nitrogen Oxides Trends in the UK 2005 to 2018'*

[10] *Kent & Medway Air Quality Partnership (2016) 'Air Quality Planning Guidance'*

15-minute mean	All locations where members of the public might reasonably be regularly exposed for a period of 15 minutes or longer.	

Magnitude of Impact

Construction Dust Impacts

8.55 The IAQM guidance[4] recommends that the magnitude of construction dust effects without mitigation should not be determined but rather, that the level of risk determined should be used to inform appropriate mitigation measures. With these mitigation measures in place, the residual effects will be 'not significant.

Road Traffic Impacts

EPUK / IAQM Approach

8.56 There is no official guidance in the UK on how to assess the significance of the air quality impacts of a new development on existing receptors. The approach developed by EPUK and the IAQM[8], which considers the change in air quality as a result of a Proposed Development on existing receptors in combination with baseline concentrations at the receptors, has therefore been used. The guidance sets out three stages: determining the magnitude of change at each receptor, describing the impact, and assessing the overall significance. Impact magnitude relates to the change in pollutant concentration; the impact description relates this change to the NAQO (as presented in **ES Volume 2, Appendix Air Quality: Annex 4**), and is shown in Table 8.3.

Table 8.3 Impact Significance Criteria

Long term average Concentration at receptor in assessment year	% Changes in Concentration with development in relation to NAQO / Limit Value			
	1*	2-5	6-10	>10
> 110 % a	Moderate	Substantial	Substantial	Substantial
>102% - ≤110% b	Moderate	Moderate	Substantial	Substantial
>95% - ≤102% c	Slight	Moderate	Moderate	Substantial
>75% - ≤95% d	Negligible	Slight	Moderate	Moderate
≤75% e	Negligible	Negligible	Slight	Moderate

Where concentrations increase the impact is described as adverse, and where it decreases as beneficial.

% change rounded to nearest whole number. Where the % change is 0 (i.e. Less than 0.5%) the impact will be Negligible.

a NO_2 or PM_{10} : > 44 µg/m^3 annual mean; $PM_{2.5}$ >27.5 µg/m^3 annual mean; PM_{10} >35.2 µg/m^3 annual mean (days).

b NO_2 or PM_{10} : > 40.8 – ≤ 44 µg/m^3 annual mean; $PM_{2.5}$ > 25.5 – ≤27.5 µg/m^3 annual mean; PM_{10} >32.64 – ≤35.2 µg/m3 annual mean (days).

c NO_2 or PM_{10} : > 38 – ≤40.8 µg/m^3 annual mean; $PM_{2.5}$ >23.75 – ≤25.5 µg/m^3 of annual mean; PM_{10} >30.4 – ≤32.64 µg/m^3 annual mean (days).

d NO_2 or PM_{10} : >30 - ≤38µg/m^3 annual mean; PM $_5$ >18.75 - ≤23.75 µg/m^3 annual mean; or <24 - ≤ 30.4 µg/m^3 annual mean (days).

e NO_2 or PM_{10} : ≤30 µg/m3 annual mean; PM2.5 ≤18.75 µg/m3 annual mean; PM_{10} ≤24 µg/m^3 annual mean (days).

8.57 Analysis of long-term monitoring data suggests that if the annual mean NO_2 concentration is less than 60 µg/m^3 then the 1-hour mean NO_2 NAQO is unlikely to be exceeded where road transport is the main source of pollution[11]. Furthermore, analysis of long-term monitoring data suggests that if the annual mean PM_{10} concentration is less than 32 µg/m^3 then the 24-hour mean NO_2 NAQO is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment these concentrations (60 µg/m^3 for NO_2 and 32 µg/m^3 for PM_{10}) have been used as a proxy to determine whether the 1-hour mean NO_2 and 24-hour mean PM_{10} NAQOs are likely to be achieved.

Kent and Medway Air Quality Planning Guidance

8.58 The Kent and Medway Air Quality Partnership Air Quality Planning Guidance[10] provides an alternative method for classifying impacts, as set out in Table 8.4. This approach to defining impact significance has been considered within the assessment, however, the judgement of the overall effect places greater emphasis on the EPUK / IAQM approach (as outlined in Paragraph 8.56). Therefore, the EPUK / IAQM approach has been used for this assessment as it provides a greater level of detail in determining effects.

Table 8.4 Kent and Medway Air Quality Planning Guidance Classification of Significance

Classification of Impact	Concentration Change due to Development	Or if Development Causes:
Very High	Increase >10%	Worsening of air quality within an existing AQMA Creation of a new AQMA Introduction of new receptors within an existing AQMA
High	Increase 5-10%	Levels to be within 5% of NAQO
Medium	Increase 1-5%	Levels to be within 10% of NAQO
Low / Imperceptible	Increase <1%	-

NOTE: Concentrations are relative to NAQOs.

Site Suitability

8.59 There is no official guidance in the UK on how to assess the significance of the air quality impacts of existing air quality on a new development. The assessment of site suitability has, therefore, been limited to consideration of pollutant concentrations within the Proposed Development and comparing these concentrations to the relevant NAQOs and reference is then made as to whether the Proposed Development is considered suitable for its intended use or not in regard to air quality.

Defining the Effect

8.60 A significant worsening of air quality conditions (either as a result of increasing concentrations of pollutants at existing sensitive locations and / or causing a exceedance(s) of NAQO(s), including by introducing new sensitive locations in areas where concentrations are above the relevant NAQOs) is considered to be an 'adverse' effect. A significant improvement of air quality conditions (as a result of decreasing concentrations of pollutants at existing sensitive locations) is considered to be a 'beneficial' effect. An insignificant change in air quality conditions (as a result of insignificant changes to pollutant concentrations and no introduction of new exceedances of the NAQOs) is considered to be 'neutral' effect.

8.61 At a spatial level, 'local' effects are those affecting the site and neighbouring receptors, while effects upon receptors in TDC beyond the vicinity of the site and its neighbours are considered to be 'district' level effects. Effects affecting adjacent local authority areas are considered to be 'regional' level effects, whilst those which affect areas beyond this are considered to be 'national' level effects.

8.62 For the purposes of the ES, effects that are generated as a result of the enabling and construction works (i.e. those that last for this set period of time) are classed as being 'temporary'; these may be further classified as either 'short-term' or 'medium-term' temporary effects depending on the duration of the enabling and construction works that generate the effects in question. Effects that result from when the Proposed Development is completed and operational are classed as being 'permanent' and 'long-term' effects.

8.63 The assessment identifies whether overall effects are 'direct' (i.e. resulting without any intervening factors) or 'indirect' (i.e. not directly caused).

Categorising Likely Significant Effects

8.64 The IAQM guidance states that the overall assessment of significance should be based on professional judgement, taking into account factors including:

- the number of properties affected by 'Slight', 'Moderate' or 'Substantial' adverse air quality impacts and a judgement on the overall balance[12];
- the magnitude of the changes and the descriptions of the impacts at the receptors findings;

[11] *DEFRA (2018b). 'UK Plan for tackling Roadside Nitrogen Dioxide Concentrations: Detailed Plan'. Available at: https://www.gov.uk/government/publications/air-quality-plan-for-nitrogen-dioxide-no2-in-uk-2017*

[12] *Minor and Major are standard EIA terminology, and are considered to broadly correspond to Slight and Moderate/Substantial respectively in the relevant guidance. Refer to: Moorcroft and Barrowcliffe et al (2017) Land-Use Planning & Development Control: Planning For Air Quality v1.2, IAQM, London, Available: http://iaqm.co.uk/guidance/.*

- whether or not an exceedance of an NAQO or limit value is predicted to arise in the operational study area (where there are significant changes in traffic) where none existed before or an exceedance area is substantially increased;
- the uncertainty, comprising the extent to which worst-case assumptions have been made; and
- the extent to which an NAQO or limit value is exceeded.

8.65 The IAQM methodology categorises impacts at an individual receptor and 'Moderate' or 'Substantial' adverse impacts may be considered to be a 'significant' environmental effect, whereas 'Negligible' or 'Slight' impacts would not be considered 'significant'. The overall effect however, needs to be considered taking into account the changes at all of the modelled receptor locations, with a determination made as to whether the overall air quality effect of the development is 'significant' or not based on professional judgement.

