FICHTNER

Consulting Engineers Limited

Wates Developments Limited

Air Quality Assessment

ENGINEERING CONSULTING

Document approval

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Management Summary

Fichtner Consulting Engineers Ltd ("Fichtner") has been engaged to undertake an Air Quality Assessment to support the outline planning application for the development of up to 145 residential dwellings together with the full planning application for the change in land use from agricultural land to land to be used as a country park, formal sports pitches and pavilion (the "Proposed Development"), in Tenterden, Kent. The need for an Air Quality Assessment was highlighted by the Environmental Health Officer (EHO) during the determination process for a previous planning application for the Site.

Based on the EHO consultation response and our analysis of the site and nature of the development the following have been identified as having the potential to have significant effects and as such have been considered within this assessment:

- Generation of dust as a result of construction activities; and
- Generation of exhaust pollutants from operational phase traffic.

The assessment has been carried out in a number of stages.

Review of Legislation and Planning Policy

In the UK, the levels of pollution in the atmosphere are controlled by a number of European Directives, which have been fully implemented, and by the National Air Quality Strategy. These have led to the setting of a number of Air Quality Assessment Levels (AQALs) for pollutants. The AQALs are set at a level well below those at which significant adverse health effects have been observed in the general population and in particularly sensitive groups.

There is no prescriptive methodology for air quality assessment outlined in either the National Planning Policy Framework or Planning Practice Guidance. Therefore, practitioners are directed to use guidance provided by other non-governmental organisations. In this case the guidance published by the Institute of Air Quality Management (IAQM) has been applied.

This assessment has been carried out in accordance with the Ashford Borough Local Plan and the Kent and Medway Air Quality Planning Guidance, which details the local requirements for an air quality assessment including an emissions mitigation assessment.

Review of baseline conditions

A review of the local and national monitoring networks has shown that there are no local monitoring sites within the proximity of the Proposed Development. Therefore, in lieu of this national modelled background data has been used to determine the baseline concentrations for this assessment.

Assessment of dust generating construction activities

An assessment of the impact of dust generating construction activities has been undertaken using the guidance produced by the IAQM. This takes into account the type of activities undertaken and the number of sensitive receptors within set distances from these activities. The site is classified as a "medium risk site". In accordance with the IAQM methodology measures have been recommended to ensure that effects are controlled to a suitable level.

Assessment of operational phase vehicle emissions

An assessment of the impact of operational phase road vehicle emissions has been undertaken using the guidance produced by the IAQM supported by detailed modelling. This has considered the sensitivity of the assessment to different emissions projections.

The magnitude of change at all receptor locations is predicted to be 'negligible', even under the highly conservative assumption that there will be no improvement in emissions from an average vehicle and fleet composition does not change between 2018 and the first year of full occupation (2026). Therefore, the overall significance of the effect of the vehicle emissions associated with the operational phase of the Proposed Development on local air quality is deemed to be 'not significant'.

Assessment of emissions mitigation

The five-year exposure cost has been calculated as £30,909. This is the value of mitigation that is expected to be spent on measures to mitigate the impacts of the Proposed Development on air quality. The indicative value to be spent on mitigation measures is £195,575, well above the five-year exposure cost value of £30,909.

Summary

In summary, a comprehensive assessment of the impact of the Proposed Development has shown that this would not have a significant impact on local air quality.

Contents

1 Introduction

1.1 Background

Fichtner Consulting Engineers Ltd (Fichtner) has been engaged by Wates Developments Limited (the Client) to undertake an Air Quality Assessment to support the outline planning permission for the development of up to 145 residential dwellings together with the full planning permission for the change in land use from agricultural land to land to be used as a country park, formal sports pitches and pavilion (the "Proposed Development"), to be located at Land between Woodchurch Road and Appledore Road (the Site), in Tenterten, Kent. The location of the Site is shown in Figure 1 of Appendix A.

The Proposed Development lies within the administrative area of Ashford Borough Council (ABC). A previous planning application (Reference 19/01788/AS) was submitted to ABC in December 2019 and was refused, although air quality was not a reason for refusal. As part of the consultation process for application 19/01788/AS the Environmental Protection Team requested that an Air Quality Assessment including an emissions mitigation assessment be submitted to support the planning application. This response is provided in Appendix B. This Air Quality Assessment has been prepared in accordance with the EHO comments on application 19/01788/AS.

This assessment has been produced to consider the effect of the development on local air quality. Analysis of the site and nature of the development has identified that the following have the potential to have significant effects and as such have been considered within this assessment:

- Generation of dust as a result of construction activities; and
- Generation of exhaust pollutants from operational phase traffic.

1.2 Structure of the report

This report has the following structure:

- National and international air quality legislation and guidance, and local planning policies which relate to air quality, are considered in section 2.
- The assessment methodology is outlined in section 3.
- The current levels of ambient air quality are described in section 4.
- The impact of dust emissions during the construction phase is explained in section 5.
- The impact of vehicle emissions during the operational phase is explained in section 6.
- The emissions mitigation assessment can be found in section 7
- The conclusions of the assessment can be found in section 8.
- The Appendices include illustrative figures and detailed assessment methodologies.

2 Legislation and Planning Policy Context

2.1 Legislation

European air quality legislation is consolidated under the Ambient Air Quality Directive (AAD) (Directive 2008/50/EC), which came into force on 11 June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides Ambient Air Directive (AAD) Limit Values for nitrogen dioxide, particulate matter (as PM_{10}) and a new AAD Target Value and Limit Value for fine particulates ($PM_{2.5}$).

The Air Quality Standards Regulations (2010) seek to transpose Directive 2008/50/EC within the United Kingdom (UK). The regulations also extend powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to local authorities for the implementation of these Directives. The UK Air Quality Strategy (2007)[1] is the method of implementation of the AAD Limit Values and Targets in England, Scotland, Wales and Northern Ireland. This document builds on the previous Strategy, published in 2000, and a 2003 Addendum. The UK Clean Air Strategy (2019) builds on the UK Air Quality Strategy but does not update any relevant AAD Limit Values or Targets.

The Air Quality Strategy includes two objectives for nitrogen dioxide, both of which are included in the Air Quality Directive.

- A limit for the one-hour mean of 200 µg/m^3, not to be exceeded more than 18 times a year (equivalent to the 99.79th percentile).
- A limit for the annual mean of 40 µg/m^3.

The Air Quality Strategy includes two objectives for PM_{10}, both of which are included in the Air Quality Directive.

- A daily limit of 50 µg/m^3, not to be exceeded more than 35 times a year (the 90.4th percentile).
- A limit for the annual mean of 40 µg/m^3.

The Air Quality Strategy includes an exposure reduction objective for $PM_{2.5}$ in urban areas and a Target Value for $PM_{2.5}$ of 20 µg/m^3 as an annual mean. This Target Value is included in the Air Quality Directive.

For the remainder of this report these objectives, Target Values and Limits are collectively referred to as Air Quality Assessment Levels (AQALs).

2.2 Local Air Quality Management

Under Section 82 of the Environment Act (1995) (Part IV) local authorities are required to periodically review and assess air quality within their area of jurisdiction under the system of Local Air Quality Management (LAQM). This review and assessment of air quality involves assessing present and likely future ambient pollutant concentrations against AQALs. If it is predicted that levels at the façade of buildings where members of the public are regularly present (normally residential properties) are likely to be exceeded, the local authority is required to declare an Air Quality Management Area (AQMA). For each AQMA, the local authority is required to produce an

[1] The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, CM 7169 NIA 61/06-07, July 2007, DEFRA – para 17 of Volume 1.

Air Quality Action Plan (AQAP), the objective of which is to reduce pollutants levels in pursuit of the relevant AQALs.

2.3 Control of dust and emissions during construction

The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting Regulations, which would include the Project construction site, are those provided in Section 80 of Part III of the Environmental Protection Act (1990). The Act defines nuisance as:

"any dust, steam, smell or other effluvia arising on industrial trade or business premises and being prejudicial to health or a nuisance."

Enforcement of the Act, in regard to nuisance, is under the jurisdiction of the local Environmental Health Department, whose officers are deemed to provide an independent evaluation of nuisance. If the local authority is satisfied that a statutory nuisance exists, or is likely to occur or happen again, it must serve an Abatement Notice under Part III of the Act requiring abatement and any necessary works to achieve it.

2.4 National Planning Policy Framework

In terms of air quality, paragraph 181 of the National Planning Policy Framework (NPPF) states:

"Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

The Planning Practice Guidance (PPG) was issued on-line on 6th March 2014 and will be updated by the Government as a live document. The latest update was on 1st November 2019. The Air Quality section of the PPG describes the circumstances when air quality, odour and dust can be a planning concern requiring assessment.

It states that whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. It acknowledges that they could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife). The steps a local planning authority[2] might take in considering air quality are set out below:

"Considerations that may be relevant to determining a planning application include whether the development would:

- *Lead to changes (including any potential reductions) in vehicle related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.*

[2] The Planning Practice Guidance, Air Quality Section, paragraph 006, reference ID 32-006-20191101

- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion with a Smoke Control Area; or extraction systems (including chimney) which require approval or permits under pollution control legislation;*
- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.*
- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value.".*

Neither the NPPF nor the PPG is prescriptive on the methodology for assessing air quality effects or describing significance, practitioners continue to use guidance provided by Department for Environment Food and Rural Affairs (DEFRA) and non-governmental organisations, including the Institute of Air Quality Management (IAQM). However, it is recommended that the following forms part of assessments[3]:

- *"a description of baseline conditions and any air quality concerns affecting the area, and how these could change both with and without the proposed development;*
- *sensitive habitats (including designated sites of importance for biodiversity;*
- *the assessment methods to be adopted and any requirement for the verification of modelling air quality;*
- *the basis for assessing impact and determining the significance of an impact;*
- *where relevant, the cumulative or in-combination effects arising from several developments;*
- *construction phase impacts;*
- *acceptable mitigation measures to reduce or remove adverse effects; and*
- *measures that could deliver improved air quality even when legally binding limits for concentrations of major air pollutants are not being breached."*

The assessment includes each of the above recommended aspects.

The PPG provides advice on how air quality impacts can be mitigated and notes[4]:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important therefore that local planning authorities work with applicants to consider appropriate mitigation so as to ensure the new development is appropriate for its location and unacceptable risks are prevented. Planning conditions and obligations can be used to secure mitigation where the relevant tests are met.

Examples of mitigation include:

- *maintaining adequate separation distances between sources of air pollution and receptors;*
- *using green infrastructure, in particular trees, where this can create a barrier or maintain separation between sources of pollution and receptors;*
- *appropriate means of filtration and ventilation;*

[3] The Planning Practice Guidance, Air Quality Section, paragraph 007, reference ID 32-007-20191101

[4] The Planning Practice Guidance, Air Quality Section, paragraph 008 Reference ID 32-008-20191101

- *including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points);*
- *controlling dust and emissions from construction, operation and demolition; and*
- *contributing funding to measures, including those identified in air quality action plans and low emission strategies, designed to offset the impact on air quality arising from new development".*

2.5 Local Planning Policy

2.5.1 Ashford Local Plan

The Ashford Local Plan establishes a policy and delivery framework that provides clear and firm guidance to ensure that the Council's aims for the Borough are achieved where they relate to issues of planning and land use, consistent with the NPPF and PPG. The Local Plan covers the period between 2011 and 2030 and was adopted in February 2019.

The section of the plan relevant to air quality, Policy ENV12, states that:

"All major development proposals should promote a shift to the use of sustainable low emission transport to minimise the impact of vehicle emissions on air quality.

Development should be located where it is accessible to support the use of public transport, walking and cycling.

Development proposals that might lead to a significant deterioration in air quality or national air quality objectives being exceeded, either by itself, or in combination with other committed development, will require the submission of an Air Quality Assessment to be carried out in accordance with the relevant guidance. This should address: -

1. *The cumulative effect of further emissions; and,*
2. *The proposed measures of mitigation through good design and offsetting measures that would prevent the National Air Quality Objectives being exceeded or reduce the extent of the air quality deterioration.*

Proposals which will result in National Air Quality Objectives being exceeded will not be permitted."

