OTTERPOOL PARK

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ENVIRONMENTAL STATEMENT

OP5 CHAPTER 6 - **AIR QUALITY**

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March 2022

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OTTERPOOL PARK

Environmental Statement Volume 2: Main ES
Chapter 6: Air Quality

MARCH 2022

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6 Air Quality

6.1 Introduction

6.1.1 This chapter of the ES assesses the impact of construction and operation of the proposed Development with respect to Air Quality. The assessment includes consideration of construction phase impacts on local air quality and construction dust, and consideration of operational phase impacts on local air quality, limit values, ecological receptors and odour.

6.1.2 This Chapter should be read in conjunction with Chapters 1-4 (the introductory chapters) and Chapter 7: Biodiversity.

6.1.3 It has also been prepared alongside and informed by ES Appendices 6.1- 6.9. ES Appendix 6.1 contains Figures 6.1 to 6.7.

Relevant Aspects of the Proposed Development

Construction Phase

6.1.4 The construction phase associated with the proposed Development encompasses the 19-year period between 2023 and 2042 for 8,500 homes. The duration and extent of the construction phase means there is the potential for significant adverse dust emissions and long-term impacts from dust and construction vehicle emissions.

6.1.5 Construction dust is typically emitted during the preparation of the land (for instance demolition, land clearance, and earth movement) and during construction. A large proportion of dust emissions are sourced to site plant and vehicles moving over temporary roads and open ground. These vehicles may then travel onto the local road network and deposit mud and dust onto the roads meaning that dust emissions can occur relatively far from site boundaries. The magnitude of dust impacts is dependent on the effectiveness of dust suppression and additional mitigation measures which are applied.

6.1.6 Additionally, the scale and duration of the build out of the proposed Development means that there would be a number of additional journeys to and from the site through the increased use of construction vehicles which may impact on air quality in terms of exhaust emissions. Chapter 4: The site and proposed Development identifies the peak construction year as 2030 (i.e. the year with the greatest number of construction vehicle movements).

6.1.7 Additionally, the Framework Masterplan is expected to provide a further 1,500 homes anticipated to be completed approximately 2 years after the completion of the proposed Development, i.e. in 2044. The first on-site residential occupation is scheduled for 2024, therefore the site would be partially operational whilst the remainder of the proposed Development is built out. Therefore, there is the potential for receptors to be impacted on, within, and adjacent to the outline planning application site boundary and Framework Masterplan boundaries both during operational and construction phases.

Operational Phase

6.1.8 The construction of 8,500 residential units (and a further 1,500 in the proposed Framework Masterplan) and supporting employment and education infrastructure means that a significant number of additional vehicle trips would be generated as the proposed Development is constructed and becomes occupied. The exhaust emissions associated with the additional vehicle trips generated have the potential to impact on local air quality. Both existing receptors (adjacent to the existing road network in the

vicinity of the application site) and future (on site) receptors may be affected by the additional vehicle journeys.

6.1.9 The exact specification and schedule of energy provision has not been finalised. However, it is anticipated that there would be no significant fossil-fuel point source emissions such as on-site energy centre(s) or Combined Heat and Power (CHP) units, therefore emissions from these sources are scoped out of this stage of assessment. Further detail on energy is provided in the Energy Strategy (ES Appendix 4.9).

6.1.10 The operational assessment therefore focusses on the impact of transport emissions on local air quality.

6.1.11 The proposed Development also includes provision of an on-site WwTW however there is currently insufficient detail in terms of design and input parameters to undertake a quantitative odour assessment. A qualitative risk-based odour assessment has therefore been undertaken to provide a general indication of potential effects in this Chapter. However, a quantitative odour assessment incorporating dispersion modelling should be undertaken during Tier 3 to ensure that there are no unacceptable impacts as a result of odour from the operation of the plant. Folkestone & Hythe District Council's (F&HDC's) environmental health team were consulted on this approach and had no objections.

6.1.12 The potential effects on carbon dioxide emissions as a result of increased heating/power demand have been examined in the separate Energy Strategy (ES Appendix 4.9) that is submitted in support of the Outline Planning Application (OPA).

6.2 Assessment Methodology

Legislation, Policy and Guidance

Legislation

6.2.1 The following pieces of legislation are relevant to the assessment:

- Part IV of the Environment Act (1995) (Ref 6.1): requires the government to produce a national Air Quality Strategy which contains standards, objectives and measures for improving quality. The ambient air quality standards and objectives relevant to air quality assessment are given statutory backing in England through the Air Quality Regulations (2000) (Ref 6.2), the Air Quality (Amendment) Regulations (2002) (Ref 6.3) and the Air Quality Standards Regulations (2007) (Ref 6.4). The Air Quality Standards Regulations (2010) (Ref 6.5) came into force during 2011 and transposed the requirements of the European Union Directive 2008/50/EC (Ref 6.6). Pursuant to the European Union (Withdrawal) Act (2018) (Ref 6.7), law derived from the EU has been converted into domestic law following the UK's withdrawal from the European Union. The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations (2019) (Ref 6.8) made amendments to the Air Quality Standards Regulations (2010) to transpose provisions of the EU Ambient Air Quality Directive (2008/50/EC). The Environment Act 2021 (Ref 6.9) establishes a legally binding duty to bring forward at least two new air quality targets in secondary legislation by 31st October 2022; target objectives under consideration include reducing the annual mean level of PM2.5 and reducing population exposure to PM2.5.
- Environmental Protection Act (1990) (Ref 6.10): The main requirements with respect to dust control from industrial or trade premises not regulated under the Environmental Permitting (England and Wales) Regulations 2010 and subsequent amendments, such as construction sites, are those provided in Section 79 of Part III of the Environmental Protection Act 1990.

Policy

6.2.2 The following policy documents are of relevance to the assessment and are summarised in Table 6-1.

Table 6-1: Summary of relevant Adopted Policies

Document	Policy	Summary of Requirements	Project Response
Air Quality Plan for tackling roadside nitrogen dioxide concentrations in South East (UK0031) (Ref 6.11)	Section 1.3 Zone Status	The Air Quality Plan (AQP) sets out the respective anticipated dates of compliance in 2023 and 2024 with the Air Quality Limits in South East England when baseline measures to reduce NO_2 are considered and when additional measures detailed in the Air Quality Plan for nitrogen dioxide (NO_2) in UK (2017) (Ref 6.12) are considered.	The assessment contains an appraisal of the compliance risk associated with the proposed Development in 2024 and 2030. Assessment of compliance risk was screened out for 2044. It is carried out in broad accordance with National Highways Design Manual for Roads and Bridges (DMRB) LA 105 – Air Quality.
National Planning Policy Framework (NPPF, 2021) (Ref 6.13)	Paragraph 105 - Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes.	Consideration of sustainability in terms of transport choices serves to reduce congestion and emissions and improve air quality and public health.	A number of measures have been embedded in the design of the proposed Development to minimise the number of trips generated in the operational phase and to minimise congestion. These are considered in section 6.5.
	Paragraph 186 – Planning policies and decisions should sustain and contribute towards compliance with relevant limit values/objectives and take into account the presence of Air Quality Management Areas and Clean Air Zones, and cumulative impacts from individual sites in local areas.	The NPPF details the various significant considerations that should be made when making planning decisions and writing planning policy.	The assessment gives an indication of whether objectives will be exceeded as a result of the proposed Development in section 0. The baseline review (section 6.3) undertaken for the assessment indicates that there are no Clean Air Zones or Air Quality Management Areas in the vicinity of the proposed Development. Additionally, as a result of the scoping opinion, the impact of the development on an AQMA in Canterbury (outside of the traffic microsimulation area) has been subject to a sensitivity test, as presented in ES Appendix 6.7. An assessment of the compliance risk (with regards to the Air Quality Limits) associated with the operational phase of the proposed Development is presented in section 0.