RECEPTORS AND RECEPTOR SENSITIVITY

Existing

8.66 Representative sensitive receptors have been identified within the Study Area as worst-case existing receptors for the assessment based on proximity to roads where the TSHM predicts development traffic will be routed. When identifying these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, where there is a combined effect of several road links and routes along which higher volumes of traffic generated by the Proposed Development will travel as predicted by the TSHM. These locations are described in Table 8.5 and shown in **Figure 8.2** in **ES Volume 2, Appendix Air Quality: Annex 7**.

8.67 All identified sensitive receptor locations are considered to be of 'high sensitivity'.

Table 8.5 Existing Receptor Locations

Receptor ID	X Coordinate	Y Coordinate	Height (m)
R01	629661	168326	1.5
R02	629641	168361	1.5
R03	629849	168625	1.5
R04	629908	168691	1.5
R05	629916	168683	1.5
R06	630056	168860	1.5
R07	630207	168992	1.5
R08	630253	169033	1.5
R09	630258	169010	1.5
R10	630235	169087	4.5
R11	630172	169139	1.5
R12	630130	169171	4.5
R13	629472	169312	1.5
R14	629584	169332	1.5
R15	629597	169313	1.5
R16	629747	169357	1.5
R17	629878	169358	1.5
R18	630289	169050	1.5
R19	630309	169070	1.5
R20	630335	169063	1.5
R21	630393	169089	1.5
R22	630680	169319	1.5
R23	631353	169553	1.5
R24	629366	167959	1.5
R25	627026	166396	1.5
R26	625733	165000	1.5
R27	625707	165010	1.5
R28	630404	168759	1.5
R29	630473	167952	1.5
R30	630777	167406	1.5
R31	630753	167202	1.5
R32	630787	167022	1.5
R33	631115	165816	1.5
R34	631067	165767	1.5
R35	631423	167839	1.5
R36	632414	169793	1.5
R37	634519	169199	1.5
R38	634571	169233	1.5
R39	633121	166501	1.5
R40	634686	166170	1.5
R41	637008	165436	1.5
R42	636183	167816	1.5
R43	635060	169520	0
R44	635155	169576	1.5
R45	635319	169464	1
R46	635254	169713	1.5
R47	635436	169787	1
R48	635546	169875	0.5
R49	635923	170037	1.5
R50	635390	170306	1.5
R51	635453	170833	0
R52	635208	170745	4.5
R53	634730	170685	1.5
R54	634543	170594	0
R55	633587	169802	1.5
R56	635282	169673	1.5

Ecological Receptors

8.68 There are a number of designated ecological sites located within the Study Area including the nearby Thanet Coast and Sandwich Bay Ramsar site and Special Area of Protection (SPA), the Outer Thames Estuary SPA, the Special Area of Conservation (SAC) and the Thanet Coast Site of Special Scientific Interest (SSSI)) that will be considered against the assessment approach.

BASELINE CONDITIONS

Current Baseline Conditions

EU Limit Values

8.69 The Study Area does not contain any predicted exceedances of an EU Limit Values. As there are no Automatic Urban and Rural Network (AURN) monitoring sites located within the Study Area, no exceedances of the EU Limit Values have been measured.

LAQM

8.70 TDC has investigated air quality within its area as part of its responsibilities under the LAQM regime and has declared three AQMAs, one of which (Thanet Urban AQMA) is still in place. Thanet AQMA was declared in 2011 for exceedances of the annual mean NO_2 NAQO and covers a number of urban areas within Thanet. It is located directly to the north-east of the site, predominantly adjacent to the site boundary, though small sections of the north-eastern parts of the site is located within the AQMA (see **Figure 8.1** in **ES Volume 2, Appendix Air Quality: Annex 7**).

Local Monitoring Data

NO_2

8.71 TDC carries out monitoring at two automatic monitoring sites, one of which (ZH5) is located within 1 km of the site. TDC also deploys NO_2 diffusion tubes at a number of locations, including three sites (TH13/46/47 (a triplicate site), TH48 and TH49) located within 1 km of the site. Monitoring site locations are shown is **Figure 8.1** in **ES Volume 2, Appendix Air Quality: Annex 7**. 2015-2019 monitoring results for monitoring sites located within the Study Area are shown in Table 8.6 and Table 8.7.

8.72 Measured annual mean concentrations in 2019 were below the annual mean NO_2 NAQO at all monitoring sites within the Study Area. Concentrations above the annual mean were measured from 2015 to 2017 at site TH13/46/47 located at The Square, Birchington-on-Sea but reduced by over 10% to 35.9µg/m^3 in 2019. Automatic monitoring site ZH5 did not measure any exceedances of the annual or 1-hour mean NO_2 NAQO from 2015 to 2019. Furthermore, as all annual mean concentrations measured by diffusion tubes between 2015 and 2018 were below 60 µg/m^3, it is unlikely that the 1-hour mean NAQO was exceeded at any of these locations either.

Table 8.6 Measured Annual Mean NO_2 Concentrations (2015 – 2019)

Site ID	Site Type	Annual Mean (µg/m^3)				
		2015	2016	2017	2018	2019
Automatic Site						
ZH5 – The Square, Birchington*	Roadside	24.6	33.6	32.4	31.0	29.3
Diffusion Tubes						
TH10*	Kerbside	34.9	35.0	31.0	32.3	30.7
TH13/46/47a*	Kerbside	**42.4**	**44.1**	**40.6**	37.3	35.9
TH16	Urban Background	14.7	16.7	16.4	14.4	14.9
TH26	Kerbside	35.3	36.0	33.0	32.4	30.5
TH27	Urban Background	14.1	16.3	16.4	14.2	15.1
TH31	Urban Background	12.9	14.7	15.8	12.2	12.2
TH32	Urban Background	14.4	15.4	16.7	14.0	14.2
TH33	Urban Background	14.9	16.5	16.1	15.0	14.6
TH34	Roadside	24.1	25.8	23.7	21.8	21.7
TH36	Kerbside	22.5	28.6	23.9	26.5	25.5
TH37	Kerbside	14.8	16.0	16.1	14.4	16.3
TH48*	Kerbside	31.9	31.2	27.9	29.9	25.5
TH49	Roadside	20.3	20.7	22.0	20.8	19.5
TH51/52/53a	Roadside	23.7	23.7	21.4	20.2	19.3
TH54/64/65a	Roadside	38.2	**40.9**	38.0	32.7	33.7
TH55	Roadside	21.9	29.0	27.0	22.7	23.6
TH66	Roadside	31.1	27.2	26.3	24.7	24.0
TH67/68/69a	Roadside	33.7	35.6	32.2	31.8	30.4
TH70/71/72a	Roadside	**42.8**	**44.9**	**41.6**	38.6	37.6
TH76	Roadside	21.6	25.5	25.8	21.3	22.1
TH78	Roadside	N/A	N/A	19.9	16.9	16.8
TH79	Roadside	N/A	N/A	N/A	21.4	19.6
TH80	Roadside	N/A	N/A	N/A	21.0	19.1
TH81	Roadside	N/A	N/A	N/A	21.2	19.1
TH82*	Roadside	N/A	N/A	N/A	25.1	20.8
TH83	Roadside	N/A	N/A	N/A	19.4	17.2
TH84	Roadside	N/A	N/A	N/A	19.1	22.1
TH85	Roadside	N/A	N/A	N/A	**41.8**	29.2
NAQO		**40**				

Exceedances of the NAQO are highlighted in bold.
Data taken from the TDC's 2020 Air Quality Annual Status Report (ASR) (TDC, 2020).
[a] Average concentration of the three diffusion tubes.

Table 8.7 Number of Hours when NO_2 Concentrations >200 µg/m^3 were Measured (2015 – 2019)

Site ID	Number of Hours >200 µg/m^3				
	2015	2016	2017	2018	2019
ZH5 – The Square, Birchington *	0	0	0	0	0
NAQO	**18**				

Data taken from the TDC's 2020 Air Quality ASR (TDC, 2020).

PM_{10}

8.73 The results of the PM_{10} monitoring at automatic monitoring site ZH5 are presented in Table 8.8.

8.74 No exceedances of either the annual mean or the 24-hour mean PM_{10} NAQO have been measured from 2015 to 2019. There is a weak trend of increasing concentrations at site ZH5 over this time period.

Table 8.8 Measured Annual Mean PM_{10} Concentrations and the Number of Days when Concentrations >50 µg/m^3 were Measured (2015 – 2019).

Site ID	Annual Mean PM10 (µg/m3)				
	2015	2016	2017	2018	2019
ZH5 – The Square, Birchington *	22.3	24.8	23.2	25.2	23.9
NAQO	**40**				
Number of Days >50 µg/m^3					
ZH5 – The Square, Birchington	6	4	9	10	14

NAQO		**35 (days >50 µg/m^3)**

Data taken from the TDC's 2020 Air Quality ASR (TDC, 2020).