2.5.2 Kent and Medway Air Quality Partnership Air Quality Planning Guidance

The Kent and Medway Air Quality Partnership produced an Air Quality Planning Guidance document in December 2015 which can be used by each of the local authorities including ABC. This document details requirements for air quality assessment, emissions mitigation assessment and provides guidance on the execution of both. This guidance includes criteria for assessing the impact of a development on air quality. Since this guidance was published the IAQM has produced a guidance document which also includes criteria for assessing the impact of a development on air quality. Consultation with ABC's Environmental Protection Team on a previous application for the Site confirmed that the use of the IAQM approach to assessing the impact is acceptable, but the assessment should follow the approach of the Kent and Medway Air Quality Partnership guidance and include an emissions mitigation assessment and mitigation cost calculation.

3 Assessment Methodology

3.1 Construction phase dust generating activities

There is the potential for dust to be released into the atmosphere as a result of construction and demolition phase activities. These fugitive dust emissions have been assessed on a qualitative basis in accordance with the methodology outlined within the IAQM guidance document 'Guidance on the assessment of dust from demolition and construction' (2014). This guidance sets out the methodology for assessing the air quality impacts of construction and demolition and identifies good practice for mitigating and managing air quality impacts. The quantity of dust emitted will be related to the area of land being worked and the nature, magnitude and duration of construction activities.

The assessment methodology is based on the risk of a site giving rise to dust impacts and the sensitivity of the surrounding area. Activities are divided into four types to reflect their different potential impacts. These are:

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

“Trackout” is a less well-known term. It is defined by IAQM as:

"The transport of dust and dirt from the construction / demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when lorries leave the construction / demolition site with dusty materials, which may then spill onto the road, and/or when lorries transfer dust and dirt onto the road having travelled over muddy ground on site."

The assessment methodology considers three separate dust effects:

- annoyance due to dust soiling;
- harm to ecological receptors; and
- the risk of health effects due to significant increase in exposure to PM_{10} (particulate matter with a diameter less than 10 µm).

The first stage of the assessment of the impact of fugitive emissions of dust during construction is to determine whether the impact can be screened out as ‘negligible’, or whether a more detailed assessment is required. The IAQM recommends that the developer will normally be required to undertake a detailed assessment where there is:

- a human receptor within 350 m of the boundary of the Site;
- an ecological receptor within 50 m of the boundary of the Site; or
- a human or ecological receptor within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the Site entrance(s).

A human receptor, in this context, is any location where a person may experience the annoyance effects of airborne dust or dust soiling or suffer exposure to PM_{10} over a period of time relevant to the AQALs. This includes:

- residential dwellings;
- schools;

- hospitals;
- care homes;
- hotels;
- gardens (where relevant public exposure is likely i.e. excluding extremities of gardens or front gardens); and
- sensitive commercial premises including vehicle showrooms, food manufacturers, and electronics manufacturers.

Ecological receptors should include statutory and non-statutory designated sites.

If the development can be screened out from undertaking a detailed assessment, the developer is to provide a clear description of the proposed demolition and construction activities, their location and duration, and any phasing of the development.

If a detailed assessment is required, the second stage is to assess the risk of dust effects arising. A site is allocated to a risk category based on two factors; dust emission magnitude; and the sensitivity of the area. These factors are combined to give the risk of dust impact. Full details of the methodology for assessing the risk of dust effects arising is presented in Appendix B.

The third stage is to define appropriate, site-specific, mitigation measures.

The final stage is to determine whether significant effects are likely. For almost all construction activities, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience has shown that this is normally possible through the implementation of suitable mitigation. Hence the residual effect would normally be 'not significant'.

3.2 Operational phase traffic emissions

In 2017 the IAQM published the guidance document "Land-Use Planning & Development Control: Planning for Air Quality" (referred to within this report as the IAQM 2017 guidance). This has been developed for professionals operating within the planning system. It provides them with a means of reaching sound decisions, having regard to the air quality implications of development proposals. The IAQM 2017 guidance states that an air quality assessment is required where a development would cause a "significant change" in Light Duty Vehicles < 3.5t (LDV) or Heavy Duty Vehicles >3.5 t (HDVs). The indicative criteria to progress to an assessment are:

- A change in LDV flows of:
  - more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA; or
  - more than 500 AADT elsewhere.
- A change in HDV flows of:
  - more than 25 AADT within or adjacent to an AQMA; or
  - more than 100 AADT elsewhere.

The traffic data provided by the Transport Consultant for the project (I-Transport), has shown that the above criteria would be exceeded as a result of the Proposed Development. Therefore, detailed dispersion modelling has been undertaken using the model ADMS Roads 5.0, developed and supplied by Cambridge Environmental Research Consultants (CERC). ADMS-Roads is routinely used for modelling of emissions of traffic for planning purposes. The model has been used to predict the concentration of pollutants on a long and short term basis at the identified sensitive receptors.

In order to investigate the impact of the Proposed Development on the surrounding area, the following modelling assessment scenarios have been considered:

- Scenario 1: 2018 Baseline.
- Scenario 2: 2026 do-minimum: including Tempro growth and the committed developments identified in Appendix D;
- Scenario 3: 2026 do-something: as scenario 2, plus the Proposed Development flows.

The impact in 2026 has been assessed as this is the first year in which the Proposed Development will be fully occupied. The marginal effect of the Proposed Development is defined as the difference between the 'do-something' and 'do-minimum' scenarios, i.e. scenario 3 minus scenario 2.

Full details of the model and inputs, including derivation of traffic flows used in the assessment, are provided in Appendix D.

The IAQM 2017 guidance includes the following matrix which should be used to describe the magnitude of impact based on the change in concentration relative to the AQAL and the overall predicted concentration with the scheme – i.e. the future baseline plus the process contribution.

Table 1: IAQM Magnitude of Change Descriptors

Long term average concentration at receptor in assessment year	% change in concentration relative to AQAL			
	1	2 – 5	6 – 10	> 10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94% of AQAL	Negligible	Slight	Moderate	Moderate
95-102% of AQAL	Slight	Moderate	Moderate	Substantial
103-109% of AQAL	Moderate	Moderate	Substantial	Substantial

It is intended that the change in concentration relative to the AQAL (the process contribution) is rounded to the nearest whole number. Therefore, any impact which is between 0.5% and 1.5% will be classified as a 1% change in concentration.

The above table sets out the criteria for defining the magnitude of change. In accordance with the IAQM 2017 guidance, this considers the sensitivity of the receptor to additional pollution. The significance of the effect should then be determined based on professional scientific judgement taking into consideration the spatial extent of impacts and number of receptors impacted by the Proposed Development. An effect of 'moderate' or greater significance is classified as a significant effect for the purpose of this assessment.

This assessment has focused on the impact in relation to the annual mean AQAL for nitrogen dioxide, PM_{10} and $PM_{2.5}$. As outlined in section 2.1, there are also short term AQALs for nitrogen dioxide and PM_{10}. Local Air Quality Management Technical Guidance Note 16 (LAQM.(TG16)) states that if annual mean nitrogen dioxide concentrations are above 60 µg/m^3 (i.e. 150% of the AQAL), analysis should be undertaken of short term nitrogen dioxide concentrations as there is the potential for exceedences of the 1-hour AQAL.

With regard to daily mean PM_{10}, LAQM(TG16) states that the number of exceedances of the AQAL per year can be predicted from the predicted annual mean concentration using the following relationship:

$$No.24 - hour\ mean\ exceedances\ =$$
$$-18.5\ +\ 0.00145\ \times annual\ mean^3 +\ (206/annual\ mean)$$

3.3 Emissions mitigation calculation

The Kent and Medway Air Quality Planning Guidance document states that all major developments will require an emissions mitigation assessment and sets out the following guidance.

"Standard Mitigation for all developments:

1. *Residential: All gas-fired boilers to meet a minimum standard of <40mgNOx/kWh; 1 Electric Vehicle charging point* per dwelling with dedicated parking or 1 charging point per 10 spaces (unallocated parking)*
2. *Commercial/Retail/Industrial: 10% of parking spaces to be provided with Electric Vehicle charge points* which may be phased with 5% initial provision and the remainder at an agreed trigger level.*
3. *Demolition/Construction: Mitigation in accordance with the Institute of Air Quality Management (IAQM) Guidance on the Assessment of Dust from Demolition and Construction*

** this shall be the best technology available at the time of planning approval.*

Mitigation for minor developments:

If the development is within or close to an AQMA and is considered minor development then it will be at the discretion of the Air Quality Officer to suggest reasonable mitigation options for these types of development.

Mitigation for all other developments:

The emissions mitigation calculator provides a formula to calculate the emissions resulting from a development and produces an exposure cost value to be spent on mitigation measures."

The Proposed Development is large enough for an emissions mitigation calculation to be required. The calculation inputs the additional number of trips generated by the development into the latest DEFRA Emissions Factor Toolkit (EFT), which calculates the amount of transport related pollutant emissions a development is likely to produce.

The output is given in kg of specified pollutant per year and requires converting to tonnes per year. The output is then multiplied by the latest Interdepartmental Group on Costs and Benefits (IGCB) damage costs[5] for the key pollutants nitrogen oxides (NOx) and particulates ($PM_{2.5}$). This total is then multiplied by 5 to provide a 5 year exposure cost value which is the amount (value) of mitigation that is expected to be spent on measures to mitigate those impacts. This value is used for costing the required emissions mitigation for the development.

[5] https://www.gov.uk/government/publications/assess-the-impact-of-air-quality/air-quality-appraisal-damage-cost-guidance

4 Baseline Conditions

4.1 Description of site and surroundings

The Proposed Development is located in Tenterden, Kent, as shown in Figure 1 of Appendix A. In this section, we have reviewed the baseline air quality and defined appropriate baseline concentrations to be used within this assessment.

4.2 Air quality review and assessment

As detailed in Section 2.2, local authorities are required to periodically review and assess air quality within their area of jurisdiction. The 2020 Air Quality Annual Status Report prepared by Air Quality Consultants for ABC, which is the most recent report available, states that pollutant concentrations within the borough are all below national air quality objectives and the latest monitoring data show levels are decreasing slightly. There are no AQMAs within ABC's area of jurisdiction.

4.3 National modelling – mapped background data

In order to assist local authorities with their responsibilities under LAQM, DEFRA provides modelled background concentrations of pollutants throughout the UK on a 1 km by 1 km grid. This model is based on known pollution sources and background measurements and is used by local authorities in lieu of suitable monitoring data. The mapped background data is calibrated against monitoring data. For instance, the 2018 mapped backgrounds are based on 2018 meteorological data and are calibrated against monitoring undertaken in 2018. Using 2018 data avoids uncertainty as to how background concentrations will change in the future. A summary of the concentrations is presented within Table 2.

Table 2: Mapped Background Data

Pollutant	Annual Mean Concentration (µg/m³)		Dataset
	At Proposed Development	Max Within 5 km of Proposed Development	
Nitrogen Dioxide	8.37	9.40	DEFRA 2018 Dataset
Particulate matter (as PM_{10})	14.12	15.62	DEFRA 2018 Dataset
Particulate matter (as $PM_{2.5}$)	9.23	9.49	DEFRA 2018 Dataset

The background concentration of PM_{10} is required to determine the sensitivity of the area to human health effects during the construction phase of the development. As shown in Table 2 above, the 2018 background concentration of PM_{10} in the vicinity of the Proposed Development is 14.12 µg/m³ which is well below the AQAL of 40 µg/m³ and expected due to the location of the site which is well away from any significant sources of particulate matter

4.4 Automatic monitoring data

The UK Automatic Urban and Rural Network (AURN) is a country-wide network of air quality monitoring stations operated on behalf of the DEFRA. There is no automatic monitoring being

undertaken within Ashford Borough, and the closest AURN monitoring sites (Chatham Roadside site, approximately 35 km north of the Proposed Development and the Canterbury site, approximately 36 km north east of the Proposed Development) are considered too distant from the Proposed Development to be representative of concentrations in its vicinity. Therefore, AURN monitoring data has not been considered further in this assessment.