Document	Policy	Summary of Requirements	Project Response
Folkestone & Hythe District Council Core Strategy Review 2022 (Ref 6.14	Aim B2 (*Minimise local carbon emissions, monitor and manage air quality, control pollutants and promote sustainable waste management*) of Strategic Need B '*The challenge to enhance management and maintenance of natural and historic assets'*	The aim states that local carbon emissions should be minimised, (good) air quality should be managed (particularly along A20 corridor) and maintained and pollutants should be controlled.	The impact on carbon emissions is presented in Chapter 8: Climate Change of the ES. The air quality assessment appraises whether the proposed Development is likely to result in an unacceptable impact on existing air quality. The risk of construction dust impacts (unmitigated) has been evaluated and has prompted the recommended application of a number of construction phase mitigation measures (fully detailed in ES Appendix 6.3) which are embedded into the Outline Code of Construction Practice (CoCP)(ES Appendix 4.17) which ensures that dust is controlled during construction. Significance of effects for construction dust was evaluated based on residual effects after implementation of embedded design mitigation (CoCP). Impacts along M20 and A20 corridor have been appraised in section 0.
	Policy SS7: New Garden Settlement – Place Shaping Principles	Policy SS7 states a distance buffer should be implemented between the Garden Settlement and the M20/High Speed transport corridor for air quality and noise purposes. The Policy adds that this barrier should be created through planting and habitat creation.	Further information relating to this saved policy is presented in Chapter 4: The site and the proposed Development and Chapter 7: Biodiversity.
Folkestone & Hythe Places and Policies Plan (2020) (Ref 6.16)	T4: Parking for Heavy Goods Vehicles (HGVs)	The policy discusses that F&HDC will improve parking and service facilities for HGVs. Proposals for the mitigation of air quality from HGVs will need to be specifically addressed in any application.	The Transport Assessment (ES Appendix 16.4) contains a number of features which have been employed to minimise the number of HGV movements travelling to and from the proposed Development.

Guidance

6.2.3 The following guidance documents are of relevance to the assessment and are discussed below:

- The National Planning Practice Guidance (2014, updated 2019) (Ref 6.17): The Government has revised and updated national planning practice guidance to support the NPPF in order to make it more accessible. The guidance includes advice relating to; planning and air quality, the role of Local Plans with regard to air quality, when air quality is likely to be relevant to a planning decision, what

should be included within an air quality assessment and how impacts on air quality can be mitigated. The assessment follows the guidance which contains recommendations when undertaking an air quality assessment for the purpose of applying NPPF policy. The guidance encourages early communication with local planning and environmental health departments, which has been included in the proposed Development assessment work undertaken to date.

6.2.4 For construction phase impacts the following guidance was used to inform the assessment:

- Holman et al (2014). IAQM Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London (Ref 6.18), hereafter referred to as the 'IAQM (2014) construction dust guidance'): The Institute of Air Quality Management (IAQM) construction dust guidance provides a mechanism for the assessor to consider both the magnitude of emissions and sensitivity of an area in order to define the level of risk of dust soiling and human health impacts during the construction phase.

6.2.5 For the assessment of operational impacts, the following guidance was followed:

- Moorcroft and Barrowcliffe et al. (2017) Land-use Planning & Development Control: Planning for Air Quality. v1.2. Institute of Air Quality Management, London (Ref 6.19). *(*Hereby referred to as the 'IAQM (2017) development control guidance'): The IAQM Land Use Planning and Development Control guidance is applicable for assessing the effect of changes in exposure of members of the public resulting from residential-led mixed-use developments such as the proposed Development and Framework Masterplan. It provided guidance on; how to decide whether an air quality assessment is required, how to undertake a suitable assessment of operational impacts and whether these are to be considered significant or not, and how to identify whether additional mitigation is required. This guidance also provides detail on how to carry out a damage cost assessment as a means of estimated the level of emissions offsetting required.
- National Highways Design Manual for Roads and Bridges (DMRB) LA 105 (Ref 6.20) provides guidance on how to assess the impact of traffic emissions on human health and the risk assessment related to compliance with the air quality Limit Values.
- Holman et al (2020). A guide to the assessment of air quality impacts on designated nature conservation sites – version 1.1, (Hereby referred to as the 'IAQM (2020) ecological guidance' (Ref 6.21). This document has been produced by the IAQM to assist its members in the assessment of the air quality impacts of development on designated nature conservation sites. It may also be useful for ecologists, who use the results of air quality assessments (AQAs) to evaluate the effects of air pollution on habitats and species, by increasing their understanding of the information provided by air quality specialists. This document focuses on air quality assessments in support of Habitats Regulations Assessments (HRA), but its' principles can be used as the basis for assessing the air quality impact on national or local designated nature conservation sites.
- Bull et al (2018) IAQM Guidance on the assessment of odour for planning – version1.1, (Ref 6.22) (hereby referred to as the 'IAQM odour guidance'. This document provides advice on the qualitative and quantitative assessment of odour for developments such as waste-handling, wastewater treatment works (WwTWs), some industrial processes and rural activities.

Consultation and Scoping

Consultation

6.2.6 Table 6-2 provides a summary of the consultation undertaken for this chapter prior to and following the submission of the 2019 application (Y19/0257/ FH). The table summarises how the comments have been addressed in this chapter, where relevant.

Table 6-2: Summary of Consultation undertaken with F&HDC.

Consultee/ Contact	Date	Summary of Consultee Issue	Outcome
F&HDC (Environmental Protection Officer, Environmental Health)	October 2016	Arcadis requested F&HDC 2016 Annual Summary Report detailing baseline air quality data	Report supplied by F&HDC.
	March 2017	Agreement is sought on proposed Arcadis monitoring locations	F&HDC happy with method and location of Arcadis monitoring.
	March 2018	Arcadis requested F&HDC 2017 Annual Summary Report detailing baseline air quality data	Report supplied by F&HDC.
	September 2018	Arcadis sought feedback from F&HDC on proposed assessment years, rationale for assessment, and aspects to be screened out	F&HDC indicated agreement with proposals, stating proposed assessment and modelling years are considered a reasonable approach and added no further comments.
Consultations since 2019 **This mainly includes addressing the following LPA and key consultee comments to the previously submitted Outline Planning Application Otterpool Park (Y19/2057/FH)**			
Temple on behalf of F&HDC, Interim Review Report	April 2019	*The Applicant should provide bias adjustment and annualisation calculations for the baseline monitoring survey as these were not included in the ES Air Quality Chapter or Appendix.*	The bias adjustment and annualisation calculations are provided in ES Appendix 6.2 Model Verification.
	2019	*The Applicant should clarify whether the dust risk in Table 6-16* [of the 2019 ES] *is applicable for the duration of construction works across all development zones.*	The findings of the dust risk assessment presented in this chapter have been assumed to be representative of all development zones as the exact locations and durations of construction activities have not been finalised; therefore, a number of conservative assumptions have been made to ensure that dust would be adequately controlled during construction. Mitigation measures commensurate with a high-risk site have been recommended in order to prevent or minimise dust emissions.
	2019	The following comments all concern the Canterbury AQMA No.3 Sensitivity Test	Responses to these queries were provided to F&HDC during 2019.

Consultee/ Contact	Date	Summary of Consultee Issue	Outcome
		that was presented alongside the 2018 Environmental Statement Air Quality Chapter: *The Applicant should clarify why the LDV of 161 at 2029 at Nackington Road has not been assessed* *The Applicant should clarify why 2022 was not included in the Sensitivity Test.* *The Applicant should clarify why Old Dover Road was not included in the Canterbury AQMA Sensitivity Test.*	The assessment presented in the Environment Statement provides an updated Canterbury Sensitivity Test where justifications are provided for screening in or out the various assessment years. The findings of the test are provided in ES Appendix 6.7 Canterbury AQMA No.3 Sensitivity Test.
	2019	*The Applicant should provide information on the proposed energy provision for the site as it is not included in the ES Air Quality Chapter. A detailed air quality assessment should be undertaken of any centralised boiler or CHP plant proposed.*	The Energy Strategy (ES Appendix 4.9) provides the detail on the current outline energy options. The current preferences are for non-centralised energy and heat which would be provided by connecting the proposed Development to the existing national gas and electricity infrastructure. However, should the design evolve to explicitly include a significant fossil-fuelled point source such as a gas CHP, then a further air quality assessment would be carried out to quantify the impacts.
	2019	*Vehicle flows associated with committed developments were considered. However, the Applicant should consider cumulative effects in the construction dust assessment.*	This assessment has identified the developments that lie within 500m of the proposed Development and has attempted to establish whether those developments are high risk. Further detail is provided in the cumulative effects section.
F&HDC (Environmental Protection Officer, Environmental Health)	May 2021	Clarification sought by Arcadis on requested damage cost assessment. A method was agreed on whereby the damage cost assessment produced for Tier 1 (the OPA) would be indicative rather than binding and that phase specific assessments would be carried out in due course at Tier 3 as and when the designs are more mature for those areas to be built out.	Assessment approach agreed. However, due to the uncertainty of the assessment at this stage, specific figures have not been presented within the report.
	May 2021	Permission was sought to defer Odour Assessment to Tier 3 owing to a lack of certainty on specification and location of WwTWs at OPA stage.	This approach was agreed with F&HDC, however this chapter contains a qualitative assessment of odour in relation to the proposed WwTW.
Natural England (Lead Advisor,	March 2021	Natural England were contacted regarding approach to assessment of air quality impacts on European sites (Folkestone to Etchinghill SAC) with	Natural England acknowledged receipt of the initial query. No response has been received at the time of writing; therefore it has

Consultee/ Contact	Date	Summary of Consultee Issue	Outcome
Sussex and Kent)		regards to deferring to the findings of the local plan HRA.	been assumed that the proposed approach is agreed.