$PM_{2.5}$

8.75 TDC has not undertaken any monitoring of $PM_{2.5}$ concentrations within 1 km of the site.

Predicted Background Concentrations

8.76 Estimated background concentrations in the 'base year' (2018 as used for model verification) at sensitive identified receptors have been obtained from the latest 2018-based national maps provided by DEFRA[2], and are presented in Table 8.9.

8.77 The background concentrations are all well below the relevant NAQOs both in the current and future year.

Table 8.9 Estimated Base Year (2018) Annual Mean Background Concentrations

Location	Annual Mean (µg/m^3)		
	NO_2	PM_{10}	PM_{25}
R01	9.9	17.9	11.1
R02	9.9	17.9	11.1
R03	9.9	20.4	12.5
R04	9.9	20.3	12.4
R05	9.9	20.4	12.5
R06	10.0	19.7	12.5
R07	10.0	18.7	11.8
R08	10.6	21.2	13.8
R09	10.6	17.9	11.8
R10	10.6	16.2	10.8
R11	10.6	17.5	11.5
R12	10.6	15.5	10.4
R13	9.7	14.7	9.7
R14	9.7	14.7	9.7
R15	9.7	14.7	9.7
R16	9.7	14.8	9.8
R17	9.7	14.8	9.8
R18	10.6	17.8	11.7
R19	10.6	19.8	12.9
R20	10.6	18.6	12.2
R21	10.6	19.3	12.6
R22	10.6	17.7	11.6
R23	10.6	16.6	10.8
R24	9.8	19.6	11.6
R25	10.1	17.9	10.8
R26	8.9	17.1	10.4
R27	8.9	17.4	10.5
R28	10.0	17.4	11.1
R29	9.5	16.3	9.9
R30	9.5	16.9	10.2
R31	9.5	18.5	11.2
R32	9.5	18.1	11.0
R33	11.6	19.0	11.5
R34	11.6	21.1	12.8
R35	9.9	16.9	10.2
R36	10.9	19.8	12.8
R37	10.2	16.7	10.7
R38	10.2	16.4	10.6
R39	10.3	14.7	9.6
R40	10.1	17.5	10.9
R41	12.4	19.1	13.0
R42	12.7	18.2	11.6
R43	11.7	17.3	11.6
R44	11.7	16.6	11.2
R45	11.7	15.3	10.4
R46	11.7	18.3	12.3
R47	11.7	16.7	11.2
R48	11.7	18.8	12.5
R49	12.9	20.3	13.5
R50	12.9	18.4	12.3
R51	12.9	18.2	12.2
R52	12.9	20.7	13.8
R53	11.3	15.9	10.6
R54	11.3	18.4	12.0
R55	10.8	17.5	11.2
R56	11.7	17.5	11.8
NAQOs	**40**	**40**	**20**

Predicted Baseline Concentrations

8.78 The ADMS-Roads model has been used to predict baseline NO_2, PM_{10} and $PM_{2.5}$ concentrations in the 'base' year (2018) at each of the existing receptor locations identified in Table 8.6. The results for the baseline scenarios are presented in Table 8.10.

8.79 Predicted concentrations of NO_2 exceed the relevant NAQO at six existing receptors (R08, R19, R36, R48, R49 and R52) in 2018. PM_{10} and $PM_{2.5}$ concentrations are well below the relevant NAQOs at all existing receptors.

8.80 None of the predicted annual mean NO_2 concentrations exceed 60 µg/m^3 and therefore exceedance of the 1-hour mean NO_2 NAQO is unlikely.

8.81 None of the predicted annual mean PM_{10} concentrations exceed 32 µg/m^3 and therefore exceedance of the 24-hour mean PM_{10} NAQO is unlikely.

Table 8.10 Predicted Baseline Concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2018

Location	Annual Mean (µg/m3)		
	NO2	PM_{10}	$PM_{2.5}$
R01	22.4	17.9	11.1
R02	22.3	17.9	11.1
R03	35.2	20.4	12.5
R04	31.8	20.3	12.4
R05	32.1	20.4	12.5
R06	36.4	19.7	12.5
R07	31.0	18.7	11.8
R08	**49.0**	21.2	13.8
R09	31.6	17.9	11.8
R10	20.5	16.2	10.8
R11	26.3	17.5	11.5
R12	16.1	15.5	10.4
R13	10.2	14.7	9.7
R14	10.3	14.7	9.7
R15	10.3	14.7	9.7
R16	10.4	14.8	9.8
R17	10.9	14.8	9.8
R18	29.7	17.8	11.7
R19	**40.5**	19.8	12.9
R20	31.5	18.6	12.2
R21	36.1	19.3	12.6
R22	27.1	17.7	11.6
R23	21.8	16.6	10.8
R24	28.5	19.6	11.6
R25	22.2	17.9	10.8
R26	21.0	17.1	10.4
R27	23.8	17.4	10.5
R28	22.8	17.4	11.1
R29	13.5	16.3	9.9
R30	16.8	16.9	10.2
R31	28.8	18.5	11.2
R32	25.1	18.1	11.0
R33	29.3	19.0	11.5
R34	38.8	21.1	12.8
R35	16.1	16.9	10.2
R36	**43.3**	19.8	12.8
R37	18.4	16.7	10.7
R38	17.1	16.4	10.6
R39	14.7	14.7	9.6
R40	24.4	17.5	10.9
R41	31.1	19.1	13.0
R42	26.8	18.2	11.6
R43	25.9	17.3	11.6
R44	22.5	16.6	11.2
R45	13.9	15.3	10.4
R46	38.0	18.3	12.3
R47	26.8	16.7	11.2
R48	**40.2**	18.8	12.5
R49	**47.5**	20.3	13.5
R50	32.9	18.4	12.3
R51	33.2	18.2	12.2
R52	**46.7**	20.7	13.8
R53	19.9	15.9	10.6
R54	31.3	18.4	12.0
R55	22.4	17.5	11.2
R56	22.3	17.5	11.8
NAQOs	**40**	**40**	**20**

Exceedances of the NAQOs are highlighted in bold.

Future Baseline

EU Limit Values

8.82 The Study Area does not contain any predicted exceedances of an EU Limit Values in future years (2025 and 2030).

Predicted Background Concentrations

8.83 Estimated background concentrations in the future baseline year (2025) at the sensitive receptors have been obtained from the latest 2018-based national maps provided by DEFRA[3], and are presented in Table 8.11.

8.84 The background concentrations are all well below the relevant NAQOs both in the current and future year.

Table 8.11 Estimated Future Baseline Year (2025) Annual Mean Background Concentrations

Location	Annual Mean (µg/m3)		
	NO_2	PM_{10}	$PM_{2.5}$
R01	7.8	14.3	8.6
R02	7.8	14.3	8.6
R03	7.8	14.3	8.6
R04	7.8	14.3	8.6
R05	7.8	14.3	8.6
R06	7.9	13.9	8.7
R07	7.9	13.9	8.7
R08	8.4	13.3	8.8
R09	8.4	13.3	8.8

R10	8.4	13.3	8.8
R11	8.4	13.3	8.8
R12	8.4	13.3	8.8
R13	7.8	13.3	8.6
R14	7.8	13.3	8.6
R15	7.8	13.3	8.6
R16	7.8	13.3	8.6
R17	7.8	13.3	8.6
R18	8.4	13.3	8.8
R19	8.4	13.3	8.8
R20	8.4	13.3	8.8
R21	8.4	13.3	8.8
R22	8.4	13.3	8.8
R23	8.4	13.6	8.7
R24	7.8	14.6	8.5
R25	7.9	14.3	8.4
R26	7.1	14.0	8.2
R27	7.1	14.0	8.2
R28	7.9	13.9	8.7
R29	7.6	14.2	8.4
R30	7.6	14.2	8.4
R31	7.6	14.2	8.4
R32	7.6	14.2	8.4
R33	9.2	14.7	8.7
R34	9.2	14.7	8.7
R35	8.0	14.3	8.4
R36	8.7	14.1	9.1
R37	8.3	13.8	8.7
R38	8.3	13.8	8.7
R39	8.2	12.6	8.0
R40	8.1	13.7	8.4
R41	9.9	14.4	10.0
R42	10.0	14.4	9.1
R43	9.5	13.6	9.1
R44	9.5	13.6	9.1
R45	9.5	13.6	9.1
R46	9.5	13.6	9.1
R47	9.5	13.6	9.1
R48	9.5	13.6	9.1
R49	10.4	14.1	9.5
R50	10.4	14.1	9.5
R51	10.4	14.1	9.5
R52	10.4	14.1	9.5
R53	9.1	13.1	8.7
R54	9.1	13.1	8.7
R55	8.7	14.3	9.1
R56	9.5	13.6	9.1
NAQOs	**40**	**40**	**20**

Predicted Future Baseline Concentrations

8.85 The ADMS-Roads model has been used to predict baseline NO_2, PM_{10} and $PM_{2.5}$ concentrations in the 'future' year (2025) at each of the existing receptor locations identified in Table 8.6. The results for the baseline scenario are presented in Table 8.12.