4.5 Non-automatic monitoring data

ABC undertook non-automatic monitoring of nitrogen dioxide at 42 sites during 2019. The locations of the monitoring sites are all centred around the town of Ashford. The nearest of these monitoring sites to the Proposed Development are approximately 13 km to the north east, which is considered too distant from the Proposed Development to be considered representative of concentration in its vicinity. However, ABC operated one roadside non-automatic monitoring location in Tenterden (ref: AS07) until July 2015. For completeness the nitrogen dioxide monitoring data from this site is presented in Table 3 below.

Table 3: Non-automatic Roadside Nitrogen Dioxide Monitoring

Ref	Units	2011	2012	2013	2014	2015
AS07	µg/m³	27.6	24.6	26.2	25.1	21.1*
Note: Data collection ceased in July 2015. Data for 2015 has been annualised.						

As shown, the monitored concentrations were well below the AQAL of 40 µg/m³.

4.6 Summary

The analysis of baseline monitoring has shown that there are no currently operating automatic or non-automatic monitoring locations within the assessment area. The 2018 mapped background concentrations have been chosen as the most appropriate representation of concentrations at the Proposed Development and have been used in this assessment.

5 Construction Phase Impact Assessment

The assessment has been undertaken in accordance with the methodology contained within Appendix B.

5.1 Stage one – screening

Figure 2 of Appendix A presents the site boundary proximity zones based on the methodology presented in Section 3.1. As shown, there are a number of residential properties with the specified distances from the site boundary and potential dust generation areas.

The IAQM methodology outlined in section 3.1 is based on:

- The risk category for the site – which is based on the type of activity and the distance to the nearest receptor; and
- The sensitivity of the area – which is based on the number of properties within certain distances of the boundary of the works.

The methodology assesses the significance of the site rather than the significance of the impact on an individual receptor. As such, individual receptors have not been identified. However, the following table outlines how many residential properties have been identified in the relevant distance bands. For clarity, the IAQM methodology states that one residential unit is one receptor.

Table 4: Dust Sensitive Receptors - Number of Residential Properties

Distance from the source (m)	Estimated number of human receptors	
	From Site Boundary	From Site Access Routes
<20	~13	~100
<50	~80	~160
<100	~135	-
<200	~360	-
<350	~600	-

Note:

Distance from site access routes is used in the assessment of trackout, and only receptors within 50m of the edge of the road (up to 500m from the Site entrance) need to be considered.

This shows there are a number of residential properties within the human receptor screening distances (i.e. within 350 m of the site boundary, or 50 m by any route used by construction vehicles on the public highway, up to 500 m from the site entrance). In addition to this Hales Court Retirement home is within 350 m of the site boundary. Residential dwellings and care homes are considered high sensitivity receptors because people would be expected to be continuously present and expect enjoyment of a high level of amenity.

No hospitals, schools, hotels or sensitive commercial premises have been identified within these screening distances.

Knock Wood, a designated ancient woodland, to the north of the site boundary is located within the ecological screening distances (50 m of the site boundary or the route used by construction vehicles on the public highway, up to 500 m from the site entrance). This is considered to be a low

risk sensitivity receptor because it is a locally designated site. However, due to its proximity to the Proposed Development this has been included in this assessment.

5.2 Stage two - risk of dust emissions

5.2.1 Description of activities

The Proposed Development site encompasses 243,400 m^3 of land between Appledore Road and Woodchurch Road. The area currently comprises of 14 parcels of land, which are used for occasional grazing and one is currently a sports pitch. The Proposed Development includes 1 x all modes and 1 x emergency, pedestrian, and cycle only access points from Appledore Road and a pedestrian and cycle access point from Woodchurch Road. There is to be the creation of a network of roads, footways and cycleways through the site. Of the total site area, circa 54,800 m^3 is to be up to 145 residential dwellings, circa 190,800 m^3 is to be country park, formal sports pitches, open space including children's play areas, sustainable drainage systems, landscape buffers and green links on the site.

5.2.2 Dust emission magnitude

The dust emission magnitude is based on the scale of anticipated works and is classified as small, medium or large. The criteria for these definitions are set out in Appendix C.2.

The western section of the site is allocated as the area of housing, with the area to the east the recreational grounds. Therefore, the most significant dust generating activities would not occur across the whole site. During the development of the sports pitches the most significant dust generating would be during the preparation of the land and when the grass is establishing. This area is distanced from the majority of the residential properties. During the construction of the residential units the dust generating activities would occur within and around the footprint of the unit and stockpile areas. However, as a worst-case It has been assumed that dust generating activities will occur in all parts of the Site that will be developed.

The dust emission magnitude for each type of activity has been assessed and is displayed in the following table.

Table 5: Dust emission magnitudes

Activity	Dust Emission Magnitude	Justification
Demolition	N/A	The current land use for the proposed development area is fields, so there will be no demolition activities during construction. The impact of demolition activities does not need to be considered further in this assessment. It is noted that if the existing cadets portacabin is removed. this is not likely to cause significant dust impacts and has therefore been excluded from this assessment.
Earthworks	Large	The total area that may require earthworks is > 10,000 m^3. Although the quantity of material to be moved has not yet been established, the proposed landscaping suggests it may be significant and therefore the dust emission magnitude is deemed to be large.

Activity	Dust Emission Magnitude	Justification
Construction	Large	The total building volume will be >100,000 m^3 and will likely involve potentially dusty activities such as concrete mixing and on-site batching.
Trackout	Medium	During the construction phase there is expected to be less than 50 HDV vehicles in any one day. Although it is likely there will be long stretches of unpaved road within the site during construction, due to the moderate number of HGV movements the dust emission magnitude of trackout is considered to be medium.

5.2.3 Sensitivity of area

The area has been assessed for its sensitivity to dust soiling effects, human health effects to PM10 and ecological effects, using the criteria set out in Section C.3. These are displayed for each type of dust emission activity:

Table 7: Sensitivity of the Area to Dust

Effect	Sensitivity	Justification
Earthworks		
Dust soiling	Medium	There are 135 high risk human receptors (residential properties) located within 100m of the site.
Human health impacts	Low	The baseline PM_{10} concentrations for the area are less than 24 µg/m^3 and the number of high risk human sensitive receptors (residential properties) is less than 100 within 100 m of the site.
Ecological effects	Low	There is an ecological receptor within 20 m of the site but as it is a local nature site it is considered a low risk receptor.
Construction		
Dust soiling	Medium	There are 135 high risk human receptors (residential properties) located within 100m of the site.
Human health impacts	Low	The baseline PM_{10} concentrations for the area are less than 24 µg/m^3 and the number of high risk human sensitive receptors (residential properties) is less than 100 within 100 m of the site.
Ecological effects	Low	There is an ecological receptor within 20 m of the site but as it is a local nature site it is considered a low risk receptor.
Trackout		
Dust soiling	High	There are ~160 high risk human receptors (residential properties) within 50 m of the routes used by construction vehicles on public highway up to 500 m from site entrance(s).

Effect	Sensitivity	Justification
Human health impacts	Medium	The baseline PM_{10} concentrations for the area are less than 24 µg/m^3 and the number of high risk human sensitive receptors (residential properties) is >100 within 20 m of the routes used by construction vehicles on public highway up to 500 m from site entrance(s).
Ecological effects	Low	There are no ecological sites within 50 m of the routes used by construction vehicles on public highway up to 500 m from site entrance(s).

5.2.4 Summary

The risk of dust impacts from construction and earthworks is summarised as using the criteria outlined in Table 18. This is based on the dust emission magnitude and the sensitivity of the area.

Table 8: Summary of Dust Risk

Potential Impact	Demolition	Earthworks	Construction	Trackout
Dust Soiling	-	Medium Risk	Medium Risk	Medium Risk
Human Health	-	Low Risk	Low Risk	Low Risk
Ecological	-	Low Risk	Low Risk	Low Risk

5.3 Stage three – Identification of mitigation measures

The dust assessment has identified that the highest risk category for the Proposed Development is 'medium risk'. The highly recommended mitigation measures suggested by the IAQM guidance for all sites and activities at this level of risk are listed below.

Mitigation measures for medium risk all sites:

Highly recommended:

- Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.
- Display the name and contact details of person(s) account-able for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.
- Display the head or regional office contact information.
- Develop and implement a Dust Management Plan (DMP.
- Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.
- Make the complaints log available to the local authority when asked.
- Record any exceptional incidents that cause dust and/or air emissions, either on- or off- site, and the action taken to resolve the situation in the log book.
- Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.
- Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.

- Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.
- Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.
- Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.
- Avoid site runoff of water or mud.
- Keep site fencing, barriers and scaffolding clean using wet methods.
- Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.
- Cover, seed or fence stockpiles to prevent wind whipping.
- Ensure all vehicles switch off engines when stationary - no idling vehicles.
- Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.
- Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.
- Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.
- Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.
- Use enclosed chutes and conveyors and covered skips.
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.
- Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.
- Avoid bonfires and burning of waste materials.
- Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.
- Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.
- Avoid dry sweeping of large areas.
- Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.
- Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).
- Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.

- Access gates to be located at least 10 m from receptors where possible.

5.4 Stage four - summary

The assessment has screened out the need for a detailed assessment of dust impacts as a result of the demolition activities associated with the Proposed Development. When considering earthworks, construction and trackout activities the site has been assessed to be of medium risk for dust soiling impact, and low risk for human health and ecological impact. Appropriate mitigation measures have been identified. It is considered that with the implementation of the measures identified any residual impacts would not be significant.

6 Operational Phase Vehicle Emissions Impact Assessment

The impact of vehicle emissions associated with the operational phase of the Proposed Development has been assessed on a quantitative basis. The dispersion modelling has focussed on the receptors along the roads for which there is an increase in vehicle movements as a result of the proposals.

6.1 Sensitive receptors

The AQALs only apply at locations where the public may be exposed to pollution for a sufficient period for there to be any measurable health effect. The averaging period and AQAL involved will determine which locations are considered to be sensitive receptors. For annual mean nitrogen dioxide and particulate matter AQALs, LAQM.TG(16) considers typical locations for sensitive receptors to include:

- Residential properties;
- Hospitals;
- Schools; and,
- Care homes.

20 receptors have been selected which are representative of the residential properties along each of the roads which vehicles associated with the Proposed Development will travel. These have been selected as the locations where the impact of the Proposed Development is expected to be greatest. In addition, two proposed receptor (PR) locations have been selected to represent areas of relevant exposure within the Proposed Development close to Appledore Road and the Site Access Road. These are displayed in Figure 4 in Appendix A and set out in Table 6.

Table 6: Road Traffic Emissions Sensitive Receptors

ID	Description	X (m)	Y (m)	Height (m)
R1	Appledore Road 1	589116	133603	1.5
R2	Appledore Road 2	589136	133550	1.5
R3	Appledore Road 3	589079	133627	1.5
R4	East Hill 1	588991	133651	1.5
R5	East Hill 2	588836	133653	1.5
R6	East Hill 3	588815	133663	1.5
R7	Beacon Oak Road 1	589009	133659	1.5
R8	Golden Square 1	588953	133730	1.5
R9	Golden Square 1	588947	133754	1.5
R10	Beacon Oak Road 2	588925	133792	1.5
R11	Beacon Oak Road 3	588938	133805	1.5
R12	Ashford Road 1	588834	134081	1.5
R13	Ashford Road 2	588798	134044	1.5
R14	Oaks Road 1	588779	133667	1.5

ID	Description	X (m)	Y (m)	Height (m)
R15	Oaks Road 2	588728	133609	1.5
R16	Oaks Road 3	588530	133451	1.5
R17	High Street 1	588693	133609	1.5
R18	High Street 2	588481	133401	4.0(1)
R19	High Street 3	588391	133316	4.0(1)
R20	High Street 4	588363	133316	4.0(1)
PR1	Proposed Development 1	589496	133452	1.5
PR2	Proposed Development 2	589518	133480	1.5

Note:
(1) R18 to R20 on the high street are elevated residential receptor locations located on the first floor above commercial properties.