Scoping

6.2.7 A previous EIA Scoping Opinion was undertaken for the 2019 application, where relevant, the comments from this process have been incorporated within Table 6-3. For this amended application, a request for a Scoping Opinion was submitted to F&HDC in June 2020. This outlined the work that had been undertaken to date and sets out the proposed approach to the EIA. A Scoping Opinion was issued by F&HDC in July 2020. Table 6-4 provides a summary of the scoping opinion comments relevant to this chapter, and how they have been addressed.

6.2.8 Additionally, a Scoping Addendum was submitted on 5 October 2021 to outline key changes to the application. These comprised additional land in the north-west corner of the site for provision of the wastewater treatment works (WWTW), additional land for highway junction works at Newingreen Junction, minor amendments to clarify land ownership boundaries and a change in the assessment approach in relation to the future uses of Westenhanger Castle. A response was received from F&HDC on this Scoping Addendum as set out in Chapter 2: EIA Approach and Methodology. All relevant changes since the submission of the scoping report have been assessed in this ES.

Table 6-3: Summary of Scoping Opinion and further consultation

Consultee/Contact	Summary Scoping Opinion Response	Location in the ES
F&HDC	The 2020 Scoping Report notes that there is a relatively long construction timeframe (25 years (now 19)) and phasing is not known. A reasonable worst case scenario approach should be taken to construction phasing, taking into account early phase occupation as well as the order in which retail and community infrastructure is delivered, which will have implications particularly for noise, air quality, traffic, socioeconomics, health, and landscape and visual impact. We recommend a section or broader commentary explaining how reasonable worst-case assessments have been derived and whether any sensitivity testing has been applied to allow for flexibility within any future uses.	A worst-case scenario approach has been taken for the construction dust assessment and is presented in section 6.4. The peak construction year has been assessed as 2030 is anticipated to be the busiest year in terms of residential units built and non-residential floor space created. The assessment of 2044 development vehicle flows using 2030 air quality tools is likely to be worst case. Evaluation of whether impacts constitute a significant effect are presented in section 0. We have not undertaken any sensitivity testing for variations of future use, given the 3-Tier system developed since this comment
F&HDC	It should be clearly stated in the ES whether the energy centre will provide for the whole development. The ES should contain sufficient details of the type of energy generating facility being	No energy centre is included in the current proposed Development design.

Consultee/Contact	Summary Scoping Opinion Response	Location in the ES
	proposed and an assessment of environmental effects. If a temporary solution is required because of phasing, this also needs to be assessed.	
F&HDC	Methodology proposed and assessment of significance of effects in relation to air quality considered acceptable.	Methodology detailed in section 6.2, significance of effects presented in section 0.
F&HDC	A sensitivity test will be undertaken to understand effects on the AQMAs located in Canterbury. The locations assessed within these AQMAs should be fully justified.	A sensitivity test has been carried out using available traffic data on two roads in Canterbury. Please refer to the limitations section and ES Appendix 6.7 for findings of the sensitivity test.
F&HDC	Any land use which could give rise to significant odour effects requires an odour assessment.	The permitted waste facility (PWF) at Otterpool Quarry has already been subject to odour assessment when planning permission was sought by the landowner. This assessment was carried out against the EA's H4 odour criteria, which are still used as the basis of odour guidance today, such as that published by the IAQM. The assessment concluded that the potential for residual odour effects would be negligible given the limited potential for odour generation at the facility and indeed with the implementation the recommended odour abatement processes. The proposed Development would not introduce any new exposure at locations closer than those assessed as the proposed development would seek to adopt a buffer zone should the PWF site be realised. The proposed Development includes provision of a WwTW, which is the only proposed land use known at this stage that would require an odour assessment, quantitative assessment of this has been screened out of the assessment owing to a lack of design detail at this stage. Instead, it is assessed in a qualitative risk-based manner in this chapter. It has been agreed with F&HDC that a quantitative assessment should be produced at Tier 3 (secured by planning condition at OPA stage) when the design is sufficiently detailed to be assessed in such a manner.
F&HDC	The assessment of construction dust risk will be based on a worst-case construction scenario. This should consider the potential for effects on on-site receptors such as early residents of the development.	The construction dust assessment is presented in section 6.4. The assessment concludes that the site is high risk and that mitigation measures commensurate with the risk should be implemented to avoid effects. This applies to both existing and future residents.

Consultee/Contact	Summary Scoping Opinion Response	Location in the ES
F&HDC	A quantitative assessment of odour has been scoped out of this assessment. The Applicant proposes that the Household Waste Recycling Centre and Waste Transfer Station requested by Kent County Council (KCC) would be located off-site. If this is located on-site, an odour assessment would be necessary. An odour assessment may also be necessary for any other odorous land uses that might be proposed on site, or if the proposed Development would provide new residential receptors near to odour generating activities.	Refer to response above in relation to comment: *'Any land use which could give rise to significant odour effects requires an odour assessmen*t.'
F&HDC	It is noted that the extant planning permission for a Permitted Waste Facility and anaerobic digestion plant at Otterpool Quarry is situated within the application site boundary and that the Applicant proposes to justify the loss of this facility rather than need to accommodate a buffer around it. If this approach is revised prior to planning submission, and the facility is expected to be developed, the site suitability assessment and odour assessment would need to consider this facility.	The extant planning permission for the PWF has been considered in terms of induced road traffic by comparing emissions rates on local roads with the proposed Development design (which replaces the facility with housing) and those which would be likely to occur from the operation of vehicles associated with the extant planning permission for the waste site. The assessment provides the predicted cumulative impact and is detailed in Section 6.7. The air quality assessment undertaken in support of the 2007 application for the PWF has already assessed odour effects (Ref 6.23) and concluded that the potential for residual odour impacts would be negligible given the limited potential for odour generation at the facility. Additionally, the implementation of the recommended odour abatement processes is secured by Condition 21 of the Decision Notice for SH/08/124. The proposed Development would not introduce any new exposure at locations closer than those assessed as the proposed development would seek to adopt a buffer zone should the PWF permission be realised. Therefore, it is considered that the cumulative effects with the PWF, due to traffic and odour impacts, would be not significant. According to the air quality assessment undertaken for the PWF, the quantification of the impact of stack emissions from the operation of the proposed gas combustion plant was to be carried out when applying for a permit to operate from the Environment Agency. This is discussed in the Limitations section.

Consultee/Contact	Summary Scoping Opinion Response	Location in the ES
F&HDC	The air quality cumulative assessment scope states that it will incorporate all of the cumulative scheme listed in Appendix B of the 2020 Scoping Report. This is considered unlikely to be practicable. The cumulative assessment of the air quality effects of traffic will incorporate the same cumulative schemes as the traffic assessment –this is acceptable. The cumulative dust risk assessment should consider schemes in close proximity to the site that would be under construction at the same time as the proposed Development.	This is correct, the air quality model incorporates the cumulative schemes as the Transport Assessment (ES Appendix 16.4). Further information is presented in the cumulative effects section.
Canterbury City Council (CCC)	The development may generate significant vehicle movements which may impact on Air Quality Management Areas (AQMAs) located in Canterbury.	Following the EIA scoping response from CCC, the extent of the transport modelling study area was extended to include routes between Otterpool Park and Canterbury. Kent County Council were consulted in June and July 2018 to determine the scope of modelling required. Following a detailed analysis of traffic flow increases on these routes, Kent County Council stated that the scope of modelling should include the Old Dover Road junctions with Nackington Road and St Lawrence Road. Full information is provided within the Transport Assessment (ES Appendix 16.4). Available automatic traffic count (ATC) data was used to derive annual average daily traffic (AADT) flows from peak hour flows. Due to the limited availability of ATC data at the time, AADT flows were calculated for Old Dover Road and Nackington Road only. However, the scoping exercise with Kent County Council determined that the effect of flow increases due to the Otterpool Park development on other links was not expected to be significant in capacity terms. However, a sensitivity test has been carried out using available traffic data on two roads in Canterbury. Please refer to the limitations section and ES Appendix 6.7 for findings of sensitivity test.
National Highways (NH)	We note that it appears that the concentrations will be just under current Directive limits. Any future change to either the forecast or actual concentrations and/or to the Directive or concentration thresholds for action that lead to a situation where mitigation associated with the impact of the development will need to be fully funded	Noted – no assessment required.

Consultee/Contact	Summary Scoping Opinion Response	Location in the ES
	and delivered by the development and not on NH land.	
NH	We note that mitigation measures are proposed to reduce trip numbers. National Highways will require that it should be consulted with regards any proposed site-specific and/or sitewide Travel Plans	Noted – no assessment required.

6.2.9 Temple, on behalf of F&HDC, undertook a review of the Draft ES in December 2021. There were no comments which specifically addressed air quality.