8.86 Overall, baseline concentrations of all of the pollutants considered are predicted to decrease between 2018 and 2025, as vehicle emission factors and background concentrations are assumed to improve, despite the traffic increase on the network.

8.87 The annual mean NO_2, PM_{10} and $PM_{2.5}$ NAQOs are not predicted to be exceeded at any of the existing receptor locations in 2025.Furthermore, predicted concentrations of NO_2 are lower than 60 µg/m^3 during 2025, indicating that it is unlikely that any of exceedances of the 1-hour mean NAQO have occurred, and predicted concentrations of PM_{10} are lower than 32 µg/m^3 in 2025, indicating that it is unlikely that any exceedances of the 24-hour mean NAQO will occur.

Table 8.12 Predicted Future Baseline Concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2025

Location	Annual Mean (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
R01	14.8	16.6	9.9
R02	14.8	16.6	9.9
R03	20.1	18.4	10.9
R04	18.4	18.3	10.9
R05	18.5	18.4	10.9
R06	21.0	17.7	10.8
R07	18.3	16.8	10.3
R08	27.8	18.8	11.9
R09	18.8	16.0	10.3
R10	13.4	14.7	9.5
R11	17.1	16.0	10.3
R12	11.3	14.1	9.2
R13	8.3	13.4	8.7
R14	8.7	13.5	8.8
R15	8.4	13.5	8.7
R16	8.5	13.5	8.7
R17	8.7	13.5	8.8
R18	18.1	16.0	10.3
R19	24.3	17.9	11.3

R20	19.4	16.9	10.8
R21	21.9	17.5	11.1
R22	16.9	16.0	10.3
R23	13.9	15.0	9.5
R24	18.5	18.3	10.5
R25	13.5	16.3	9.5
R26	13.3	15.8	9.2
R27	15.0	16.0	9.4
R28	14.1	15.7	9.7
R29	12.2	15.7	9.2
R30	10.6	15.2	9.0
R31	12.1	15.4	9.1
R32	11.2	15.3	9.0
R33	21.8	18.5	10.8
R34	24.5	19.9	11.6
R35	13.2	16.1	9.4
R36	24.6	17.9	11.2
R37	15.4	16.2	10.0
R38	14.1	15.7	9.8
R39	11.2	13.5	8.6
R40	16.3	16.2	9.8
R41	21.7	18.0	12.0
R42	18.0	16.8	10.4
R43	16.4	15.7	10.2
R44	15.6	15.2	10.0
R45	11.7	14.2	9.4
R46	25.8	17.5	11.3
R47	15.5	14.9	9.8
R48	24.4	17.0	11.0
R49	29.9	18.5	12.0
R50	23.2	17.3	11.3
R51	22.4	16.8	11.0
R52	30.6	19.3	12.5
R53	14.0	14.6	9.5
R54	20.9	17.0	10.9
R55	16.6	16.6	10.4
R56	18.7	15.7	10.3
NAQOs	**40**	**40**	**20**

Exceedances of the NAQOs are highlighted in bold.

POTENTIAL EFFECTS

Enabling and Construction

Construction Dust Impacts Assessment

Screening Assessment

8.88 There are a number of existing sensitive human receptors primarily located within residential properties located within 350 m of the site boundary and / or within 50 m of the routes that will be used by enabling and construction vehicles. As such, further assessment of the risk of impacts from dust soiling and PM_{10} concentrations is required.

8.89 There are no sensitive ecological receptors located within either 350 m of the site boundary or within 50 m of the routes used by enabling and construction vehicles on the public highway (the closest designated ecological site to the site is located approximately 620 m from the site boundary). As such, the potential for ecological impacts as a result of dust soiling can be screened out as being **not significant**.

Further Assessment

Dust Emission Magnitude

8.90 The dust emissions magnitude of enabling and construction activities and as a result of trackout by construction vehicles have been determined based the criteria shown in Table A8.4.**1** (**ES Volume 2, Appendix Air Quality: Annex 4**). There will not be a requirement for demolition activities, therefore, impacts from demolition have not been considered.

8.91 Whilst the risk for individual phases would be lower if considered in isolation, due to the overlapping enabling and construction activities across phases, the site has been considered as a single site as a worst-case assessment. The phased introduction of additional receptors during the construction period has been accounted for in defining the sensitivity of the site.

8.92 The site is >10,000 m^2 in area and soil within the site is considered to be moderately dusty (including areas of deep, argillaceous soil with a clayey loam to silty loam or silt to silty loam texture and residual clay subsoil and areas of intermediate / shallow, argillic-arenaceous soil with a chalky clay to chalky loam texture and chalk subsoil (British Geological Survey, 2019)). Based on this, the dust emission magnitude of earthworks activities is judged to be 'large'.

8.93 Construction activities comprise the construction of up to 1650 residential dwellings, a primary school and buildings for various other land uses (e.g. C2 / E / F1), with a combined volume of >100,000 m^3. Based on this, the dust emission magnitude of construction activities is judged to be 'large'.

8.94 The construction related HDV movements (as summarised in **ES Volume 1, Chapter 5: Enabling and Construction**) range from between 40 and 134 across the construction period Based on this, the dust emission magnitude of trackout is judged to be 'large'.

Area Sensitivity

8.95 The area sensitivity to dust soiling and human health impacts has been determined based on the criteria shown in Table A8.4.2, Table A8.4.3 and Table A8.4.4 in **ES Volume 2, Appendix Air Quality: Annex 4**).

8.96 Residential properties are classed as being 'high sensitivity' receptors to loss of amenity as a result of dust soiling, based on the IAQM guidance (IAQM, 2014) (see Table A8.4.3, in **ES Volume 2, Appendix Air Quality: Annex 4**). There are over 100 residential properties located within 20 m of the overall site boundary; as such, the sensitivity of the area surrounding the site to dust soiling is judged to be high.

8.97 The IAQM guidance states that trackout may occur for distance of up to 500 m from large sites. The construction traffic generated by the Proposed Development will pass either via Acol Hill, followed by Crispe Road then southwards along Canterbury Road (A28) for Phase 1B or directly southwards from the site via Canterbury Road (A28) for all other phases. There are approximately 12 offsite residential properties located within 20 m of roads which may be affected by trackout as well as onsite receptors located within earlier phases; as such the sensitivity to dust soiling of the area surrounding roads along which material may be tracked is judged to be 'high'.

8.98 The IAQM also defines residential properties as being of 'high sensitivity' to human health impacts as a result of increases in concentrations of PM_{10} (see Table AX.4.4 in **ES Volume 2, Appendix Air Quality: Annex 4**). Concentrations of PM_{10} at existing residential properties within the Study Area during construction are

anticipated to be similar to the maximum of the predicted 2018 PM_{10} concentrations at receptors R1 and R2 (i.e. below 20 µg/m^3, see Table 8.10).

8.99 Therefore the sensitivity to human health effects of the areas surrounding the site is judged to be 'medium' and the sensitivity to human health effects in the area surrounding roads along which material may be tracked is judged to be 'low'.

Risk of Impacts

8.100 The risk of construction dust impacts, without mitigation, have been defined based on the criterion shown in Table A8.4-6 in **ES Volume 2, Appendix Air Quality: Annex 4** and are presented in Table 8.13.

Table 8.13 Risk of Construction Dust Impacts without Mitigation

Potential Impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	High Risk	High Risk	High Risk
Human Health	Medium Risk	Medium Risk	Low Risk

Construction Traffic Impacts Assessment

8.101 Vehicle movements associated with access, enabling and construction will vary through the construction programme, with periods of peak HDV movements associated with the delivery of materials during construction. During the construction period the Proposed Development is anticipated to generate between 40 and 134 (two-way) HDV movements per day.