6.2 Impact analysis

Detailed results tables can be found in Appendix E for each sensitive receptor. Two emissions scenarios have been considered:

- A worst-case which assumes there is no change to the fleet composition on the local road network between 2018 and 2026; and
- A best-case scenario in which the fleet composition changes in line with current projections, which results in lower emissions along the roads.

For both scenarios it has been assumed that background concentrations do not reduce in line with projections from 2018 levels as discussed in Section 4.

The results are summarised as follows. When applying the IAQM criteria:

1. For annual mean nitrogen dioxide, the impact at all receptor locations is predicted to be negligible at all receptor locations for all scenarios considered. The maximum impact at a receptor is predicted to be 3.9% of the AQAL at receptor R1, which includes the effect of the Proposed Development traffic and the reduction in vehicle speed due to the proposed traffic calming measures. As the total concentration is predicted to be less than 75% of the AQAL, the impact is described as 'negligible' in accordance with the IAQM 2017 criteria. In addition, this assumes that the vehicle fleet does not change with time and there is no improvement in emissions from the average vehicle. If the vehicle fleet changes with time as predicted, the impact at R1 is predicted to be 1.7% of the AQAL.
2. For annual mean particulate matter as PM_{10}, even for the worst-case emissions scenario the magnitude of change is predicted to be negligible irrespective of the total concentration at all receptors. As such, it is not necessary to present the results for the best-case scenario. The maximum impact at a receptor is predicted to be 0.23% of the AQAL.
3. For annual mean particulate matter as $PM_{2.5}$, even for the worst-case emissions scenario the magnitude of change is predicted to be negligible irrespective of the total concentration at all receptors. As such, it is not necessary to present the results for the best-case scenario. The maximum impact at a receptor is predicted to be 0.33% of the AQAL.
4. The maximum predicted annual mean concentration of nitrogen dioxide at a receptor location is 22.13 µg/m³, well below the concentration of 60 µg/m³ which would indicate potential exceedances of the short-term AQAL. In addition, the maximum long-term concentration of

PM_{10} of 16.15 µg/m³ is sufficiently low that fewer than one exceedance of the short-term AQAL is predicted per year in accordance with the formula detailed in section 3.2; the allowable number of exceedances per year is 35.

The significance of effect has been assessed using professional judgement, taking into account the results of the assessment in relation to the IAQM 2017 criteria. The magnitude of change at all receptor locations is predicted to be 'negligible', even under the highly conservative assumption that there will be no changes to the current fleet mix or improvements in emissions from an average vehicle between 2018 and 2026. Therefore, the overall significance of the effect of the vehicle emissions associated with the operational phase of the Proposed Development on local air quality is deemed to be 'not significant'.

6.3 Cumulative impacts

The preceding sections have quantified the magnitude of change in vehicle emissions associated with the Proposed Development considering a scenario in which emissions do and do not reduce in line with projections. The assessment includes the calculation of the Do-Minimum and Do-Something scenarios which includes the operation of the committed developments listed in the Transport Assessment and detailed in Appendix D. Therefore, the assessment already considers the cumulative impact of these other consented, but not yet operational, developments.

7 Emissions Mitigation Assessment

7.1 Introduction

This assessment has been undertaken in accordance with the Kent and Medway Air Quality Partnership Air Quality Planning Guidance. The purpose of this assessment has been to assess the local emissions from a development and to determine the appropriate level of mitigation required to help reduce the potential effect on health and/or the local environment.

The Kent and Medway Air Quality Partnership Air Quality Planning Guidance explains that an assessment must include:

- Development traffic input data for emissions mitigation calculation;
- Emissions calculation and totals;
- Mitigation proposed to be equivalent to the value of emissions calculation (appropriate to the type and size of development and local policy requirements); and
- Statement of provision required to minimise dust emissions in accordance with the IAQM Guidance on the Assessment of Dust from Demolition and Construction.

The mitigation measures required to minimise dust emissions during the construction phase of the Proposed Development are detailed in Section 5.3.

7.2 Emissions calculation

The emissions assessment and mitigation calculation provide a means of calculating the emissions resulting from a development and producing an exposure cost value for mitigation measures and/or compensation. The emission calculation has been completed in accordance with the methodology outlined in the Kent and Medway Air Quality Partnership Air Quality Planning Guidance, as detailed below.

- The additional number of trips generated by the development has been input into the latest DEFRA EFT which calculates the amount of transport related pollutant emissions a development is likely to produce.
- The output, given in kg of specified pollutant per year, has been converted to tonnes per year.
- The output has then been multiplied by the Interdepartmental Group on Costs and Benefits (IGCB) damage costs for the key pollutants NOx and particulate matter. The IGCB no longer publishes damage costs for PM_{10}, recognising that the most risk to health is from the smaller $PM_{2.5}$ fraction. Therefore, $PM_{2.5}$ has been used in the calculation.
- Finally, the emissions total has then been multiplied by five to provide a five-year exposure cost value which is the amount (value) of mitigation that is expected to be spent on measures to mitigate those impacts. This value has then been used for costing the required emissions mitigation for the development.

7.2.1 Calculation of the emissions for the pollutants of concern

As detailed in Appendix D, the Proposed Development is predicted to generate 883 daily LDV trips. No additional HDV trips are predicted as a result of the Proposed Development. DEFRA's EFT V10.1 has been used to calculate the emissions resulting from the Proposed Development in the first year of full occupation (2026). The vehicle speed and link length used in the calculation are as

recommended in the Kent and Medway Air Quality Partnership Air Quality Planning Guidance. The data input into the EFT is summarised in the following table.

Table 7: EFT Inputs

Vehicle Class	Road Type	Traffic Flow (24-hour AADT)	Speed (kph)	Link Length (km)
LDV	Urban (Not London)	883	50	10

The speed of 50 kph is recommended in the Kent and Medway Air Quality Partnership Air Quality Planning Guidance noting. This equates to a speed of ~30 mph.

The outputs from the EFT are summarised in the following table.

Table 8: EFT Outputs

Pollutant	LDVs	HDVs
Annual NOx emissions (tonnes / year)	0.490	0
Annual $PM_{2.5}$ emissions (tonnes / year)	0.056	0

The IGCB damage costs used are the latest central estimate of the road transport "urban small", which are currently £6,251 per tonne of NOx, and £55,777 per tonne of $PM_{2.5}$. The calculation of the total emissions mitigation cost is summarised in the following table.

Table 9: Emissions Mitigation Cost

Pollutant	Annual Emissions (tonnes)	IGCB Damage Cost per tonne	Damage Cost per Year	5-Year Damage Cost
NOx	0.490	£6,251	£3,061	£15,305
PM_{10}	0.056	£55,777	£3,121	£15,604
			Total	**£30,909**

The five-year exposure cost has been calculated as **£30,909.**

7.3 Proposed mitigation measures

The five-year exposure cost value is the value of mitigation that is expected to be spent on measures to mitigate the impacts of the Proposed Development on air quality. Scheme mitigation should be provided within the design of the development where possible.

The below table lists the mitigation measures and estimated costs that have been, or will be, put in place by the developer.

Table 10: Table of proposed mitigation measures

Measure	Details	Indicative cost estimate	Number of units	Total Cost
Electric Vehicle Charging Points	-	£800	145	£116,000
Travel Plan	-	£30,000	-	£30,000
Welcome Packs	-	£35	145	£5,075
Cycle storage	-	£100	145	£14,500
Soft landscaping	Approximately 82 new trees, 1,111 m native hedgerow planting, and 5030 m² scrub planting.	£30,000(1)	-	£30,000
			Total	**£195,575**

Note:
(1) Excludes any other habitat/vegetation types such as wetland planting, as well as the cost of future maintenance.

The total figure for cost to be spent on mitigation measures reaches £195,575. This is an approximate figure, but is well above the five-year exposure cost value of £30,909. Therefore, the cost of the proposed mitigation measures is considered sufficient to remunerate the damage costs.

8 Conclusions

This Air Quality Assessment has been undertaken to support the outline planning permission for the development of up to 145 residential dwellings together with the full planning permission for the change in land use from agricultural land to land to be used as a country park, formal sports pitches and pavilion, in Tenterden, Kent.

The following air quality effects have been considered in this assessment:

1. Generation of dust as a result of construction activities; and
2. Generation of exhaust pollutants from operational phase traffic.

In conclusion:

1. The assessment has been conducted in accordance with the requirements of the Ashford Local Plan.
2. The assessment of dust generating activities has deemed that the site is of medium risk to both dust nuisance and health effects, and suitable mitigation measures have been recommended.
3. The assessment of the impact of vehicle emissions at receptors has predicted that the magnitude of change at all receptor locations is 'negligible'. Therefore, given that all impacts are predicted to be negligible, the overall significance of the effect of the vehicle emissions associated with the operational phase of the Proposed Development on local air quality is deemed to be 'not significant'.
4. The five-year exposure cost has been calculated as £30,909. The estimated total cost of proposed mitigation measures by the developer has been calculated as £195,575. Because the total mitigation cost exceeds the five year exposure cost, the proposed mitigation measures are considered financially sufficient.

In summary, providing the suggested mitigation measures are taken, the Proposed Development will not have a significant impact on local air quality.