The Study Area

Construction Phase

6.2.10 The IAQM (2014) construction dust guidance requires that construction dust impacts are assessed up to 350m from the boundary of the site. The construction phase study area also covers within 50m from the route(s) used by construction vehicles on the public highway up to 500m from the site entrance(s). The site entrance and routes to be used by construction vehicles has not yet been determined and therefore the study area covers the public highways up to 500m from the proposed Development; this represents a worst-case approach.

6.2.11 The construction dust study area therefore covers Lympne, Barrow Hill, Sellindge, Newingreen, Westenhanger and Stanford.

6.2.12 Exhaust emissions from construction vehicle flows are considered if the increase in flow is greater than 100 Annual Average Daily Trips (AADTs) on a road during the construction phase. Emissions from construction vehicles were assessed at those receptors comprising the operational air quality study area receptors. The construction vehicle flows were integrated into the 2024 and 2030 'with proposed Development' operational traffic datasets. Further detail is presented in section 6.3.

6.2.13 The construction vehicle emissions study area is therefore the same as the operational phase study area which is outlined in section 6.3 and presented in Figures 6.1 and 6.2 of ES Appendix 6.1.

Qualitative Odour Assessment for proposed on-site WwTW

6.2.14 The qualitative odour assessment has considered odour effects at receptors within 500m of the HT.5 development area boundary (as displayed on the Development Areas and movement Corridors Parameter Plan, ES Appendix 4.2), which is the development area where the WwTW is to be allocated and constructed. This is because odour pathways can generally be considered ineffective at distances beyond 500m. The Anglian Water Asset Encroachment Risk Methodology (Ref 6.24) considers the risk of their existing WwTW assets to new developments up a distance a 400m, so there is a reasonable precedent for considering odour pathways to be ineffective beyond 400-500m. It should be noted that the Anglian Water methodology is a 'one-size-fits-all' approach and considers existing assets which may have been in place for a number of years and therefore may account for older/obsolete processes/technologies and larger sites.

Operational Phase (Local Air Quality) Assessment Criteria

6.2.15 For the operational phase, the IAQM (2017) development control guidance does not explicitly specify the geographical extent within which impacts should be assessed. The DMRB states that all impacts within 200m of those roads which meet any of a set of traffic change criteria should be assessed. Impacts from traffic emissions beyond 200m of the emission source are generally accepted to be negligible.

6.2.16 The IAQM development control guidance details its own indicative criteria with respect to change as a result of a proposed Development that, if met, highlight the need for an assessment, rather than necessarily defining the boundaries of a study area. The criteria relevant to the proposed Development are:

- A change in Light Duty Vehicle (LDV) flows of >100 AADT within or adjacent to an Air Quality Management Area (AQMA), or >500 AADT elsewhere
- A change in Heavy Duty Vehicles (HDV) flows of >25 AADT within or adjacent to an AQMA, or >100 AADT elsewhere
- Where a road is realigned by 5m or more and is within an AQMA

- Where a junction is added or removed close to existing receptors
- Where there is one or more substantial combustion processes where there is a risk of impacts at relevant receptors.

6.2.17 Should any of the above criteria be exceeded, then further assessment may be required. For the proposed Development, the magnitude of change in traffic flows define the extent of the study area. However, it should be noted that the guidance states that "*the criteria provided are precautionary and should be treated as indicative; in some instances, it may be appropriate to amend them on the basis of professional judgement*." Therefore, the decision to proceed to further assessment should also be based on professional judgement rather than the criteria alone.

6.2.18 The traffic data was screened against the IAQM criteria and the majority of the roads in the traffic network provided by the transport planning team were identified as affected. Therefore, it was decided to assess local air quality impacts on human health across the entire geographical extent of the traffic microsimulation rather than assessing only those roads that met the IAQM criteria. This represents a precautionary approach.

6.2.19 The assessment considered worst case sensitive receptor locations within 200m of those links which comprise the traffic microsimulation model and modelling predictions were compared against UK AQS objectives as appropriate.

Operational Phase (Ecological Impacts) Assessment Criteria

6.2.20 Some air pollutants (such as NO_x) can have an effect on vegetation. Ambient concentrations of pollutants and deposition of particles can damage vegetation directly or affect plant health and productivity. Deposition of pollutants (such as nitrogen) to the ground and vegetation can affect the characteristics of the soil, which in turn can then affect plant health, productivity and species composition.

6.2.21 For ecological receptors the study area is defined using National Highway's DMRB LA 105 guidance which indicates that potential for impacts at ecological sites may occur where the increase in AADT generated by the scheme is more than 1,000 vehicles per day or 200 HDVs per day, with relevant ecological receptors within 200m of the road. These receptors are typically those with the following ecological designation(s):

- Site of Special Scientific Interest (SSSI)
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)
- Ramsar sites
- Ancient Woodland (AW)
- Local Nature Reserves (LNRs).

6.2.22 Geological sites such as the Otterpool Quarry SSSI are not sensitive to nitrogen deposition or dust impacts and therefore do not require assessment.

Operational Phase Assessment Geographical Extent

6.2.23 The operational phase air quality assessment comprised the affected road network (ARN) presented in Figure 6.1 and Figure 6.2 of ES Appendix 6.1 and includes the following areas:

- M20/A20 between north-east Ashford and Capel-le-Ferne
- A20 Hythe Road
- The proposed Development and surrounding roads

- Lympne
- Newingreen
- Westenhanger
- Hythe
- North Folkestone
- Sellindge.

6.2.24 Additionally, the received scoping opinion (June 2020) requested that the impact of the proposed Development upon the Canterbury No.3 AQMA was assessed. The traffic dataset was extended to include the traffic flows without and with the proposed Development, for Nackington Road and the Old Dover Road in eastern Canterbury which feeds into the AQMA. Further detail on the Canterbury sensitivity test is provided in ES Appendix 6.7.

Methodology for Establishing Baseline Conditions

Establishing the Existing Baseline

6.2.25 The existing baseline comprises the existing air quality conditions in the area that is likely to be affected by the proposed Development. A review of the baseline has been undertaken to establish an understanding of existing air quality, to identify areas that are likely to be sensitive to changes in emissions as a result of the proposed Development and to inform air quality dispersion modelling verification. The traffic base year was defined as 2018, as detailed in Chapter 16: Transport, therefore air quality monitoring data representative of 2018 was acquired in order to allow the comparison of historic air quality and traffic data which serves to inform the model verification process (further detail on this process is provided in section 6.3). Baseline information on air quality has been collected from the following sources:

- Online map and aerial photograph resources (including Google Maps, www.magic.gov.uk, and digital Ordnance Survey mapping)
- Defra UK Air website (http://uk-air.defra.gov.uk/)
- F&HDC website (https://www.folkestone-hythe.gov.uk)
- Ashford Borough Council (ABC) website (https://www.ashford.gov.uk/)
- Kent Air website (http://www.kentair.org.uk)
- Arcadis Air Quality monitoring survey
- Air Pollution Information System (APIS, http://www.apis.ac.uk/).

6.2.26 The information acquired from the sources above is summarised in section 6.3.

Local authority monitoring data

6.2.27 Monitoring data collected by F&HDC and ABC as part of their Local Air Quality Management (LAQM) duties and NO_2 diffusion tube data collected by field survey was obtained to inform the baseline and for the purposes of model verification. A summary of the 2018 bias adjusted results recorded by F&HDC and ABC tubes within the operational phase study area is shown in section 6.3. To ensure reliability and representativeness, only those diffusion tubes that met the following criteria were included in the model verification process;

- Monitors with greater than 75% data capture for 2018. Defra's Local Air Quality Management (Technical Guidance (16)) ((LAQM (TG.16)) Ref 6.25) states that

data capture rates of 75% or less should be treated with extreme caution, particularly when comparing the data against annual average AQS Objectives.

- Monitors near roads that were within 50m of the operational air quality study area.
- Monitors with verified location coordinates.

6.2.28 The results from these sites are presented and discussed in section 6.3.

6.2.29 F&HDC and ABC do not currently undertake monitoring for PM_{10} or $PM_{2.5}$. Defra's modelled background concentrations suggest that PM_{10} and $PM_{2.5}$ concentrations are low – these are presented and discussed in section 6.4.

Arcadis monitoring data

6.2.30 It was acknowledged that there was a lack of local authority air quality baseline monitoring in and around the proposed Development site, especially with consideration of the nearby M20 motorway. Consequently, following consultation with F&HDC it was agreed that a six-month air quality monitoring survey was to be undertaken centred around the application site in order to better inform baseline air quality. The monitoring survey was undertaken during the period between April and October of 2017. The diffusion tubes were supplied by Staffordshire Highways Laboratory.