8.102 These HGV will pass either via Acol Hill, followed by Crispe Road then southwards along Canterbury Road (A28) for Phase 1B or directly southwards from the site via Canterbury Road (A28) for all other phases. As such, the EPUK / IAQM screening criteria of 100 HDV AADT will be marginally exceeded during peak years of construction along Thanet Way (A299) and the section of Canterbury Road (A28) to the south of Crispe Road.

8.103 A Construction Environmental Management Plan (CEMP) will be developed to outline measures to control and minimise the risk of adverse effects from construction activities and will consider HDV and other construction traffic movements, including details of routing and times of day of movements.

8.104 The potential impacts of construction vehicle movements on human health within the Study Area are considered to be temporary, as the construction period anticipated to last for approximately 12 years and the number of movements only exceed the IAQM criteria for 2 years.

8.105 Furthermore, vehicle movements associated with construction of the Proposed Development are significantly lower than the number of vehicle movements associated with the Proposed Development when it is completed and operational as assessed within the TSHM. As such, the impacts associated with the operational traffic (as outlined in Paragraph 8.110) are anticipated to provide a worst-case scenario estimate of potential impacts that may occur as a result of construction traffic.

Assessment of Significance

8.106 The IAQM guidance recommends that no judgement of the significance of effects of construction dust without mitigation is made, as mitigation is assumed to be secured by planning conditions, legal requirements or required by regulations[4]. Following the implementation of appropriate mitigation measures (as described in Paragraph 8.122) the residual effects will be **not significant**.

8.107 The potential impact of construction related traffic are considered **not significant** and it is not considered necessary to undertake a detailed assessment of the potential impacts of construction traffic generated by the Proposed Development.

Completed Development

Operational Road Traffic Impacts

Screening Assessment

8.108 The Proposed Development is anticipated to generate operational traffic flows above the EPUK / IAQM screening criteria (as outlined in **ES Volume 2, Appendix Air Quality: Annex *3***) along several roads in proximity to human receptors thus, it is necessary to undertake a detailed assessment.

8.109 In relation to ecological receptors, changes to traffic flows along some roads within 200m of designated sites are predicted by the TSHM to exceed the screening criteria. However, as detailed in **ES Volume 1, Chapter 11 Ecology and Biodiversity**, there are no designated features considered to be sensitive the effects of emissions to air within 200m of these roads; therefore, the potential for likely significant effects at these sites has been screened out and not assessed further.

Detailed Assessment: With Columbus Avenue Extension (CAE)

8.110 Predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ at sensitive receptors, both without and with the Proposed Development in place (based on 2031 TSHM traffic data and 2025 air quality backgrounds and emissions), with the CAE scheme in place are presented in Table 8.14, Table 8.15 and Table 8.16 respectively. The 'without development' scenario predicted concentrations include background concentrations and emissions from existing traffic, traffic flows from all Local Plan allocations, background growth and where possible committed development on the local road network. The 'with development' scenario predicted concentrations also include emissions generated by the Proposed Development. Impacts have been determined for each receptor following the approach outlined by the EPUK / IAQM guidance[6].

8.111 The predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations, both without and with the Proposed Development in place, are below the relevant NAQOs at all identified receptor locations. Furthermore, predicted annual mean NO_2 concentrations are below 60µg/m^3 at all receptors, indicating that exceedances of the 1-hour mean NO_2 NAQO are not likely, and the predicted annual mean PM_{10} concentrations are below 32 µg/m^3 at all receptors, indicating that exceedances of the 24 hour mean PM_{10} NAQO are not likely.

8.112 The changes in annual mean NO_2 concentrations (when rounded to the nearest whole number) are 0% at 9 receptors, 1% at 25 receptors, 2% at 15 receptors and 3% at six receptors. Using the criteria set out in 8.56, these impacts are all described as **Negligible**.

8.113 The changes in annual mean PM_{10} and $PM_{2.5}$ concentrations (when rounded to the nearest whole number) are 1% or less at the majority of receptors; using the criteria set out in 8.56, all PM_{10} and $PM_{2.5}$ impacts are described as **Negligible**.

Table 8.14 Predicted Concentrations and Impacts of NO_2 (µg/m³) – with CAE

Receptor	Without Development	With Full Development	Change (as % of NAQO)	Impact Descriptor
R01	14.8	15.7	2	Negligible
R02	14.8	15.7	2	Negligible
R03	20.1	21.3	3	Negligible
R04	18.4	19.3	2	Negligible
R05	18.5	19.5	2	Negligible
R06	21.0	22.1	3	Negligible
R07	18.3	19.1	2	Negligible
R08	27.8	29.2	3	Negligible
R09	18.8	19.4	1	Negligible
R10	13.4	13.8	1	Negligible
R11	17.1	17.6	1	Negligible
R12	11.3	11.5	0	Negligible
R13	8.3	8.4	0	Negligible
R14	8.7	9.4	2	Negligible
R15	8.4	8.6	1	Negligible
R16	8.5	9.0	1	Negligible
R17	8.7	9.3	1	Negligible
R18	18.1	18.8	2	Negligible
R19	24.3	25.3	3	Negligible
R20	19.4	20.1	2	Negligible
R21	21.9	22.8	2	Negligible

R22	16.9	17.4	1	Negligible
R23	13.9	14.1	1	Negligible
R24	18.5	19.9	3	Negligible
R25	13.5	14.2	2	Negligible
R26	13.3	13.7	1	Negligible
R27	15.0	15.4	1	Negligible
R28	14.1	14.4	1	Negligible
R29	12.2	13.1	2	Negligible
R30	10.6	10.8	0	Negligible
R31	12.1	12.1	0	Negligible
R32	11.2	11.3	0	Negligible
R33	21.8	22.0	1	Negligible
R34	24.5	24.6	0	Negligible
R35	13.2	14.2	3	Negligible
R36	24.6	25.1	1	Negligible
R37	15.4	16.2	2	Negligible
R38	14.1	14.7	2	Negligible
R39	11.2	11.8	2	Negligible
R40	16.3	16.7	1	Negligible
R41	21.7	22.0	1	Negligible
R42	18.0	18.1	0	Negligible
R43	16.4	17.3	2	Negligible
R44	15.6	16.1	1	Negligible
R45	11.7	11.7	0	Negligible
R46	25.8	26.4	1	Negligible
R47	15.5	15.7	1	Negligible
R48	24.4	24.7	1	Negligible
R49	29.9	30.1	1	Negligible
R50	23.2	23.5	1	Negligible
R51	22.4	22.6	1	Negligible
R52	30.6	31.0	1	Negligible
R53	14.0	14.2	0	Negligible
R54	20.9	21.3	1	Negligible
R55	16.6	17.0	1	Negligible
R56	18.7	19.1	1	Negligible
Objectives	**40**		-	

Table 8.15 Predicted Concentrations and Impacts of PM_{10} (µg/m³),with CAE

Receptor	Without Development	With Full Development	Change (as % of NAQO)	Impact Descriptor
R01	16.6	16.9	1	Negligible
R02	16.6	16.9	1	Negligible
R03	18.4	18.7	1	Negligible
R04	18.3	18.7	1	Negligible
R05	18.4	18.8	1	Negligible
R06	17.7	18.0	1	Negligible
R07	16.8	17.0	1	Negligible
R08	18.8	19.3	1	Negligible
R09	16.0	16.2	0	Negligible
R10	14.7	14.8	0	Negligible
R11	16.0	16.2	0	Negligible
R12	14.1	14.2	0	Negligible
R13	13.4	13.5	0	Negligible
R14	13.5	13.8	1	Negligible
R15	13.5	13.5	0	Negligible
R16	13.5	13.7	0	Negligible
R17	13.5	13.7	0	Negligible
R18	16.0	16.2	0	Negligible
R19	17.9	18.2	1	Negligible
R20	16.9	17.2	1	Negligible
R21	17.5	17.8	1	Negligible
R22	16.0	16.2	0	Negligible
R23	15.0	15.1	0	Negligible
R24	18.3	18.8	1	Negligible
R25	16.3	16.6	1	Negligible
R26	15.8	15.9	0	Negligible
R27	16.0	16.1	0	Negligible
R28	15.7	15.8	0	Negligible
R29	15.7	16.0	1	Negligible
R30	15.2	15.3	0	Negligible
R31	15.4	15.4	0	Negligible
R32	15.3	15.3	0	Negligible
R33	18.5	18.6	0	Negligible
R34	19.9	19.9	0	Negligible
R35	16.1	16.4	1	Negligible
R36	17.9	18.0	0	Negligible
R37	16.2	16.4	1	Negligible
R38	15.7	15.9	1	Negligible
R39	13.5	13.7	1	Negligible
R40	16.2	16.4	0	Negligible
R41	18.0	18.1	0	Negligible