Appendices

A Figures

Figure 1: Site Location

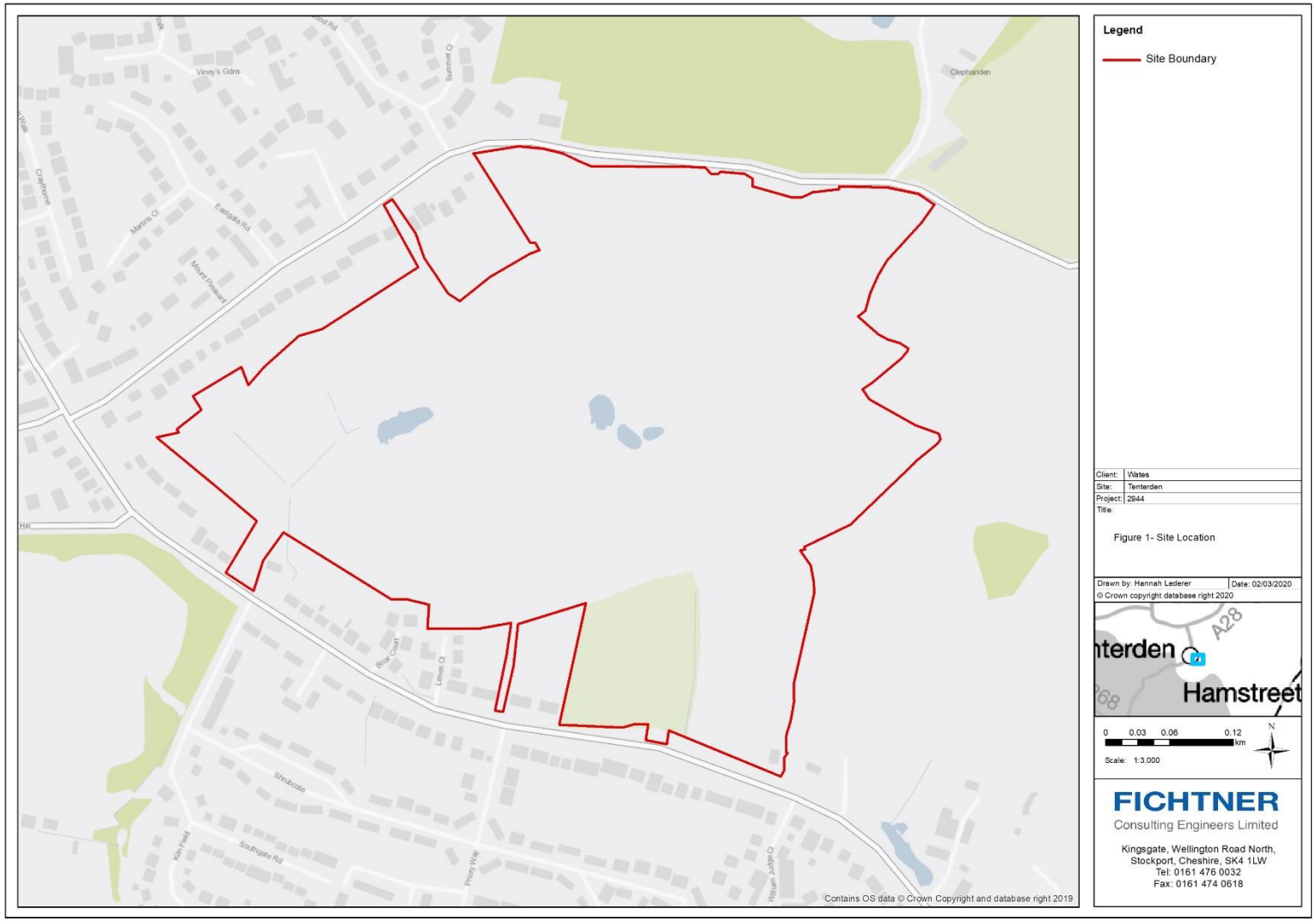


Figure 2: Site Boundary Proximity Zones

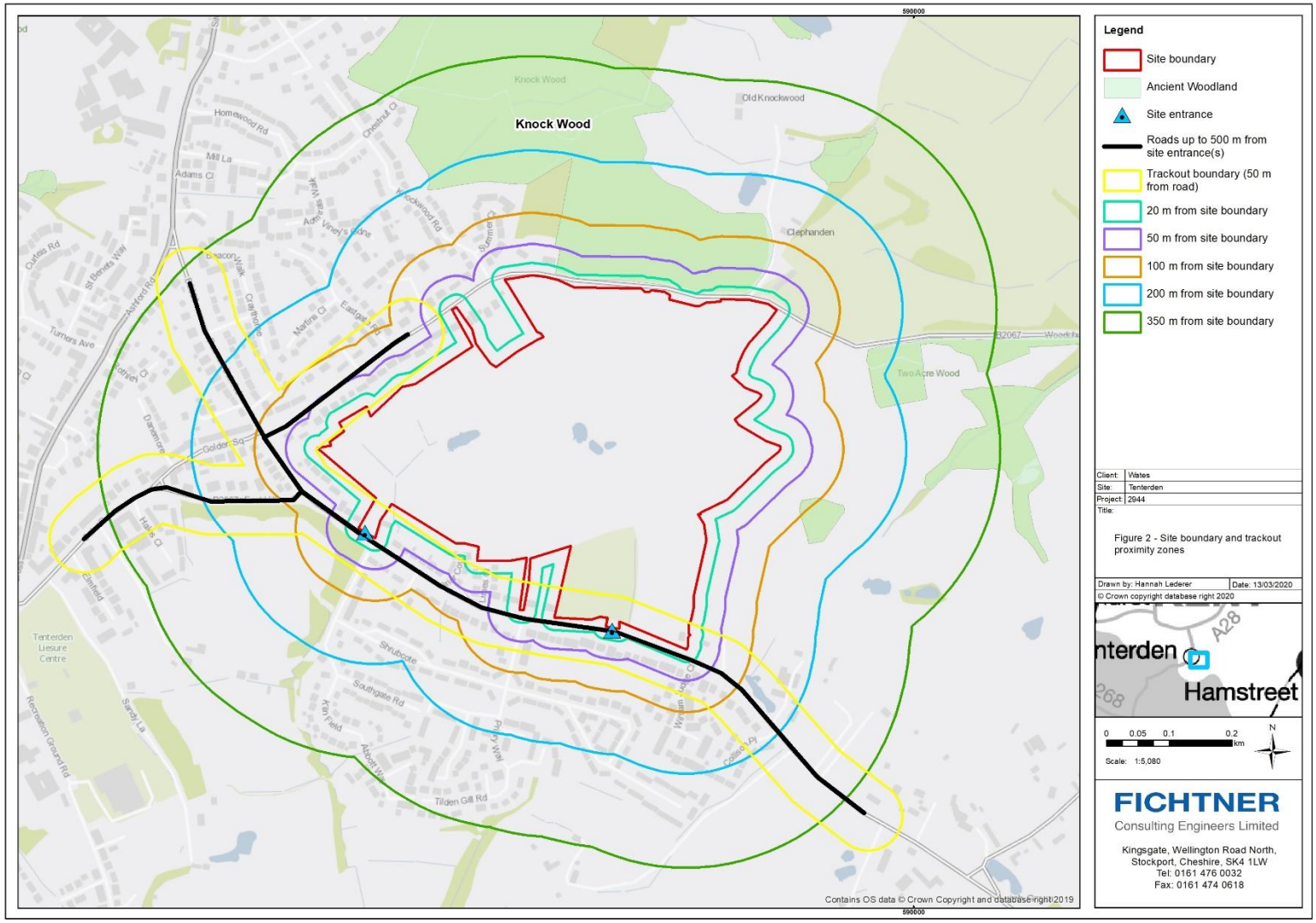


Figure 3: Wind Rose Gatwick 2019

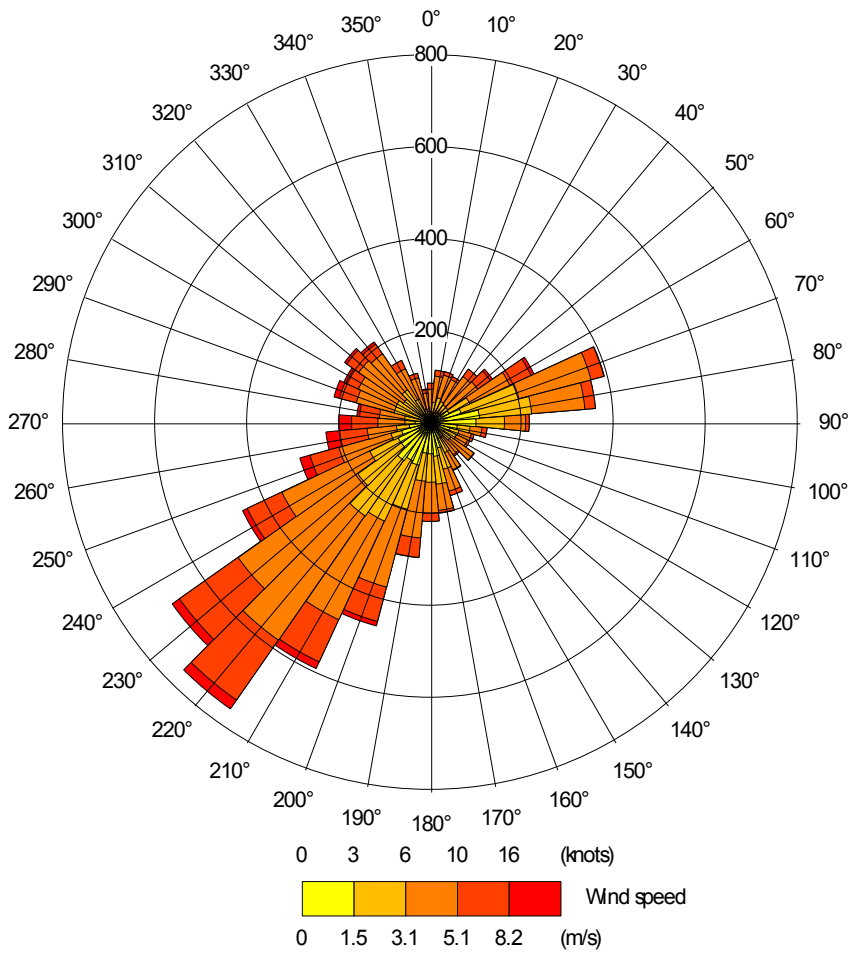
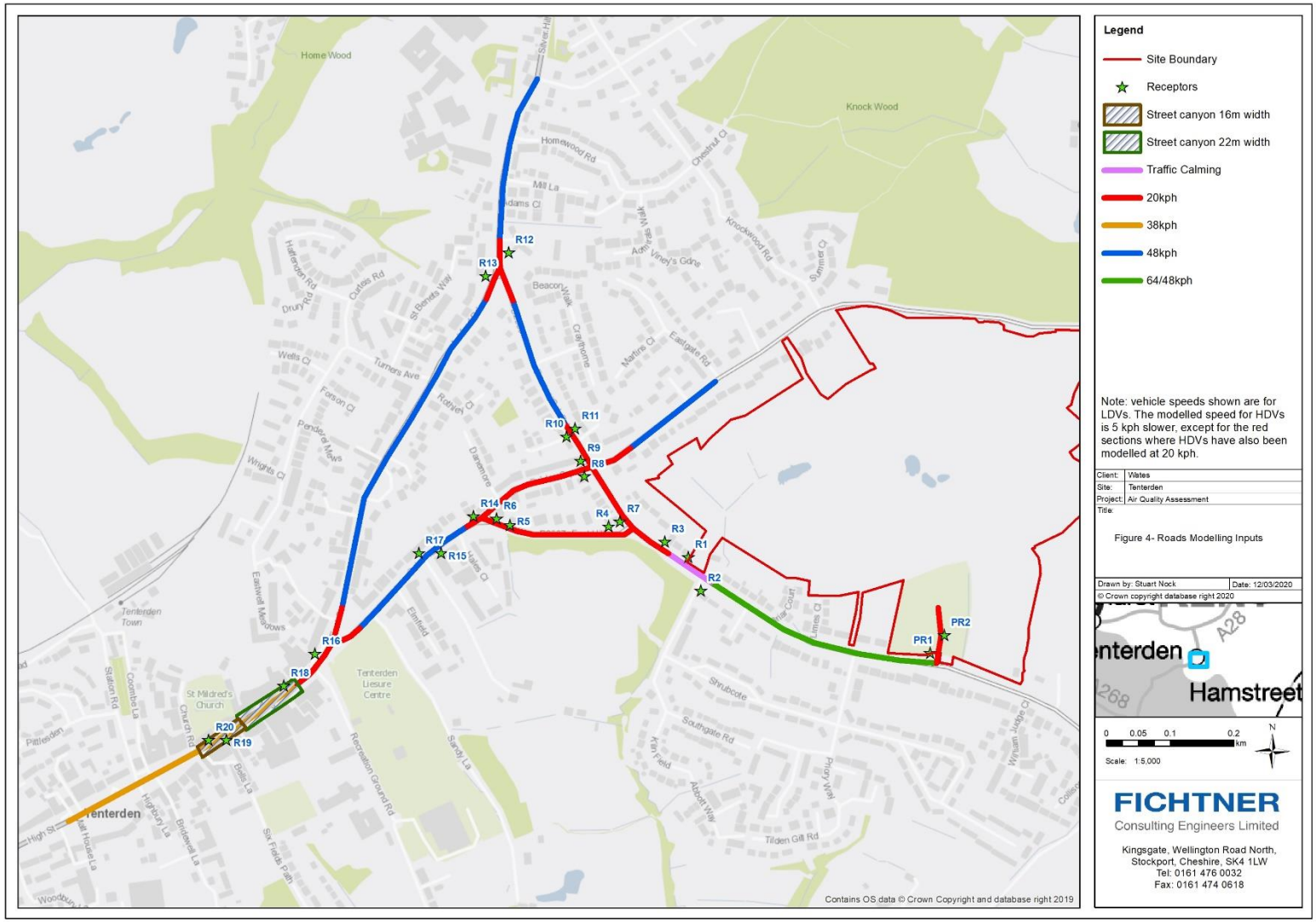


Figure 4: Roads Modelling Inputs



B EHO Comments

Online Comments Form

Application Details

App No: 19/01788/AS

Location: Land between Woodchurch Road and, Appledore Road, Tenterden, Kent

Proposal: a) Outline application for the development of up to 250 residential dwellings (40% affordable) including the creation of access points from Appledore Road (all modes) and Woodchurch Road (pedestrian and cycle only), and creation of a network of roads, footways, and cycleways through the site. Provision of open space including children's play areas, community orchards, sustainable urban drainage systems, landscape buffers and green links all on 12.35 ha of the site. (Matters for approval: Access) b) Full planning permission for the change of land use from agricultural land to land to be used as a country park (8.66 ha), and land to be used as formal sports pitches (3.33 ha), together with pavilion to serve the proposal and the surrounding area. Including accesses, ancillary parking, pathways, sustainable urban drainage systems and associated landscaping.