6.2.31 The 16 Arcadis monitoring locations were selected as there were only five F&HDC monitoring sites located along the roads within 5km of the application site which are likely to be affected by the proposed Development and therefore covered by the traffic model. The locations of the monitoring sites that were eventually utilised in the model verification process are presented in Figure 6.3 in ES Appendix 6.1.

6.2.32 Due to the inherent bias associated with passive NO_2 diffusion tubes, it was necessary to determine a bias adjustment factor which was applied to the raw diffusion tube results. Three diffusion tubes were co-located at the Maidstone Rural automatic monitor for the duration of the monitoring survey in accordance with the advice in LAQM (TG.16).

6.2.33 The results from the automatic monitoring can be compared against those measured in the same location by the three diffusion tubes to derive a local bias adjustment factor. The local bias adjustment factor was found to be 0.71. The factor suggests that the diffusion tubes were systematically over-reading ambient concentrations of NO_2. The local factor was applied to the monitoring dataset in accordance with LAQM (TG.16) which recommends that a local factor is more representative for surveys less than nine months in duration as it captures the adjustment over a matched time period whereas using the national annual factor would not.

6.2.34 As the duration of the survey was not a full year in duration and was undertaken in 2017, the data needed to be annualised in order to be representative of 2018 annual mean concentrations. This was undertaken following the guidance detailed in box 7.9 of LAQM.(TG(16)); and the Annualisation factor was calculated to be 1.13. This factor was applied to the bias adjusted short-term monitored concentrations.

6.2.35 The bias-adjusted and annualised data was then deemed to be suitable for use in the model verification process. Further information on how bias adjustment and annualisation was carried out is provided in ES Appendix 6.2 Model Verification

Baseline Traffic data

6.2.36 The year 2018 was used for the purposes of characterising the baseline environment (i.e. identifying those areas which may be sensitive to change in air quality) and for the purposes of dispersion model verification, which compares observed 2018 air pollutant concentrations against modelled 2018 concentrations. Therefore 2018 estimates of traffic data based on localised ATC surveys were provided by Arcadis transport planning team for use in the air quality assessment.

6.2.37 The dispersion model verification approach is explained in further detail in ES Appendix 6.2.

Forecasting the Future Baseline

6.2.38 The following future baseline years (i.e. Base Case years) were assessed to in order to determine the impact of the Development (Development Case). A summary of the assessed future years is provided in Table 6-4. The subsequent paragraphs discuss the rationale for the three assessments in greater detail.

Table 6-4: Summary of Operational Phase Assessment Years and Rationale

Assessment Number	Assessment Future Year	Emissions Data Year	Residential Units completed	Rationale
1) First year of residential occupation	2024	2024	121	Worst case emission rates and background concentrations. Assessment will confirm whether site is suitable for residential occupation and impacts on existing receptors in vicinity.
2) Peak construction year	2030	2030	2968	2030 is anticipated to be the busiest year in terms of residential units built and non-residential floor space created. The Development would be approximately 35% complete.
3) Completed Framework Masterplan (2044) modelled in air quality tools horizon year (2030)	2044	2030 (Horizon year)	10,000	Framework Masterplan is expected to be fully built out in 2044. Current air quality tools have a horizon year of 2030, therefore assessment beyond 2030 is not possible. The assessment of 2044 development vehicle flows using 2030 air quality tools is likely to be worst case.

6.2.39 The first future baseline year which was assessed was 2024. The suitability of the future air quality needed to be assessed in order to demonstrate that new residents would not be subjected to unacceptably poor levels of air quality. Additionally, of all the assessment years 2024 is likely to be the assessment year associated with the highest per-vehicle emissions and background concentrations as these are both expected to decrease with time as the proportion of the vehicle fleet comprised of cleaner vehicles (such as Euro VI, hybrid and electric vehicles) increases. The 'with proposed Development' scenario included both the additional traffic flows from construction vehicles and the traffic generated by the partial operation of the proposed

Development. As there will only be a small part of the site which is operational in 2024, traffic flows as a result of the proposed Development are likely to be relatively minor.

6.2.40 The second future year which was assessed was 2030. This was considered as 2030 is anticipated to be the peak construction year as part of the proposed Development would be completed and construction would be ongoing. The reasoning for the selection of 2030 as peak construction year is provided in Chapter 4: The Site and the Proposed Development. As with the 2024 scenario, the 'with proposed Development' scenario included the additional traffic flows from construction vehicles and partial operation of the proposed Development.

6.2.41 The final future year which was assessed was 2044 which represents the anticipated date that the Framework Masterplan would be fully built out and occupied. The fully constructed Framework Masterplan (10,000 residential units by 2044) was assessed in place of the proposed Otterpool Park OPA Development (8,500 residential units by 2042) as the Framework Masterplan would have a greater impact on air quality due to higher trip generation associated with the additional 1,500 residences and supporting infrastructure. The 2044 transport modelling which informed the air quality assessment inherently included the Framework Masterplan and cumulative schemes. The rationale for this approach is that it can be confidently assumed that the completed Otterpool Park Development (2042) would not result in significant air quality effects if the larger Framework Masterplan (2044) itself does not result in significant air quality effects.

6.2.42 Whilst traffic forecasts (without and with the Framework Masterplan) are available for 2044, existing air quality tools issued by Defra have a horizon year of 2030 (this means that the tools do not contain any projections beyond 2030). Therefore the 2044 traffic data was processed through the tools as the year 2030 which is likely to be worst-case as emission rates and background concentrations are expected to decrease over time following government interventions such as the proposed ban on the sale of new petrol and diesel cars from 2040 (Ref 6.26).

6.2.43 Therefore, the term 'proposed Development plus Framework Masterplan' as referenced in the assessment results are inclusive of the traffic from the Framework Masterplan development quantum (I.e. 10,000 units).

Future Baseline Traffic Data

6.2.44 Cumulative air quality effects may occur during the operational phase due to traffic associated with future committed developments in addition to traffic generated by the proposed Development.

6.2.45 The method for forecasting background flows for assessment was agreed with Kent County Council, F&HDC and National Highways. The method involved a combination of the use of TEMPro (v7.2), forecast development flow information available for specific committed developments and National Road Traffic Forecasts (for freight on the M20). TEMPro input information was updated to include the latest housing and employment forecasts for Folkestone & Hythe, Ashford and Canterbury.

6.2.46 It should be noted that growth rates derived from TEMPro for the with proposed Development scenario assume that the housing and employment forecasts in each authority would be met in full. Growth rates derived from TEMPro for the without proposed Development scenario assume that Folkestone & Hythe District Council would not meet their housing and employment forecasts if the Otterpool Park development did not go ahead as described in the Application. The with proposed Development scenario therefore tests significantly greater household and job growth than the without proposed Development scenario. This assumption is understood to be consistent with the adopted Folkestone & Hythe District Council Core Strategy Review 2022. This means that the comparison between the with and the without proposed Development traffic flows show an absolute worst case in terms of any

increases in traffic flow, highway network delay and queuing associated with the operational phase of the proposed Development.

Defining the Sensitivity of resource

Air Quality Criteria

6.2.47 For the pollutants of concern (NO_2, PM_{10} and $PM_{2.5}$), ambient air quality criteria for the protection of public health were set by the EU and transposed into UK law by The Air Quality Standards Regulations 2010 and those implementing the UK National Air Quality Strategy (AQS).

6.2.48 The criteria set out in the AQS include standards and objectives for local authorities to work towards achieving these. An objective is the taíget date on which exceedances of a Standaíd must not exceed a specified numbeí. These apply in locations with relevant public exposure which are defined in the Defra's technical guidance document LAQM.TG(16).

6.2.49 The standards are legally binding Limit Values (LV) requiring government compliance. Limit values aíe set foí individual pollutants and the Secretary of State for Environment, Food and Rural Affairs has responsibility for meeting the limit values in England. Failure to achieve compliance (for a compliance agglomeration zone) can lead to infraction proceedings by the Secretary of State against the government.

6.2.50 Local air quality criteria relevant to the air quality assessment for the proposed Development are summarised in Table 6-5.

Table 6-5: Air Quality Objectives and Limit Values

Pollutant	Criteria	AQS Objective Compliance Date	Limit Value Compliance Date
NO_2	Hourly average concentration should not exceed 200 µg/m^3 more than 18 times a year	31 December 2005	1 January 2010
	Annual mean concentration should not exceed 40 µg/m^3	31 December 2005	1 January 2010
PM_{10}	24-hour mean concentration should not exceed 50 µg/m^3 more than 35 times a year	31 December 2004	1 January 2005
	Annual mean concentration should not exceed 40 µg/m^3	31 December 2004	1 January 2005
$PM_{2.5}$	Annual Mean concentrations should not exceed 20µg/m^3 (limit value) or 25 µg/m^3 (AQS value)	2020	1 January 2015
NOx Critical level – for protection of ecosystems and vegetation	Annual mean concentrations should not exceed 30 µg/m^3	N/A - Critical Level adopted by European Union (EU) and United Nations Economic Commission for Europe (UNECE)	

6.2.51 The objectives in the AQS column are referred to in the text as the AQS objectives.

6.2.52 Defra's LAQM TG.16 states that predicting exceedances of the 1-hour mean NO_2 AQS objective is not straightforward due to high annual variance and that dispersion models cannot predict short term concentrations as reliably as annual mean concentrations. Further to this, model verification for short term concentrations is likely to be challenging as a result of the aforementioned reasons.