R42	16.8	16.9	0	Negligible
R43	15.7	15.9	1	Negligible
R44	15.2	15.4	0	Negligible
R45	14.2	14.2	0	Negligible
R46	17.5	17.6	0	Negligible
R47	14.9	14.9	0	Negligible
R48	17.0	17.1	0	Negligible
R49	18.5	18.6	0	Negligible
R50	17.3	17.4	0	Negligible
R51	16.8	16.9	0	Negligible
R52	19.3	19.5	0	Negligible
R53	14.6	14.6	0	Negligible
R54	17.0	17.1	0	Negligible
R55	16.6	16.7	0	Negligible
R56	15.7	15.8	0	Negligible
Objectives	**40**		-	

Table 8.16 Predicted Concentrations and Impacts of $PM_{2.5}$ (µg/m³),with CAE

Receptor	Without Development	With Full Development	Change (as % of NAQO)	Impact Descriptor
R01	9.9	10.1	1	Negligible
R02	9.9	10.1	1	Negligible
R03	10.9	11.1	1	Negligible
R04	10.9	11.1	1	Negligible
R05	10.9	11.1	1	Negligible
R06	10.8	11.0	1	Negligible
R07	10.3	10.5	1	Negligible
R08	11.9	12.1	1	Negligible
R09	10.3	10.4	0	Negligible
R10	9.5	9.6	0	Negligible
R11	10.3	10.4	0	Negligible
R12	9.2	9.2	0	Negligible
R13	8.7	8.7	0	Negligible
R14	8.8	8.9	1	Negligible
R15	8.7	8.8	0	Negligible
R16	8.7	8.8	0	Negligible
R17	8.8	8.9	0	Negligible
R18	10.3	10.4	1	Negligible
R19	11.3	11.5	1	Negligible
R20	10.8	10.9	1	Negligible
R21	11.1	11.3	1	Negligible
R22	10.3	10.4	1	Negligible
R23	9.5	9.5	0	Negligible
R24	10.5	10.8	1	Negligible
R25	9.5	9.6	1	Negligible
R26	9.2	9.3	0	Negligible
R27	9.4	9.4	0	Negligible
R28	9.7	9.8	0	Negligible
R29	9.2	9.4	1	Negligible
R30	9.0	9.0	0	Negligible
R31	9.1	9.1	0	Negligible
R32	9.0	9.0	0	Negligible
R33	10.8	10.8	0	Negligible
R34	11.6	11.6	0	Negligible
R35	9.4	9.6	1	Negligible
R36	11.2	11.3	0	Negligible
R37	10.0	10.2	1	Negligible
R38	9.8	9.9	1	Negligible
R39	8.6	8.7	1	Negligible
R40	9.8	9.9	0	Negligible
R41	12.0	12.1	0	Negligible
R42	10.4	10.4	0	Negligible
R43	10.2	10.4	1	Negligible
R44	10.0	10.1	0	Negligible
R45	9.4	9.4	0	Negligible
R46	11.3	11.4	0	Negligible
R47	9.8	9.8	0	Negligible
R48	11.0	11.1	0	Negligible
R49	12.0	12.0	0	Negligible
R50	11.3	11.4	0	Negligible
R51	11.0	11.1	0	Negligible
R52	12.5	12.5	0	Negligible
R53	9.5	9.5	0	Negligible
R54	10.9	10.9	0	Negligible
R55	10.4	10.5	0	Negligible
R56	10.3	10.3	0	Negligible
Objectives	**20**		-	

8.114 In relation to the criteria provided in the KMAQP:

- For NO_2 the majority of receptors have predicted impacts which are <1% of the NAQO and not within 10% of the NAQO and therefore are classified as ‘low/imperceptible’;
- At 18 receptors the predicted impacts are >1% of the NAQO and therefore are classified as ’medium’;

- For PM_{10} and $PM_{2.5}$, all receptors have predicted impacts which are <1% of the NAQO and not within 10% of the NAQO and therefore are classified as 'low/imperceptible'

Detailed Assessment: Without CAE

8.115 Predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ at sensitive receptors, both without and with the Proposed Development in place (based on 2031 traffic data and 2025 backgrounds and emissions), without the CAE scheme in place are presented in Table 8.17, Table 8.18 and Table 8.19 respectively. The 'without development' scenario predicted concentrations include background concentrations and emissions from existing traffic,, traffic flows from all Local Plan allocations, background growth and where possible committed development on the local road network. The 'with development' scenario predicted concentrations also include emission from traffic generated by the Proposed Development. Impacts have been determined for each receptor following the approach outlined by the EPUK / IAQM guidance[6].

8.116 The predicted NO_2, PM_{10} and $PM_{2.5}$ concentrations, both without and with the Proposed Development in place, are below the relevant NAQOs at all identified receptor locations. Furthermore, predicted annual mean NO_2 concentrations are below 60µg/m^3 at all receptors, indicating that exceedances of the 1-hour mean NO_2 NAQO are not likely, and the predicted annual mean PM_{10} concentrations are below 32 µg/m^3 at all receptors, indicating that exceedances of the 24 hour mean PM_{10} NAQO are not likely.

8.117 The changes in annual mean NO_2 concentrations (when rounded to the nearest whole number) are 0% at 6 receptors, 1% at 25 receptors, 2% at 17 receptors, 3% at 7 receptors and 4% at 1 receptor. Using the criteria set out in Paragraph 8.56, these impacts are all described as **Negligible**.

8.118 The changes in annual mean PM_{10} and $PM_{2.5}$ concentrations (when rounded to the nearest whole number) are 0% at the majority of receptors; using the criteria set out in Paragraph 8.56, all PM_{10} and $PM_{2.5}$ impacts are described as **Negligible**.

Table 8.17 Predicted Concentrations and Impacts of NO_2 (µg/m^3) – without CAE

Receptor	Without Development	With Full Development	Change (as % of NAQO)	Impact Descriptor
R01	14.9	15.7	2	Negligible
R02	14.8	15.7	2	Negligible
R03	20.6	21.7	3	Negligible
R04	18.7	19.7	3	Negligible
R05	18.9	19.9	3	Negligible
R06	21.4	22.6	3	Negligible
R07	18.6	19.5	2	Negligible
R08	28.2	29.7	4	Negligible
R09	18.9	19.5	2	Negligible
R10	13.4	13.8	1	Negligible
R11	16.9	17.4	1	Negligible
R12	11.2	11.4	0	Negligible
R13	8.3	8.5	0	Negligible
R14	8.8	9.5	2	Negligible
R15	8.4	8.6	1	Negligible
R16	8.6	9.0	1	Negligible
R17	8.8	9.4	1	Negligible
R18	18.2	18.9	2	Negligible
R19	24.3	25.4	3	Negligible
R20	19.4	20.2	2	Negligible
R21	21.9	22.8	2	Negligible
R22	16.9	17.5	1	Negligible
R23	14.0	14.3	1	Negligible
R24	18.5	19.9	3	Negligible
R25	13.9	14.6	2	Negligible
R26	13.5	13.9	1	Negligible
R27	15.0	15.4	1	Negligible
R28	14.0	14.4	1	Negligible
R29	11.1	12.1	2	Negligible
R30	11.3	12.1	2	Negligible
R31	17.4	18.4	2	Negligible
R32	15.6	16.4	2	Negligible
R33	21.6	21.8	1	Negligible
R34	24.6	24.7	0	Negligible
R35	12.8	13.8	3	Negligible
R36	24.6	25.1	1	Negligible
R37	14.1	14.9	2	Negligible
R38	13.1	13.7	2	Negligible
R39	11.5	12.2	2	Negligible
R40	16.5	17.0	1	Negligible
R41	21.8	22.0	1	Negligible
R42	18.0	18.1	0	Negligible
R43	15.3	16.1	2	Negligible
R44	15.1	15.6	1	Negligible
R45	11.7	11.8	0	Negligible
R46	26.2	26.8	1	Negligible
R47	15.5	15.8	1	Negligible
R48	24.4	24.7	1	Negligible
R49	29.9	30.2	1	Negligible
R50	23.0	23.3	1	Negligible
R51	22.4	22.6	1	Negligible
R52	30.5	30.9	1	Negligible
R53	14.0	14.1	0	Negligible
R54	20.7	21.1	1	Negligible
R55	16.1	16.5	1	Negligible
R56	18.9	19.3	1	Negligible
Objective	**40**		-	