Person and Comment Details

Name: Lynne Cregeen

Address: Environmental Protection Ashford Borough Council Civic Centre Ashford Kent TN23 1PL

Action: Commenting

Created On: 15/01/2020 17:17:58

Comments

We would like to request the application of the following informative as part of any consent granted:

“The applicant should note the code of practice hours in relation to potentially noisy construction/demolition activities which are 0800-1800 Monday to Friday, and 0800-1300 hours Saturday. Noisy works should not occur, in general, outside of these times, on Sundays or Bank/Public Holidays.

In addition, the applicant should note that it is illegal to burn any controlled wastes, which includes all waste except green waste/vegetation cut down on the site where it can be burnt without causing a nuisance to neighbouring properties.

Finally the applicant should take such measures as reasonably practical to minimise dust emissions from construction and demolition activities and for that purpose would refer them to the IAQM guidance on controlling dust on construction sites.”

We note that the proposed development is considered major using the criteria from DoT indicative thresholds for transport assessments. As such we would recommend that the applicant complete an air quality assessment (including damage cost analysis in accordance with DEFRA guidance) and apply mitigation to the development based on the calculated damage cost.

We note that the development includes residential dwellings. To promote the move towards sustainable transport options and to take account of cumulative impacts of development on air quality we would request the application of E047 to provide electric vehicle charging facilities on driveways etc.

As with all developments on sites where there has been previous activity/development there is a potential for unexpected contamination to be found during the works. As such we would ask that the following condition is applied;

“If unexpected contamination is to be found at any time when carrying out the approved development it must be reported in writing to the Local Planning Authority. An investigation and risk assessment must then be undertaken and submitted to the Local Planning Authority for approval, and where remediation is necessary a remediation scheme must be prepared and agreed in writing prior to completion. Finally, a verification report must be submitted for approval by the Local Planning Authority prior to the occupation of the development.”

Reason: To ensure that risks from land contamination to the future users of land and neighbouring land are minimised, together with those to controlled waters, property and ecological systems, and to ensure that the development can be carried out safely without unacceptable risks to workers, neighbours and other offsite receptors.

We note that the proposed development is considered a major site, and as such I would request that condition E028 is applied with respects to providing a construction management plan. In particular we request this for the purposes of ascertaining the; measures to minimise the production of dust on the site(s), measures to minimise the noise (including vibration) generated by the construction process to include the careful selection of plant and machinery and use of noise mitigation barrier(s), maximum noise levels expected 1 metre from the affected façade of any residential unit adjacent to the site(s), measures to minimise the potential for pollution of groundwater and surface water, and the arrangements for public consultation and liaison during the construction works.

Kind Regards

Lynne Cregeen

Chartered Environmental Health Practitioner

C Construction Phase Dust Assessment Methodology

C.1 Background

The assessment is based on the risk of a construction site giving rise to dust impacts and the sensitivity of the surrounding area. The risk of dust emissions from a construction site causing loss of amenity and / or health or ecological effects is related to:

- The activities being undertaken (demolition, number of vehicles and plant etc.);
- The duration of these activities;
- The size of the Site;
- The meteorological conditions (wind speed, direction and rainfall);
- The proximity of receptors to the activity;
- The adequacy of the mitigation measures applied to reduce or eliminate dust; and
- The sensitivity of the receptors to dust.

The quantity of dust emitted is related to the area of land being worked and the level of construction activities, in terms of the nature, magnitude and duration of those activities. The wind direction, wind speed and rainfall at the time when a construction activity is taking place will also influence whether there is likely to be a dust impact. Atmospheric conditions which promote adverse impacts can occur in any direction from a site. However, adverse impacts are more likely to occur downwind of the prevailing wind direction and / or close to the worked areas. Impacts are also more likely to occur during drier periods as rainfall acts as a natural dust suppressant.

For developments where a detailed assessment is required, a risk category is determined based on two factors;

1. dust emission magnitude (Table 1); and
2. the sensitivity of the area (Tables 2, 3, 4, 5, 6 and 7).

These factors are combined to give the risk of dust impacts (Table 8) in the absence of any mitigation measures.

C.2 Dust emission magnitude

The dust emission magnitude is based on the scale of the anticipated works and should be classified as Small, Medium or Large. The following are example of how the potential dust emissions magnitude for different activities can be defined:

Table 11: Dust Emission Magnitude Criteria

Magnitude	Description
Demolition Activities	
Large	total building volume > 50,000m^3, potentially dusty construction material (i.e. concrete), on-site crushing and screening, demolition activities > 20m above ground level
Medium	total building volume 20,000 - 50,000m^3, potentially dusty construction material, demolition activities 10 – 20m above ground level

Magnitude	Description
Small	total building volume < 20,000m^3, construction material with low potentially for dust release (i.e. metal cladding or timber), demolition activities <10m above ground level, demolition during wetter months
Earthworks	
Large	total size area > 10,000m^2, potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size), > 10 heavy earth moving vehicles active at any one time, formation of bunds > 8m in height, total material moved > 100,000 tonnes
Medium	total size area 2,500 – 10,000m^2, moderately dusty soil type (i.e. silt), 5 – 10 heavy earth moving vehicles active at any one time, formation of bunds 4 – 8m in height, total material moved 20,000 – 100,000 tonnes
Small	total size area < 2,500m^2, soil type with large grain size (i.e. sand), < 5 heavy earth moving vehicles active at any one time, formation of bunds < 4m in height, total material moved < 10,000 tonnes, earthworks during wetter months
Construction Activities	
Large	total building volume > 100,000m^3, piling, on site concrete batching, sandblasting
Medium	total building volume 25,000 – 100,000m^3, potentially dusty construction material (e.g. concrete), piling, on site concrete batching
Small	total building volume < 25,000m^3, construction material with low potential for dust release (e.g. metal cladding or timber)
Trackout	
Large	> 50 HDV (> 3.5t) trips in any one day, potentially dusty surface material (e.g. high clay content), unpaved road length > 100 m
Medium	10 – 50 HDV (> 3.5t) trips in any one day, moderately dusty surface material (e.g. high clay content), unpaved road length 50 – 100 m
Small	< 10 HDV (> 3.5t) trips in any one day, surface material with low potential for dust release, unpaved road length < 50 m

Only receptors within 50 m of the routes(s) used by vehicles on the public highway and up to 500 m from the Site entrance(s) are considered to be at risk from the effects of dust.

C.3 Sensitivity of the area

The sensitivity of the area takes account of a number of factors:

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

The type of receptors at different distances from the site boundary or, if known, from the dust generating activities, should be included. Consideration should also be given to the number of `human receptors'. Exact counting of the number of `human receptors' is not required. Instead the guidance recommends that judgement is used to determine the receptors (a residential unit is one receptor) within each distance band.

There is no unified sensitivity classification scheme that covers the different potential effects on property, human health and ecological receptors. However, the following guidance is provided on the sensitivity of different types of receptors. For the sensitivity of people and their property to soiling, it is recommended that professional judgement is used to identify where on the spectrum between high and low sensitivity a receptor lies, taking into account the principles presented in Table 12.

Table 12: Sensitivity to Dust Soiling Effects

Sensitivity	Justification
High	Users can reasonably expect an enjoyment of a high level of amenity; or The appearance, aesthetics or value of their property would be diminished by dust deposition; and the people or property would reasonably be expected to be present continuously, or at least regularly for extended periods as part of the normal pattern of use of the land. Indicative examples include dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms.
Medium	Users would expect to enjoy a reasonable level of amenity but would not reasonably expect to enjoy the same level of amenity as in their home; or The appearance, aesthetic or value of their property could be diminished by dust deposition; or The people or property would not reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land; Indicative examples include parks and places of work.
Low	The enjoyment of amenity would not reasonably be expected; or Property would not reasonably be expected to be diminished in appearance, aesthetics or value by dust deposition; or There is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land. Indicative examples include playing fields, farmland (unless commercially-sensitive horticultural), footpaths, short-term car parks and roads.

For the sensitivity of people to the health effects of PM_{10} the IAQM Guidance recommends that there are three sensitivities based on whether or not the receptor is likely to be exposed to elevated concentrations over a 24-hour period as presented in Table 13.

Table 13: Sensitivity to Heath Effects of PM10

Sensitivity	Justification
High	Locations where members of the public are exposed over a time period relevant to the air quality objective for PM_{10} (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include residential properties. Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.
Medium	Locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM_{10} (in the case of the 24- hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day). Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM_{10}, as protection is covered by Health and Safety at Work legislation.
Low	Locations where human exposure is transient. Indicative examples include public footpaths, playing fields, parks and shopping streets

Table 14 provides an example of possible sensitivities of receptors to ecological effects.

Table 14: Sensitivity to Ecological Effects

Sensitivity	Justification
High	Locations with an international or national designation and the designated features may be affected by dust deposition; or Locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List for Great Britain. Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.
Medium	Locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or Locations with a national designation where the features may be affected by dust deposition. Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.
Low	Locations with a local designation where the features may be affected by dust deposition. Indicative example is a local Nature Reserve with dust sensitive features.

Table 15, Table 16 and Table 17 show how sensitivity of the area should be determined for dust deposition, human health and ecosystem impacts respectively. The sensitivity of these is then derived for construction, earthworks and trackout.

Table 15: Sensitivity of the Area to Dust and Soiling Impacts on People and Property

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

Table 16: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Conc.	No. of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m³	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28 - 32 µg/m³	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24 – 28 µg/m³	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m³	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32µg/m³	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28 – 32 µg/m³	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24 - 28 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m³	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

Table 17: Sensitivity of the Area to Ecological Impacts

Receptor Sensitivity	Distance from the Source (m)	
	<20	<50
High	High	Medium
Medium	Medium	Low
Low	Low	Low

C.4 Risk of dust impacts

The dust magnitude and sensitivity of the area are then combined using the following matrices to determine the risk of impacts with no mitigation applied. For the cases where the risk category is 'negligible', no mitigation measures beyond those required by accepted best practice would be necessary.

Table 18: Risk of Dust Impacts – Level of Mitigation Required

Sensitivity of Area	Dust Emission Magnitude		
	Large	Medium	Small
Demolition			
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Earthworks			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Construction			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible
Trackout			
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

D Vehicle Emissions Modelling Methodology

D.1 Model used

All traffic modelling was undertaken using the ADMS-Roads (version 5.0) dispersion modelling package. The ADMS-Roads model is a version of ADMS, which was developed by Cambridge Environmental Research Consultants (CERC) and is commonly used throughout the UK for environmental assessment purposes. ADMS-Roads is routinely used for modelling of emissions for planning purposes to the satisfaction of local authorities.

D.2 Input data

The model requires input data that details the following parameters:

- Traffic flow data;
- Vehicle emission factors;
- Spatial co-ordinates of emissions;
- Discrete receptor points;
- Meteorological data;
- Roughness length; and,
- Monin-Obukhov length.

D.2.1 Traffic flow data

24-hour AADT flows and HDV numbers have been provided by I-Transport, the transport consultant for the project, for the following scenarios:

- Scenario 1: 2018 Baseline.
- Scenario 2: 2026 do-minimum: including Tempro growth and the committed developments identified below.
- Scenario 3: 2026 do-something: as scenario 2, plus the Proposed Development flows.