6.2.53 Measurements across the UK have shown that the 1-hour mean NO_2 AQS objective is unlikely to be exceeded unless the annual mean NO_2 concentration is greater than 60µg/m³. Therefore, exceedances of 60µg/m³ as an annual mean NO_2 concentration are used as an indicator of potential exceedances of the 1-hour mean NO_2 objective.

6.2.54 Similarly, LAQM.TG(16) also provides a relationship between the annual mean PM_{10} concentration and the number of exceedances of the 24-hour objective: those areas where the annual mean concentration is greater than 32µg/m³ were demonstrated to be at risk of exceeding the 24-hour objective. Thus, exceedances of 32µg/m³ as an annual mean PM_{10} concentration are used as an indicator of potential exceedances of the 24 hour mean PM_{10} objective.

6.2.55 For some gaseous pollutants, critical levels (below which significant harmful effects on ecological receptors are not thought to occur) have been adopted by the EU and the United Nations Economic Commission for Europe (UNECE) and are used as regulatory standards.

6.2.56 Some air pollutants (such as NO_x) can have an effect on vegetation. The critical level relevant to this assessment is 30µg/m^3 for NOx. This level is set at a concentration which if exceeded, may cause damage to vegetation and ecosystems.

6.2.57 For the deposition of air pollutants critical loads, given as a range, for different habitats have been provided by UNECE and are detailed on the Air Pollution Information Service (APIS) website. APIS provides critical loads for nitrogen deposition (leading to eutrophication) and acid deposition (leading to acidification). Critical loads for nitrogen deposition are in units of kilogrammes of nitrogen per hectare per year (kg N/ha/year) and vary with habitat sensitivity. Site specific critical loads for surrounding designated nature sites are detailed in the baseline section of this chapter.

6.2.58 Assessment of Sulphur Dioxide (SO_2) in relation to acidification of ecosystems from road sources has been scoped out as SO_2 emissions from transport is negligible at the local level.

Adverse Effects of Odour

6.2.59 As the assessment of odour within this chapter is qualitative, discussion of quantitative assessment criteria is not appropriate given the adopted presented methodology is based on risk following a Source-Pathway-Receptor concept. This is further explored later in this section under the sub-heading '*Methodology for Assessing Impacts and Effects: Odour'.*

6.2.60 The IAQM (2014) Odour Guidance discusses the adverse effects of odour in terms of annoyance and nuisance. The principal odour effect to consider is negative appraisal by a human receptor. Once exposure to odour has occurred, the process can lead to adverse effects such as disamenity, annoyance, nuisance and possibly complaints. It is important to emphasise the technical differences between annoyance and nuisance.

Annoyance is the adverse effects occurring from immediate exposure and nuisance us the adverse effect caused cumulatively by repeated events of annoyance.

6.2.61 Loss of amenity or disamenity does not equate directly to nuisance and significant loss of amenity will often occur at lower levels of odour exposure than would constitute a statutory nuisance.

6.2.62 Both or either of annoyance and nuisance can lead to complaints. However, a lack of complaints does not always prove there is no annoyance or nuisance, or loss of amenity. Conversely there needs to be an underlying level of annoyance before complaints are generated. Furthermore, people's annoyance and nuisance responses can change over time. The appraisal is influenced by a wide range of predictive factors including history of exposure.

Health Impacts

6.2.63 The health impacts associated with the modelled pollutants are summarised in Table 6-6.

Table 6-6: Health Impacts from NO_2, PM_{10} and $PM_{2.5}$

Pollutant	Main Health Impacts
NO_2	Studies have shown associations of NO_2 in outdoor air with adverse effects on health, including reduced life expectancy. It has been unclear whether these effects are caused by NO_2 itself or by other pollutants emitted by the same sources (such as traffic). Evidence associating NO_2 with health effects has strengthened substantially in recent years and it is now thought that, on the balance of probability, NO_2 itself is responsible for some of the health impact found to be associated with it in epidemiological studies. Short-term exposure to high concentrations may cause inflammation of respiratory airways. Long-term exposure may affect lung function and enhance responses to allergens in sensitised individuals. Asthmatics are particularly at risk according to the Committee on the Medical Effects of Air Pollution (COMEAP) (Ref 6.27).
PM_{10}	Particulate matter can affect human health. The available evidence as detailed by COMEAP (Ref 6.28) suggests that it is the fine components of PM_{10} that are formed by combustion, that are the main cause of the harmful effects of particulate matter. Particles cause the most serious health problems among those susceptible groups with pre-existing lung or heart disease and/or the elderly and children. There is evidence that short- and long-term exposure to particulate matter cause respiratory and cardiovascular illness and even death. It is likely that the most severe effects on health are caused by exposure to particles over long periods of time.
$PM_{2.5}$	Inhalation of particulate pollution can have adverse health impacts, and there is understood to be no safe threshold below which no adverse effects would be anticipated. The biggest impact of particulate air pollution on public health is understood to be from long-term exposure to $PM_{2.5}$, which increases the age-specific mortality risk, particularly from cardiovascular causes. Several plausible mechanisms for this effect on mortality have been proposed, although it is not yet clear which is the most important. Exposure to high concentrations of PM (e.g. during short-term pollution episodes) can also exacerbate lung and heart conditions, significantly affecting quality of life, and increase deaths and hospital admissions. Children, the elderly and those with predisposed respiratory and cardiovascular disease, are known to be more susceptible to the health impacts from air pollution. Potential mechanisms by which air pollution could cause cardiovascular effects are described in the COMEAP report on particulate matter.

Receptors

6.2.64 The AQS Objectives only apply where members of the public are likely to be regularly present for the averaging time of the objective (i.e. where people will be exposed to pollutants). The annual mean objectives apply to all locations where members of the public might be regularly exposed. The 24-hour mean objective applies to all locations where the annual mean objective would apply, together with hotels and gardens of residential properties. The 1-hour mean objective also applies at these locations as

well as at any outdoor location where a member of the public might reasonably be expected to stay for one hour or more, such as shopping streets, parks and sports grounds, as well as bus stations and railway stations that are not fully enclosed.

6.2.65 Exceedances of 60µg/m³ as an annual mean NO_2 concentration are used as an indicator of potential exceedances of the 1-hour mean NO_2 objective. Also, exceedances of 32µg/m³ as an annual mean PM_{10} concentration are used as an indicator of potential exceedances of the 24-hour mean PM_{10} objective.

6.2.66 LAQM.TG(16) provides the following examples of where annual mean AQS objectives should apply:

- Residential properties
- Schools
- Hospitals
- Care homes.

6.2.67 These are all locations where sensitive subsets of the population could potentially be exposed to air pollutants over a long-term period. Worst case locations were selected for assessment, which were those locations where existing pollution concentrations are highest and/or where the proposed Development is expected to have the largest impact. Increases in traffic associated with the proposed Development have the potential to affect air quality at existing sensitive receptors near to the local road network in the vicinity of the application site and proposed sensitive receptors that would be constructed and occupied in the future as part of the proposed Development (future receptors).

6.2.68 The proposed Development Areas & Movement Corridors (OPM(P)4001_rev AA) were used to select a number of future roadside receptor locations where air pollutant concentrations are expected to be the highest within the application site.

6.2.69 Figure 6.4 (presented in ES Appendix 6.1) shows the location of the modelled receptors in relation to the proposed Development.

Ecological Receptors

6.2.70 A number of sensitive sites have been identified for assessment as they lie within 200m of the ARN as defined by DMRB LA 105. These sites are summarised in Table 6-7 and displayed on Figure 6.5 (presented in ES Appendix 6.1).