Table 8.18 Predicted Concentrations and Impacts of PM_{10} (µg/m^3), without CAE

Receptor	Without Development	With Full Development	Change (as % of NAQO)	Impact Descriptor
R01	16.7	17.0	1	Negligible

R02	16.6	16.9	1	Negligible
R03	18.5	18.9	1	Negligible
R04	18.5	18.9	1	Negligible
R05	18.5	18.9	1	Negligible
R06	17.8	18.2	1	Negligible
R07	16.8	17.1	1	Negligible
R08	19.0	19.4	1	Negligible
R09	16.0	16.2	0	Negligible
R10	14.7	14.8	0	Negligible
R11	16.0	16.1	0	Negligible
R12	14.1	14.2	0	Negligible
R13	13.4	13.5	0	Negligible
R14	13.6	13.8	1	Negligible
R15	13.5	13.5	0	Negligible
R16	13.5	13.7	0	Negligible
R17	13.6	13.7	0	Negligible
R18	16.0	16.2	1	Negligible
R19	17.9	18.2	1	Negligible
R20	16.9	17.2	1	Negligible
R21	17.5	17.8	1	Negligible
R22	16.0	16.2	0	Negligible
R23	15.0	15.1	0	Negligible
R24	18.3	18.8	1	Negligible
R25	16.5	16.7	1	Negligible
R26	15.8	15.9	0	Negligible
R27	16.0	16.1	0	Negligible
R28	15.7	15.8	0	Negligible
R29	15.3	15.7	1	Negligible
R30	15.4	15.7	1	Negligible
R31	16.9	17.1	1	Negligible
R32	16.6	16.8	1	Negligible
R33	18.4	18.5	0	Negligible
R34	19.9	20.0	0	Negligible
R35	16.0	16.3	1	Negligible
R36	17.9	18.0	0	Negligible
R37	15.7	16.0	1	Negligible
R38	15.4	15.6	1	Negligible
R39	13.6	13.9	1	Negligible
R40	16.3	16.4	0	Negligible
R41	18.0	18.1	0	Negligible
R42	16.8	16.9	0	Negligible
R43	15.3	15.5	1	Negligible
R44	15.1	15.2	0	Negligible
R45	14.2	14.2	0	Negligible
R46	17.5	17.7	0	Negligible
R47	14.9	14.9	0	Negligible
R48	17.0	17.1	0	Negligible
R49	18.5	18.6	0	Negligible
R50	17.3	17.4	0	Negligible
R51	16.8	16.9	0	Negligible
R52	19.3	19.4	0	Negligible
R53	14.5	14.6	0	Negligible
R54	17.0	17.1	0	Negligible
R55	16.5	16.6	0	Negligible
R56	15.7	15.8	0	Negligible
Objective	**40**		-	

Table 8.19 Predicted Concentrations and Impacts of $PM_{2.5}$ (µg/m³), without CAE

Receptor	Without Development	With Full Development	Change (as % of NAQO)	Impact Descriptor
R01	9.9	10.1	1	Negligible
R02	9.9	10.1	1	Negligible
R03	11.0	11.2	1	Negligible
R04	10.9	11.2	1	Negligible
R05	11.0	11.2	1	Negligible
R06	10.9	11.1	1	Negligible
R07	10.4	10.5	1	Negligible
R08	12.0	12.2	1	Negligible
R09	10.3	10.4	0	Negligible
R10	9.5	9.6	0	Negligible
R11	10.3	10.3	0	Negligible
R12	9.2	9.2	0	Negligible
R13	8.7	8.7	0	Negligible
R14	8.8	8.9	1	Negligible
R15	8.7	8.8	0	Negligible
R16	8.8	8.8	0	Negligible
R17	8.8	8.9	0	Negligible
R18	10.3	10.4	1	Negligible
R19	11.3	11.5	1	Negligible
R20	10.8	10.9	1	Negligible

R21	11.1	11.3	1	Negligible
R22	10.3	10.4	1	Negligible
R23	9.5	9.6	0	Negligible
R24	10.5	10.8	1	Negligible
R25	9.6	9.7	1	Negligible
R26	9.3	9.3	0	Negligible
R27	9.4	9.4	0	Negligible
R28	9.7	9.8	0	Negligible
R29	9.0	9.2	1	Negligible
R30	9.1	9.2	1	Negligible
R31	9.9	10.0	1	Negligible
R32	9.7	9.8	1	Negligible
R33	10.8	10.8	0	Negligible
R34	11.6	11.6	0	Negligible
R35	9.3	9.5	1	Negligible
R36	11.2	11.3	0	Negligible
R37	9.8	10.0	1	Negligible
R38	9.6	9.7	1	Negligible
R39	8.6	8.7	1	Negligible
R40	9.8	9.9	0	Negligible
R41	12.0	12.1	0	Negligible
R42	10.4	10.4	0	Negligible
R43	10.0	10.2	1	Negligible
R44	9.9	10.0	0	Negligible
R45	9.4	9.4	0	Negligible
R46	11.4	11.4	0	Negligible
R47	9.8	9.8	0	Negligible
R48	11.0	11.1	0	Negligible
R49	12.0	12.0	0	Negligible
R50	11.3	11.3	0	Negligible
R51	11.0	11.1	0	Negligible
R52	12.4	12.5	0	Negligible
R53	9.5	9.5	0	Negligible
R54	10.8	10.9	0	Negligible
R55	10.3	10.4	0	Negligible
R56	10.3	10.4	0	Negligible
Objective	**20**		-	

8.119 In relation to the criteria provided in the KMAQP:

- For NO_2 the majority of receptors the predicted impacts are <1% of the NAQO and therefore are classified as 'low/imperceptible'
- At 25 receptors the predicted impacts are >1% of the NAQO and therefore classified as 'medium';
- All predicted impact of PM_{10} and $PM_{2.5}$ are <1% of the NAQO at the majority of receptors therefore the impacts are classified as 'low/imperceptible'.

Assessment of Significance

8.120 Overall, taking into account the conservative nature of the assessment, and the criteria set out in Paragraphs 8.54 to 8.59, the operational air quality effects of the Proposed Development are considered to be **not significant** on the basis that:

- Emissions of pollutants (NO_2, PM_{10} and $PM_{2.5}$) from operational traffic generated by the Proposed Development will not cause further exceedances of the NAQOs, either within or outside the nearby AQMA, and impacts at worst-case existing sensitive locations will be 'Negligible' according to the EPUK / IAQM guidance approach and the majority 'Low / Imperceptible' according to the Kent and Medway Air Quality Planning Guidance approach; and
- The potential impacts of pollutants from construction works traffic generated by the Proposed Development are anticipated to be lower than the impacts of the operational traffic, which have been determined to be 'Negligible' according to the EPUK / IAQM guidance approach and the majority 'Low / Imperceptible' according to the Kent and Medway Air Quality Planning Guidance approach. Furthermore, impacts will be temporary in nature and managed by the CEMP.

MITIGATION, MONITORING AND RESIDUAL EFFECTS

Enabling and Construction Mitigation

8.121 The potential air quality effects of traffic associated with enabling and construction activities are considered to be **not significant** and no additional mitigation is considered necessary; these effects will therefore remain as discussed above under 'Potential Effects'.

8.122 In relation to dust associated with enabling and construction activities, the IAQM methodology identifies the level of risk without mitigation, therefore the following mitigation measures (from the IAQM guidance) are recommended:

Communication:

- Develop and implement a stakeholder communications plan;
- Display the name and contact details of persons accountable on the site boundary;
- Display the head or regional office information on the site boundary;

Management:

- Develop and implement a Dust Management Plan (DMP);
- Record all dust and air quality complaints, identify causes and take measures to reduce emissions;
- Record exceptional incidents and action taken to resolve the situation;
- Carry out regular site inspections to monitor compliance with the DMP and record results;
- Increase site inspection frequency during prolonged dry or windy conditions and when activities with high dust potential are being undertaken;
- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible;
- Erect solid screens or barriers around dusty activities or the site boundary at least as high as any stockpile on site;
- Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period;
- Avoid site run off of water or mud;
- Keep site fencing, barriers and scaffolding clean using wet methods;

- Remove potentially dusty materials from site as soon as possible;
- Cover, seed or fence stockpiles to prevent wind whipping;
- Ensure all vehicles switch off engines when stationary;
- Avoid the use of diesel or petrol powered generators where possible;
- Produce a Construction Logistics Plan (CLP) to manage the delivery of goods and materials;
- Only use cutting, grinding and sawing equipment with dust suppression equipment;
- Ensure an adequate supply of water on-site for dust suppressant;
- Use enclosed chutes and conveyors and covered skips;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use water sprays on such equipment where appropriate;
- Ensure equipment is readily available on-site to clean up spillages of dry materials;
- No on-site bonfires and burning of waste materials on-site;

Earthworks:

- Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable;
- Only remove the cover in small areas during work and not all at once;

Construction:

- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless required for a particular process;
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored silos with suitable emissions control systems;

Trackout:

- Use water assisted dust sweepers on the site access and local roads;
- Avoid dry sweeping of large areas;
- Ensure vehicles entering and leaving the site are covered to prevent escape of materials;
- Record inspection of on-site haul routes and any subsequent action, repairing as soon as reasonably practicable;
- Install hard surfaced haul routes which are regularly damped down;
- Install a wheel wash with a hard-surfaced road to the site exit where site layout permits; and
- The site access gate to be located at least 10 m from receptors where possible.