Scenario 2 and Scenario 3 include traffic generated by the following committed developments:

- Taylor Wimpey, Dandara scheme (TENT1 – Three Fields) which was being constructed, but unoccupied, at the time of surveys (planning ref: 14/00757/AS). This site includes up to 250 residential units;
- The second phase of TENT 1 (Tenterden Southern Extension Phase B) for an additional indicative capacity of 225 dwellings; and
- The Tilden Gill Road scheme that has been approved at Appeal (planning ref: 14/01420/AS) with Reserved Matters application (planning ref: 18/00448/AS) submitted in March 2018. This site includes up to 100 residential units.

The traffic data used in the assessment is presented in Table 19.

Table 19: Traffic Data (AADT)

Road link	LDV Speed (kph)	HDV Speed (kph)	Baseline 2018		Do Minimum 2026		Do Something 2026		Development Trips	
			LDVs	HDVs	LDVs	HDVs	LDVs	HDVs	LDVs	HDVs
Site Accesses (Combined)	20	20	0	0	0	0	883	0	883	0
Appledore Road(1)	64/48	59/43	6186	233	7479	251	8321	251	842	0
Woodchurch Road	48	43	3045	240	3713	259	3727	259	14	0
Beacon Oak Road	48	43	6997	110	8206	119	8704	119	499	0
East Hill/ Oaks Road	48	43	5213	151	6154	163	6485	163	330	0
Ashford Road (N)	48	43	16490	837	20277	904	20776	904	499	0
High Street(2)	38	33	16037	686	18011	741	18341	741	330	0
Ashford Road (S)	48	43	13197	617	16073	667	16073	667	0	0

Notes:

(1) The speed limit along Appledore Road will be reduced from 40 mph (64 kph) to 30 mph (48 kph) in the Do Something scenario.

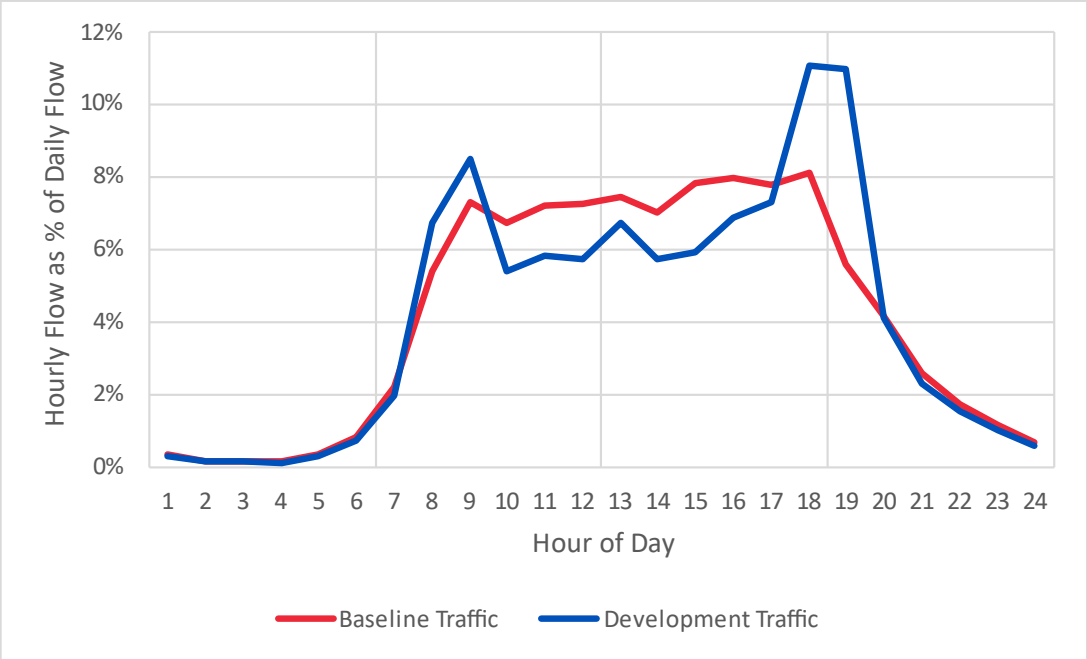
(2) Traffic on the High Street is unlikely to be free-flowing. LDVs have been modelled at 10 kph below the speed limit and HDVs at 15 kph below.

On free-flowing road sections LDVs have been modelled at the speed limit and HDVs have been modelled at 5 kph below the speed limit, apart from where detailed in Table 19. Junction approaches have been modelled at 20 kph. The slower junction approaches are generally within 25 m of the junctions but have also been extended to cover narrow sections of East Hill and Golden Square (which has been assumed to have the same traffic flow as Woodchurch Road). Reference should be made to Figure 4 of Appendix A which shows the vehicle speeds used.

D.2.2 Daily profile of traffic volume

The traffic count data shows that flows are not evenly distributed throughout the day. To account for this a time varying emission profile was applied to traffic data. The following graph shows the diurnal profile of baseline and development-generated traffic.

Figure 5: Traffic Diurnal Profile



As shown, the expected profile of traffic generated by the development is slightly different to the monitored profile. However, as the development traffic makes up a small percentage of the total traffic it is unlikely that this sight difference would significantly affect the results of the modelling. For the purpose of the dispersion modelling the baseline profile has been applied to all traffic.

D.2.3 Vehicle emission factors

Emission factors for NO_X, PM_{10} and $PM_{2.5}$ have been determined for each scenario using the traffic data and the Emissions Factors Toolkit (EFT) v 10.1 (2VC) database of road traffic emission factors within ADMS Roads. All roads were classified as “England (Urban)”.

The EFT predicts that emissions from road vehicles will reduce in future years as newer cleaner vehicles enter the fleet. However, evidence has shown that the rate of this reduction may not be occurring in the real world as fleet turnover to newer, cleaner vehicles is not as high as previously predicted. As such the assessment has considered the following scenarios:

- A worst-case which assumes there is no change to the fleet composition on the local road network between 2018 and 2026; and
- A best-case scenario in which the fleet composition changes in line with current projections which results in lower emissions .

2018 has been selected as this is the earliest year for which emissions factors are available from the EFT, and is therefore the most conservative possible choice of 'worst-case' emissions factors. As detailed in Section 4, as a conservative measure, 2018 background concentrations have been applied to the future year scenarios.

D.2.4 Spatial co-ordinates of vehicle emissions

Street locations and widths were estimated from a desk-top mapping study and referenced to UK National Grid Reference (NGR) co-ordinates.

It is not possible to enter building dimension data into the ADMS-Roads dispersion modelling software to calculate building downwash. However, it is possible to define some roads as 'street canyons'. A desk-stop study has been carried out through a review of aerial photos. Two sections of the High Street have been identified as street canyons, with height 10 m and width 16 m and 22 m. These street canyon sections are shown on Figure 4 of Appendix A.

The proposals include a set of traffic-calming measures (one-way priority shuttles) along Appledore Road. In order to represent the impact these measures have on vehicle emissions, the Do Something scenario includes an additional 20 kph 'slow-down' on Appledore Road adjacent to receptor R1. Modelling the traffic at 20 kph in this section is highly conservative as the reduction in average vehicle speed is likely to be much less in reality.

D.2.5 Discrete receptor points

The dispersion modelling study was undertaken for 22 receptor points representing residential properties along the roads affected by traffic generated by the Proposed Development. These receptor locations are presented in Table 6 and shown in Figure 4 of Appendix A.

D.2.6 Meteorological data

To calculate pollutant concentrations at identified receptor locations, the model uses sequential hourly meteorological data, including wind direction, wind speed, temperature, cloud cover and stability, which exert significant influence over atmospheric dispersion.

Sequential 1-hour meteorological data used in this assessment were taken from Gatwick Airport, located approximately 60 km west of the study area, for the period 1st January 2019 to 31st December 2019 (inclusive). There are closer meteorological stations within Kent such as Lydd, but these are coastal and unlikely to be representative of weather conditions within the study area. Ashford Council has confirmed that the use of meteorological data from Gatwick is appropriate for this study.

A wind rose of the 2019 meteorological data used as input to the model is provided in Figure 3 of Appendix A.

D.2.6.1 Roughness length

The roughness length z_0 is an important variable for dispersion models. Many studies in the past into the derivation of aerodynamic roughness for urban areas have been based upon an analysis of the city's geometrical properties or morphology.

A roughness length z_0 of 0.5 m was used within the dispersion modelling study area. This value of z_0 is recommended by CERC as appropriate for 'parkland and open suburbia' and is considered appropriate for the suburban nature of the dispersion modelling assessment area. A roughness length z_0 of 0.3 m was used for the meteorological site, which is considered appropriate for the surroundings of Gatwick Airport.

D.2.6.2 Monin-Obukhov length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. In rural areas under very stable atmospheric conditions the Monin-Obukhov length would typically be in the range 2 m to 20 m. In urban areas, there is a significant amount of heat generated from buildings and traffic, which warms the air above the town/city. For large urban areas this is known as the urban heat island. It has the effect of preventing the atmosphere from ever becoming very stable. In general, the larger the area, the more heat is generated and the stronger this effect becomes. This means that in stable conditions the Monin-Obukhov length will never fall below some minimum value; the larger the city, the larger the minimum value.

A minimum Monin-Obukhov length of 10 m has been used for the dispersion and meteorological sites, which is suitable for small towns and is considered appropriate for the location of the study area and the surroundings of Gatwick airport.

D.3 Background data

For the purpose of the assessment the mapped background concentrations for each receptor point have been extracted from the DEFRA 2018 mapped background dataset. There is considerable uncertainty as to how background pollutant concentrations will change in the future, so as a conservative measure the 2018 background pollutant concentrations have been applied to the future year (2026) scenarios – i.e. assuming no reduction in background pollutant concentrations.

D.4 Post modelling - conversion from NOx to nitrogen dioxide (NO_2)

The modelled road-NOx and the mapped background concentrations have been used as inputs in DEFRA's NOx to NO_2 calculator (V8.1) to convert modelled NOx to NO_2 in accordance with the methodology outlined in LAQM.(TG16).

When converting from NOx to NO_2 the following inputs have been used:

- The year has been taken as the same as the emissions data, i.e. 2018 or 2026 as appropriate;
- The local authority has been selected as "Ashford"; and
- The traffic mix has been selected as "All other urban UK traffic".

D.5 Verification

The ADMS Model has been validated against real world monitoring, however LAQM.TG(16) recommends that the model output is verified. The verification process should involve the comparison between predicted and measured concentrations at suitable local sites. However, as

detailed in Section 4.5 there are currently no monitoring locations available for model verification and as such it is not possible to verify the model outputs. The use of 'worst case' and 'best case' emissions scenarios detailed in Section D.2.3 is intended to mitigate against potential underprediction of vehicle emissions caused by a lack of data available for verification.

Part of the verification process would involve improvements to the base model to provide a better representation of the monitored data. This includes checks on:

- Traffic data;
- Road widths;
- Distance between sources and monitoring locations;
- Speed estimates;
- Street canyons;
- Background concentrations; and
- Monitoring data.

All of these have been reviewed and the model refined to increase the accuracy as much as possible.

As shown in Section 4.5, Ashford Council operated one nitrogen dioxide monitoring location (ref: AS07) in Tenterden until July 2015. This was located at the junction of the A28 and the B2082 towards the western end of Tenterden. It is not possible to use this site for model verification for the following reasons:

- The year of the traffic data and monitoring data must align; baseline traffic data for 2015 and earlier is not available;
- The latest version of the EFT does not contain emissions factors for years earlier than 2018; and
- Traffic data for the A28 is based on counts to the east of this site close to the town centre, and would not necessarily be representative of traffic further west. In addition, traffic data for the B2082 is not available for this study. As such it is not possible to accurately model vehicle emissions at this location.