Table 6-7: Ecological Sites considered for assessment

Site Name	Location in relation to site	Assessed for construction dust impacts?	Assessed for operational phase local air quality impacts in 2024, 2030 and 2044?
Hatch Park SSSI	3.6km to north-west	No – outside of construction dust study area	Yes
Folkestone to Etchinghill SSSI/SAC	3.6km to north-east	No – outside of construction dust study area	Yes
Lympne Escarpment SSSI	0.3km to the south	Yes	Yes
Otterpool Quarry SSSI	Within application site boundary		

Site Name	Location in relation to site	Assessed for construction dust impacts?	Assessed for operational phase local air quality impacts in 2024, 2030 and 2044?
		No – site classified for geological features which are not sensitive to nitrogen or dust.	
Folks Wood Ancient Woodland (AW)	0.3km to the east	Yes	Yes
Bockhanger Wood AW	Overlaps with Hatch Park SSSI – 3.6km to north-west	No – outside of construction dust study area	Yes
Park Wood AW	3km to north-west	No – outside of construction dust study area	Yes
Kiln Wood AW	250m to east	Yes	Yes
House Wood AW	100m to east	Yes	Yes
Bartholomews Wood AW	1.1km to north-east	No – outside of construction dust study area	Yes
Cowtye Wood AW	1.2km to north-east	No – outside of construction dust study area	Yes
Grange Alders/Oakbanks AW	3km to east	No – outside of construction dust study area	Yes
Killing Wood AW	8.5km to north-east	No – outside of construction dust study area	Yes
Lympne Park Wood AW	450m to south-east	No – outside of construction dust study area	Yes
Perry Wood AW	500m to north-east	No – outside of construction dust study area	Yes
Hoads Wood AW	12km to north-west	No – outside of construction dust study area	Yes
Unnamed AW 1	12km to north-west. Adjacent to Hoads Wood	No – outside of construction dust study area	Yes
Unnamed AW 2	13.5km to north-west adjacent to M20	No – outside of construction dust study area	Yes
Unnamed AW 3	13.5km to north-west adjacent to M20, north of unnamed AW2.	No – outside of construction dust study area	Yes
Harringe Brooks Wood AW	Within FM boundary	Yes	Yes
Ashford Green Corridors Local Nature	9km to north-west	No – outside of construction dust study area	Yes

Site Name	Location in relation to site	Assessed for construction dust impacts?	Assessed for operational phase local air quality impacts in 2024, 2030 and 2044?
Reserve ((LNR) units adjacent to A2070 and M20)			

Methodology for Assessing Impacts and Effects: Construction Dust

Impact Characterisation

6.2.71 There is the potential for fugitive dust emissions to occur as a result of construction phase activities. These have been assessed in accordance with the methodology outlined in the IAQM (2014) construction dust guidance. The methodology is summarised in the following paragraphs. However, detailed assessment steps are presented in ES Appendix 6.3 for reference.

6.2.72 It should be noted that the purpose of the IAQM construction dust guidance is to define the level of mitigation that is required to effectively control construction dust. It therefore requires the assessor to determine the unmitigated risk of dust impacts on soiling and human health. This then allows the categorisation of risk of impacts from the various aspects of construction which in turn defines the level and nature of mitigation measures. The selected mitigation measures are secured in the CoCP (ES Appendix 4.17) and effectively constitute embedded design mitigation.

6.2.73 In terms of defining a study area, if there are no ecological or human receptors within 350m of the site boundary or within 50m of the haul routes (up to 500m from the site entrance(s)) then the need for a construction dust assessment is to be screened out. However, if there are receptors within these distances then an assessment should be carried out.

6.2.74 The most common air quality impacts that may arise during demolition and construction activities are;

- Dust Deposition (soiling), resulting in the soiling of surfaces and reduction in amenity; and
- Elevated PM_{10} concentrations, as a result of dust generating activities on site.

6.2.75 These impacts may affect human receptors, and dust soiling may affect ecological receptors. The IAQM guidance defines a human receptor as:

6.2.76 “any location where a person or property may experience the adverse effects of airborne dust or dust soiling, or exposure to PM_{10} over a time period relevant to the Air Quality Objectives. In terms of annoyance effects, this will most commonly relate to dwellings, but may also refer to other premises such as buildings housing cultural heritage collections (e.g. museums and galleries), vehicle showrooms, food manufacturers, electronics manufacturers, amenity areas and horticultural operations (e.g. salad or soft-fruit production).”

6.2.77 An ecological receptor is defined as:

“any sensitive habitat affected by dust soiling. This includes the direct impacts on vegetation or aquatic ecosystems of dust deposition, and the indirect impacts on fauna (e.g. on foraging habitats)’.

6.2.78 The risk of dust emissions from construction/demolition activities causing an adverse effect on human or ecological receptors depends on:

- The type of construction activities being undertaken, and the duration of these activities;
- The size of the construction site;
- The meteorological conditions (such as wind speed, wind direction and rainfall);
- The proximity of the receptors to the construction activities;
- The effectiveness of the dust deposition mitigation measures; and
- Receptor sensitivity to dust.

6.2.79 Construction activities on the proposed Development application site are divided into four types to reflect their different potential impacts. These are demolition, earthworks, construction, and trackout (the vehicle-borne transfer of mud and debris onto the highway).

6.2.80 The potential for dust emissions was assessed for each activity that is likely to take place and considers three separate dust effects including annoyance due to dust soiling, harm to ecological receptors and the risk of health effects due to an increase in exposure to PM_{10}.

Assessing Significance of Effect

6.2.81 The IAQM construction dust guidance seeks to categorise the unmitigated risk of dust impacts on human health and amenity as a means of identifying proportional dust emissions mitigation required to ensure that residual impacts are no greater than negligible.

6.2.82 A higher dust impact risk rating means that more stringent mitigation measures are required in order to avoid a residual significant risk of effects.

6.2.83 IAQM recommends that significance is only assigned to the effect after considering the construction activity with mitigation, and that those measures are secured by planning condition, legal requirements or by regulations.

6.2.84 Table 6-8 summarises how the dust risk is calculated based on the dust emissions magnitude and the sensitivity of area for each of three impact pathways (dust soiling, human health and ecological sites).

Table 6-8: Summary of how dust risk is calculated from Dust Emission Magnitude and Sensitivity of Area (taken from IAQM Construction Dust Guidance)

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	Medium 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 Activities			

Sensitivity of Area	Dust Emission Magnitude		
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

6.2.85 The IAQM construction dust guidance states that the final step is to determine whether **significant** effects arising from the construction phase would occur. For almost all construction activity, the aim should be to prevent **significant** effects on receptors through the use of effective mitigation – experience shows this is normally possible and therefore the residual effect will normally be '**not significant'.**

6.2.86 There may be cases where certain principal measures cannot be implemented, for instance access to water for dust suppression, and even with additional mitigation measures in place there may be a significant effect. Therefore it is important to consider the site characteristics and surrounding area to ensure the conclusion of '**no significant effect'** is robust.

Methodology for Assessing Impacts and Effects: Odour

Introduction

6.2.87 The proposed Development contains an aspiration to locate a WwTW in development area HT.5 in the north westerly corner of the site; this represents the sole feature of the site that would require an odour assessment. Whilst the area has been allocated for this land-use, there are insufficient assessment parameters in order to carry out a quantitative assessment of odour as fundamental details (such as the exact location of odorous sources) have not been finalised. In such a situation the IAQM's (2018) odour guidance recommends that a qualitative assessment is undertaken in order to make predictions informed by risk.

Odour Exposure

6.2.88 Before an adverse effect can occur, there must be odour exposure. For odour exposure to occur, all three links in the source-pathway-receptor (SPR) chain must be present:

- An emission source
- A pathway (for the odour to travel through the air to locations off site noting that anything that increases dilution and dispersion as it travels from source to receptor will reduce the concentration at the receptor and reduce exposure
- The presence of receptors (people) that could experience an adverse effect.

6.2.89 The scale of exposure is determined by FIDO factors (frequency, intensity, duration and offensiveness). The magnitude of effect is determined by the scale of exposure (FIDO) and the sensitivity of the receptor. Different combinations of the FIDO factors can result in different exposures at a location. For example, odours may occur as a single event, as frequent short bursts or for longer less-frequent periods and may be

said to give acute or chronic exposures respectively. When the location is considered, the factors are referred to as FIDOL.

Table 6-9: FIDOL Factors

Factor	Description
Frequency (F)	How often the individual is exposed to odour
Intensity (I)	The individual's perception of the strength of the odour
Duration (D)	The overall duration that individuals are exposed to an odour over time
Odour Unpleasantness (O)	Odour unpleasantness describes the character of an odour as it relates to the 'hedonic tone' (which may be pleasant, neutral or unpleasant) at a given odour concentration/intensity. This can be measured in the laboratory as the hedonic tone, and when measured by the standard method and expressed on a standard nine-point scale it is termed the hedonic score.
Location (L)	The type and land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor. The location factor can be considered to encompass the receptor characteristics, receptor sensitivity and socio-economic factors.

Qualitative risk-based assessment concepts and methodologies

6.2.90 The central concept of risk assessment is that the overall risk depends on the probability of an event together with the likely consequence if that event were to transpire. For odour assessments, the probability can be considered to be the likelihood of exposure (impact), and the consequence can be considered to the effect on the receptor if that exposure (impact) took place. These two facets encompass the SPR chain and concept. Behind the SPR concept is the fundamental relationship of Effect = Dose x Response.