8.123 Following the implementation of these appropriate mitigation measures the residual effects will be **not significant**.

Completed Development Mitigation

8.124 The potential air quality effects of the completed development are considered to be **not significant** and no mitigation is therefore required.

8.125 The completed development incorporates a wide range of measures to internalise journeys (i.e. provision of onsite school, shops and leisure areas) and to encourage and facilitate the uptake of active and sustainable travel measures (such as cycling and walking infrastructure and access to bus routes) as summarised in **Annex 8.6**

8.126 The effect of such measures in reducing car journeys will be monitored through the Travel Plan and research indicates that such measures can deliver 5-7% reductions in car driver mileage.

8.127 Additionally, provision of electric vehicle charging infrastructure in line with relevant local policy requirements, specifically Policy SP12 of the TDC LP which requires one electric car charging point for every 10 parking spaces in communal areas or one charging point for every new dwelling with parking within its curtilage.

Residual Effects

8.128 All of the residual effects resulting from the Proposed Development, are presented in Table 8.20, identifying whether the effect is significant or not.

Table 8.20 Residual Effects

Receptor	Description of the Residual Effect	Scale and Nature	Significant / Not Significant	Geo	D I	P T	St Mt Lt
Enabling and Construction							
Residential Receptors within Study Area	Enabling and Construction Dust	Negligible	Not Significant	L	D	T	Mt
Ecological receptors within Study Area	Enabling and Construction Dust	Negligible	Not Significant	L	D	T	Mt
Residential Receptors	Emissions from construction related traffic	Negligible	Not Significant	D	I	T	Mt
Ecological receptors within Study Area	Emissions from construction related traffic	Negligible	Not Significant	D	I	T	Mt
Completed Development							
Residential Receptors within Study Area	Emissions from development related traffic	Negligible	Not Significant	D	ID	P	Lt
Ecological receptors within Study Area	Emissions from development related traffic	Negligible	Not Significant	D	ID	P	Lt

Notes:
Residual Effect
- Scale = Negligible / Minor / Moderate / Major
- Nature = Beneficial or Adverse

Geo (Geographic Extent) = Local (L), District (D), Regional (R), National (N)
D = Direct / I = Indirect
P = Permanent / T = Temporary
St = Short Term / Mt = Medium Term / Lt = Long Term
N/A = not applicable / not assessed

SITE SUITABILITY

Railway Screening Assessment

8.129 The closest sensitive introduced receptor to the railway lines is set back by approximately 30m (i.e. >30 m from the railway lines). Predicted annual mean concentrations at the northern site boundary (i.e. receptors R13, R14 and R15) are well below 20 µg/m³ (i.e. below the 25 µg/m³ screening criterion). Furthermore, the railway line located to the north of the site boundary is not identified within the LAQM.TG(16) guidance (DEFRA, 2016) as having heavy traffic of diesel passenger trains. As such, the potential for significant effects as a result of emissions from the nearby railway line can be discounted as being **not significant**.

Ambient Air Quality Screening Assessment

8.130 The Proposed Development contains locations (i.e. the proposed residences, care home and primary school) that are sensitive to human health effects as a result of ambient air quality. The site is located in close proximity to, and partially within, an AQMA (Thanet Urban AQMA) and in close proximity to an emissions source (i.e. the busy Canterbury Road (A28)).

8.131 Predicted background and baseline concentrations within the Study Area are well below the NAQOs. The baseline predictions are at receptors located in close proximity to main roads, therefore ambient concentrations of air pollutants within the development boundary will be lower than these offsite baseline concentrations and tend towards the background concentrations away from highways.

8.132 As such it is considered that the ambient air quality within the site boundary is acceptable for the proposed end uses.

CLIMATE CHANGE

8.133 As ambient air quality is generally anticipated to improve throughout the UK in the coming decade, it is considered likely that the worst-case air quality impacts will occur in the short-term future, whilst adverse effects from climate change are anticipated to occur over a more medium to long-term timescale. This being the case, it is not considered that combined effect of climate change and air quality will have the potential to result in greater impacts than have been identified within this chapter.

8.134 It should be noted that several of the mitigation measures identified to address air quality impacts associated with combustion emission (from transport and heating) are also likely to results in reductions in emissions of carbon dioxide, thus providing a benefit in terms of reducing the contribution of existing and proposed traffic to climate change.

8.135 In the longer term (2050 – 2080) changes in climate might affect the need for heating and cooling and, therefore, have an influence on the energy demand associated with the Proposed Development, but as the Proposed Development is heated primarily using electricity significant effects are not expected as a result.

8.136 The impact of the Proposed Development on climate change is addressed within the following chapter of this Volume of the ES (in **ES Volume 2, Appendix Greenhouse Gases**).

ASSESSMENT OF THE FUTURE ENVIRONMENT

Evolution of the Baseline Scenario

8.137 If the Proposed Development did not come forward, it is expected that the site would remain in its current state. Air quality is generally expected to improve with time, due for example, to more stringent emissions standards for motor vehicles, and the progression to greener energy strategies. This improvement is already evidenced in the air quality monitoring undertaken by TDC shows a reduction in measured concentrations of NO_2 between 2015 and 2019 (Table 8.6).

8.138 The likely evolution of the baseline conditions if the Proposed Development did not come forward has been considered in this assessment, and predicted concentrations in the future, in the absence of the Proposed Development but allowing for natural evolution and the inclusion of all committed development in the surrounding area, are provided in Table 8.10.

8.139 Table 8.6 and Table 8.10 show a continued improvement in air quality conditions in the surrounding area between the current (2018) and future assessment years.

Cumulative Effects Assessment

Enabling and Construction

Construction Dust

8.140 During the enabling and construction works there is the potential for cumulative impacts to occur as a result of the combined impact of dust generated by the enabling and construction activities associated with the Development in combination with dust generated by enabling / construction activities associated with any nearby committed developments.

8.141 There are no construction related activities within the Study Area for construction dust related impacts and therefore no risk of cumulative effects have been identified.

Construction Road Traffic

8.142 During the enabling and construction works there is the potential for cumulative impacts to occur as a result of the combined impact of enabling / construction vehicles generated by the Development in combination with enabling / construction traffic generated by any nearby committed developments.

8.143 The traffic data used in the full development scenarios (2031 Local Plan traffic data with 2025 emission factors and background concentrations) is from the Thanet Strategic Highway Model (TSHM). The air quality assessment therefore quantifies the cumulative impacts construction vehicle movements associated with Local Plan developments and associated highway infrastructure within Thanet.

8.144 Therefore, no additional or new cumulative effects are likely as a result of the Proposed Development coming forward in conjunction with the Cumulative Schemes

Completed Development

Operational Road Traffic

8.145 The traffic data used in the full development scenarios (2031 Local Plan traffic data with 2025 emission factors and background concentrations) is from the Thanet Strategic Highway Model (TSHM). The air quality assessment therefore quantifies the cumulative impacts of Local Plan developments and associated highway infrastructure within Thanet with alternative full development assessment scenarios assessed both with and without the Columbus Avenue Extension (CAE) being delivered In relation to the Manson Airport development, no significant cumulative air quality effects with the Local Plan and were identified during the DCO Examination.

8.146 Therefore, no additional or new cumulative effects are likely as a result of the Proposed Development coming forward in conjunction with the Cumulative Schemes

LIKELY SIGNIFICANT EFFECTS

8.147 No likely significant effects have been identified in relation to air quality.