Nonetheless, the monitored concentrations at this location presented in Section 4.5 can be compared to the maximum baseline concentrations for 2018 predicted in the dispersion modelling to give an indication of model performance. The monitored concentrations show a generally decreasing trend from 2011 – 2015, with the annualised concentration in 2015 being 21.1 µg/m³. As shown in Table 20 the maximum baseline (2018) concentration predicted at a receptor location is 20.8 µg/m³. Given that the maximum modelled concentration is similar to the concentration monitored in 2015, albeit at a different location, there is good confidence that the model is performing well.

E Detailed Results Tables

Table 20: Annual Mean Nitrogen Dioxide – 2018 Emissions Factors

Receptor	Background (µg/m³)	2018 Baseline		2026 Do-Minimum		2026 Do-Something		Impact		
		µg/m³	% AQAL	µg/m³	% AQAL	µg/m³	% AQAL	µg/m³	% AQAL	Impact Descriptor
R1	8.37	10.70	26.8%	11.09	27.7%	12.66	31.7%	1.57	3.93%	Negligible
R2	8.37	9.45	23.6%	9.63	24.1%	10.08	25.2%	0.45	1.13%	Negligible
R3	8.37	11.84	29.6%	12.38	31.0%	12.92	32.3%	0.54	1.35%	Negligible
R4	9.40	12.97	32.4%	13.56	33.9%	13.77	34.4%	0.21	0.52%	Negligible
R5	9.40	14.48	36.2%	15.33	38.3%	15.56	38.9%	0.23	0.58%	Negligible
R6	9.40	14.26	35.7%	15.08	37.7%	15.28	38.2%	0.20	0.50%	Negligible
R7	8.37	12.63	31.6%	13.30	33.3%	13.56	33.9%	0.26	0.65%	Negligible
R8	9.40	12.93	32.3%	13.50	33.8%	13.62	34.1%	0.12	0.30%	Negligible*
R9	9.40	14.07	35.2%	14.80	37.0%	14.96	37.4%	0.16	0.40%	Negligible*
R10	9.40	12.92	32.3%	13.47	33.7%	13.64	34.1%	0.17	0.43%	Negligible*
R11	9.40	13.95	34.9%	14.62	36.6%	14.86	37.2%	0.24	0.60%	Negligible
R12	8.78	16.68	41.7%	17.99	45.0%	18.14	45.4%	0.15	0.38%	Negligible*
R13	8.78	15.15	37.9%	16.22	40.6%	16.29	40.7%	0.07	0.18%	Negligible*
R14	9.40	13.68	34.2%	14.39	36.0%	14.56	36.4%	0.17	0.42%	Negligible*
R15	9.40	11.77	29.4%	12.17	30.4%	12.26	30.7%	0.09	0.22%	Negligible*
R16	9.40	17.34	43.4%	18.20	45.5%	18.32	45.8%	0.12	0.30%	Negligible*
R17	9.40	12.35	30.9%	12.84	32.1%	12.95	32.4%	0.11	0.27%	Negligible*
R18	9.40	16.90	42.3%	17.66	44.2%	17.78	44.5%	0.12	0.30%	Negligible*
R19	9.40	20.81	52.0%	21.94	54.9%	22.11	55.3%	0.17	0.42%	Negligible*
R20	9.40	20.84	52.1%	21.96	54.9%	22.13	55.3%	0.17	0.42%	Negligible*
Note: *Negligible irrespective of the total concentration										

Table 21: Annual Mean Nitrogen Dioxide – 2026 Emissions Factors

Receptor	Bg (µg/m³)	Do-Minimum		Do-Something		Impact		
		µg/m³	% AQAL	µg/m³	% AQAL	µg/m³	% AQAL	Impact Descriptor
R1	8.37	9.55	23.9%	10.22	25.6%	0.67	1.68%	Negligible
R2	8.37	8.92	22.3%	9.11	22.8%	0.19	0.47%	Negligible*
R3	8.37	10.10	25.3%	10.34	25.9%	0.24	0.60%	Negligible
R4	9.40	11.21	28.0%	11.31	28.3%	0.10	0.25%	Negligible*
R5	9.40	11.97	29.9%	12.08	30.2%	0.11	0.27%	Negligible*
R6	9.40	11.84	29.6%	11.94	29.9%	0.10	0.25%	Negligible*
R7	8.37	10.54	26.4%	10.66	26.7%	0.12	0.30%	Negligible*
R8	9.40	11.14	27.9%	11.20	28.0%	0.06	0.15%	Negligible*
R9	9.40	11.70	29.3%	11.78	29.5%	0.08	0.20%	Negligible*
R10	9.40	11.18	28.0%	11.26	28.2%	0.08	0.20%	Negligible*
R11	9.40	11.72	29.3%	11.83	29.6%	0.11	0.27%	Negligible*
R12	8.78	12.70	31.8%	12.77	31.9%	0.07	0.17%	Negligible*
R13	8.78	11.95	29.9%	11.98	30.0%	0.03	0.08%	Negligible*
R14	9.40	11.54	28.9%	11.62	29.1%	0.08	0.20%	Negligible*
R15	9.40	10.60	26.5%	10.65	26.6%	0.05	0.12%	Negligible*
R16	9.40	13.14	32.9%	13.20	33.0%	0.06	0.15%	Negligible*
R17	9.40	10.89	27.2%	10.95	27.4%	0.06	0.15%	Negligible*
R18	9.40	12.94	32.4%	12.99	32.5%	0.05	0.12%	Negligible*
R19	9.40	14.83	37.1%	14.91	37.3%	0.08	0.20%	Negligible*
R20	9.40	14.84	37.1%	14.92	37.3%	0.08	0.20%	Negligible*
Note: *Negligible irrespective of the total concentration								

Table 22: Annual Mean Particulate Matter as PM_{10} – 2018 Emissions Factors

Receptor	Bg (µg/m³)	2018 Baseline		2026 Do-Minimum		2026 Do-Something		Impact		
		µg/m³	% AQAL	µg/m³	% AQAL	µg/m³	% AQAL	µg/m³	% AQAL	IAQM Impact Descriptor
R1	14.12	14.54	36.3%	14.61	36.5%	14.70	36.7%	0.09	0.23%	Negligible*
R2	14.12	14.31	35.8%	14.34	35.9%	14.38	35.9%	0.03	0.08%	Negligible*
R3	14.12	14.60	36.5%	14.68	36.7%	14.73	36.8%	0.05	0.13%	Negligible*
R4	14.03	14.52	36.3%	14.60	36.5%	14.63	36.6%	0.03	0.07%	Negligible*
R5	14.03	14.72	36.8%	14.84	37.1%	14.88	37.2%	0.03	0.09%	Negligible*
R6	14.03	14.69	36.7%	14.81	37.0%	14.84	37.1%	0.03	0.08%	Negligible*
R7	14.12	14.70	36.8%	14.80	37.0%	14.84	37.1%	0.04	0.09%	Negligible*
R8	14.03	14.50	36.2%	14.58	36.5%	14.60	36.5%	0.02	0.04%	Negligible*
R9	14.03	14.65	36.6%	14.76	36.9%	14.78	37.0%	0.02	0.06%	Negligible*
R10	14.03	14.53	36.3%	14.61	36.5%	14.64	36.6%	0.03	0.06%	Negligible*
R11	14.03	14.68	36.7%	14.78	37.0%	14.82	37.0%	0.04	0.09%	Negligible*
R12	14.55	15.62	39.1%	15.83	39.6%	15.85	39.6%	0.02	0.06%	Negligible*
R13	14.55	15.44	38.6%	15.60	39.0%	15.61	39.0%	0.01	0.03%	Negligible*
R14	14.03	14.64	36.6%	14.74	36.9%	14.77	36.9%	0.03	0.06%	Negligible*
R15	14.03	14.42	36.1%	14.49	36.2%	14.51	36.3%	0.02	0.04%	Negligible*
R16	14.03	15.10	37.8%	15.23	38.1%	15.25	38.1%	0.02	0.05%	Negligible*
R17	14.03	14.53	36.3%	14.61	36.5%	14.63	36.6%	0.02	0.05%	Negligible*
R18	14.03	15.22	38.0%	15.35	38.4%	15.37	38.4%	0.02	0.05%	Negligible*
R19	14.03	15.91	39.8%	16.11	40.3%	16.15	40.4%	0.03	0.08%	Negligible*
R20	14.03	15.92	39.8%	16.12	40.3%	16.15	40.4%	0.03	0.08%	Negligible*
Note: *Negligible irrespective of the total concentration										

Table 23: Annual Mean Particulate Matter as $PM_{2.5}$ – 2018 Emissions Factors

Receptor	Bg (µg/m³)	2018 Baseline		2026 Do-Minimum		2026 Do-Something		Impact		
		µg/m³	% AQAL	µg/m³	% AQAL	µg/m³	% AQAL	µg/m³	% AQAL	IAQM Impact Descriptor
R1	9.23	9.47	47.4%	9.51	47.6%	9.58	47.9%	0.07	0.33%	Negligible*
R2	9.23	9.34	46.7%	9.36	46.8%	9.38	46.9%	0.02	0.11%	Negligible*
R3	9.23	9.52	47.6%	9.57	47.8%	9.60	48.0%	0.03	0.17%	Negligible*
R4	9.39	9.68	48.4%	9.73	48.7%	9.75	48.7%	0.02	0.09%	Negligible*
R5	9.39	9.81	49.0%	9.88	49.4%	9.90	49.5%	0.02	0.11%	Negligible*
R6	9.39	9.79	48.9%	9.86	49.3%	9.88	49.4%	0.02	0.09%	Negligible*
R7	9.23	9.58	47.9%	9.64	48.2%	9.66	48.3%	0.02	0.11%	Negligible*
R8	9.39	9.67	48.4%	9.72	48.6%	9.73	48.7%	0.01	0.05%	Negligible*
R9	9.39	9.76	48.8%	9.83	49.1%	9.84	49.2%	0.01	0.07%	Negligible*
R10	9.39	9.69	48.4%	9.74	48.7%	9.75	48.8%	0.02	0.08%	Negligible*
R11	9.39	9.78	48.9%	9.84	49.2%	9.86	49.3%	0.02	0.11%	Negligible*
R12	9.49	10.14	50.7%	10.26	51.3%	10.28	51.4%	0.01	0.07%	Negligible*
R13	9.49	10.02	50.1%	10.12	50.6%	10.13	50.7%	0.01	0.03%	Negligible*
R14	9.39	9.75	48.8%	9.82	49.1%	9.83	49.2%	0.02	0.08%	Negligible*
R15	9.39	9.62	48.1%	9.66	48.3%	9.67	48.3%	0.01	0.05%	Negligible*
R16	9.39	10.04	50.2%	10.11	50.6%	10.12	50.6%	0.01	0.06%	Negligible*
R17	9.39	9.68	48.4%	9.73	48.6%	9.74	48.7%	0.01	0.06%	Negligible*
R18	9.39	10.09	50.5%	10.17	50.8%	10.18	50.9%	0.01	0.06%	Negligible*
R19	9.39	10.50	52.5%	10.62	53.1%	10.64	53.2%	0.02	0.09%	Negligible*
R20	9.39	10.50	52.5%	10.62	53.1%	10.64	53.2%	0.02	0.09%	Negligible*
Note: *Negligible irrespective of the total concentration										

Table 24: Do-Something Concentrations at Proposed Receptor Locations – 2018 Emissions Factors

Receptor	Nitrogen Dioxide			PM_{10}			$PM_{2.5}$		
	Bg µg/m³	Total conc. µg/m³	% AQAL	Bg µg/m³	Total conc. µg/m³	% AQAL	Bg µg/m³	Total conc. µg/m³	% AQAL
PR1	8.37	10.55	26.4%	14.12	14.50	36.2%	9.23	9.61	48.0%
PR2	8.37	9.54	23.9%	14.12	14.31	35.8%	9.23	9.42	47.1%

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