6.2.91 The dose can be considered equivalent to the odour exposure (impact). The impact will be determined by FIDO. The effect is the result of the changes on specific receptors taking into account their sensitivity. The L in FIDOL is to categorise the sensitivity.

6.2.92 There are existing qualitative methodologies which deal with WwTW such as the SEPA 2010 guidance (Ref 6.29) and the Anglian Water Odour Risk Assessment; however, these tools relate to monitored or risk-based effects of an existing WwTW and are not applicable to the proposed Development. The IAQM's odour guidance provides an example framework for qualitative odour assessment which is summarised below.

IAQM Framework for Qualitative Odour Assessment

6.2.93 How well a qualitative assessment predicts the impact of a given scenario depends on how well the magnitude of source release, effectiveness of pathway and sensitivity of receptor can be ranked or scored. Table 9 of the IAQM odour guidance provides examples of low, medium and high-risk factors for the odour source, pathway and receptor sensitivity. However, the approach requires the application of professional

judgement to check that the risk-classification is suitable to the proposed Development.

6.2.94 The first step is to estimate the odour-generating potential of site activities, termed "Source Odour Potential" (SOP) which can be ranked as small, medium, or large and takes into account three factors:

- Magnitude of release from the odour source (taking into account the effectiveness of any odour mitigation measures that are already in place). This should also account for any pattern of release (e.g. intermittency).
- How inherently odorous the emission is; i.e. whether the release has a low, medium or high odour detection threshold.
- The relative pleasantness/unpleasantness of the odour. Lists of relative pleasantness of different substances are given in the EA's guidance H4 Odour Management and in more detail in the SEPA document Odour Guidance 2010.

6.2.95 The three factors above should be based on residual SOP (i.e. the SOP once any embedded design mitigation is considered).

6.2.96 The second step is to establish the effectiveness of the pollutant pathway as the transport mechanism for the receptor versus the dilution/dispersion in the atmosphere. The pathway can be categorised as ineffective, moderately effective, or highly effective. Important factors to consider are:

- Distance of receptors from the odour source
- Whether the receptors are downwind with respect to the prevailing wind direction
- The effectiveness of the point of release in promoting good dispersion. For instance, a high stack will almost always lead to an increased pathway, dilution and dispersion.
- The topography and terrain between source and receptor.

6.2.97 The third step is to combine the estimates of Source Odour Potential and the Pathway Effectiveness as a means of calculating risk of odour exposure (impact) at the receptor location as demonstrated in Table 6-10.

Table 6-10: Risk of Odour Exposure (Impact) at the Specific Receptor Location

Pathway Effectiveness	Source Odour Potential		
	Small	**Medium**	**Large**
Highly Effective Pathway	Low Risk	Moderate Risk	High Risk
Moderately Effective Pathway	Negligible Risk	Low Risk	Moderate Risk
Ineffective Pathway	Negligible Risk	Negligible Risk	Low Risk

6.2.98 The fourth step is to categorise the effect of that odour impact on the exposed receptors, taking into account its sensitivity. Odour effects may range from negligible,

through to slight adverse, and moderate adverse, up to substantial adverse. The relevant matrix is presented in Table 6-11.

Table 6-11: Likely magnitude of Odour Effect at the Specific Receptor Location

Risk of Odour Exposure	Receptor Sensitivity		
	Low	Medium	High
High Risk of Odour Exposure	Slight Adverse Effect	Moderate Adverse Effect	Substantial Adverse Effect
Medium Risk of Odour Exposure	Negligible Effect	Slight Adverse Effect	Moderate Adverse Effect
Low Risk of Odour Exposure	Negligible Effect	Negligible Effect	Slight Adverse Effect
Negligible Risk of Odour Exposure	Negligible Effect	Negligible Effect	Negligible Effect

6.2.99 This procedure results in the prediction of the likely odour effect at each sensitive receptor. The next step is to estimate the overall odour effect on the surrounding area, taking into account the different magnitude of effects at differing receptors, and the number of receptors that experience these different effects. This requires the application of professional judgement.

6.2.100 The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 require that an assessment reaches a conclusion on the likely significance of effects. Where the overall effect is greater than 'Slight Adverse', the effect is likely to be considered **Significant.**

Methodology for Assessing Impacts and Effects: Operational Impact on Local Air Quality

Dispersion Modelling

6.2.101 The ADMS (Atmospheric Dispersion Modelling System)-Urban model (version 5.0.0.1) has been used to predict the impacts associated with the operation and construction of the proposed Development in the assessment years of 2024 and 2030 (both for the without and with proposed Development scenarios) and in 2044 for the without and with proposed Development plus Framework Masterplan scenario. The extent of the modelled roads is shown on Figures 6.1 and 6.2 (presented in ES Appendix 6.1) for the without and with proposed Development scenarios. In addition to the roads, the tunnel portals at the Roundhill Tunnel on the A20 (located 9km east of the application site) have also been modelled using the ADMS-Roads Tunnel Portal feature. The following inputs and tools are required to undertake the air quality dispersion modelling:

- Traffic Data
- Emission Factors
- NO_x to NO_2 conversion
- Meteorological Data

- Future Assumptions based on observed trends.

6.2.102 These inputs are described in detail in the following sections and in ES Appendix 6.4.

Traffic Data

6.2.103 As cited in paragraph 6.2.37, traffic data used in the assessment was generated in a traffic microsimulation model. The traffic data derived from the traffic model was converted into the format required for the air quality assessment. Traffic data were provided in 24hr AADT flow format (average 24-hour total traffic flows in a year) for the Base Year 2018, and the without and with proposed Development scenarios for years 2024, 2030 and 2044. HDV flows were also supplied for each of the modelled road links. Speeds were based on the speed limit for the modelled road.

6.2.104 As construction would be ongoing during 2024 and 2030, the additional expected construction vehicle flows have been integrated into the 2024 and 2030 proposed Development traffic datasets.

Emission Factors

- At the time that the dispersion modelling was undertaken, emission factors were utilised from Defra's Emission Factor Toolkit (EFT v10.1) (Ref 6.30) which is based on vehicle fleet composition, traffic speeds and road type. The emissions rates were calculated using emissions projections for the 2018 base year and the 2024, 2030, and 2044 assessment scenarios.
- Defra subsequently released EFT v11 in November 2021. The accompanying statement from Defra explained the following key points of consideration associated with the use of EFT v11;
- 2018-2030 emission rates remained unchanged from EFT v10.1.
- New emission rates were provided in EFT v11 which cover the period between 2031-2050. However, Defra stated that emissions outputs for the years 2031-2050 were provided in support of climate assessments and appraisals only. Where emissions were to be used in a post 2030 assessment year to inform air quality assessments, the appropriate caveats around the limitations of the analysis must be included to accompany the assessment. These limitations are mainly based around the uncertainty of the traffic fleet projections and emissions compositions beyond 2030.

6.2.105 With regards to the bullet points above, the decision was made to retain the modelled outputs which had been derived using EFT v10.1 as the emissions rates are identical for 2018, 2024, and 2030. Use of EFT v11 for 2044 would produce concentrations and impacts that are lower than those presented in this chapter. Therefore, it was decided to take a precautionary approach and use EFT v10.1.

6.2.106 It should be noted that the remainder of the Defra air quality tools (background maps, NOx-NO2 calculator, and background map sector removal tool) have not been updated by Defra and still retain a horizon year of 2030, despite the issuing of the new EFT.

6.2.107 Within the air quality study area there are two tunnel portals which comprise the Roundhill Tunnel on the A20 approximately 9km east of the proposed Development. The dimensions of the tunnel were obtained and the tunnel portal option in ADMS-Roads was used to determine the concentrations around the portals. The road tunnel

modelling option modifies the dispersion of pollutants from a road source to take into account dispersion from the tunnel portals.

NO_x to NO_2 conversion

6.2.108 In accordance with LAQM.TG(16) all modelled road-based concentrations of NO_x have been converted to annual mean NO_2 using the 'NO_x to NO_2' calculator (Version 8.1, released August 2020) (Ref 6.31). The traffic mix and local authority used for the conversion from NO_x to NO_2 were selected depending on the modelled receptor and diffusion tube locations.

Meteorological Data

6.2.109 Meteorological data was acquired from Lydd, which is the nearest (at 17km to the south west) and therefore most representative meteorological monitoring station of the proposed Development site. The year of 2018 corresponds to the availability of traffic data and actual monitoring data, and allows for verification of modelled outputs with the meteorological data for 2018. The wind rose for Lydd is presented in Figure 6.6 (below). The predominant wind direction is from the south-west and is associated with the highest wind speeds.

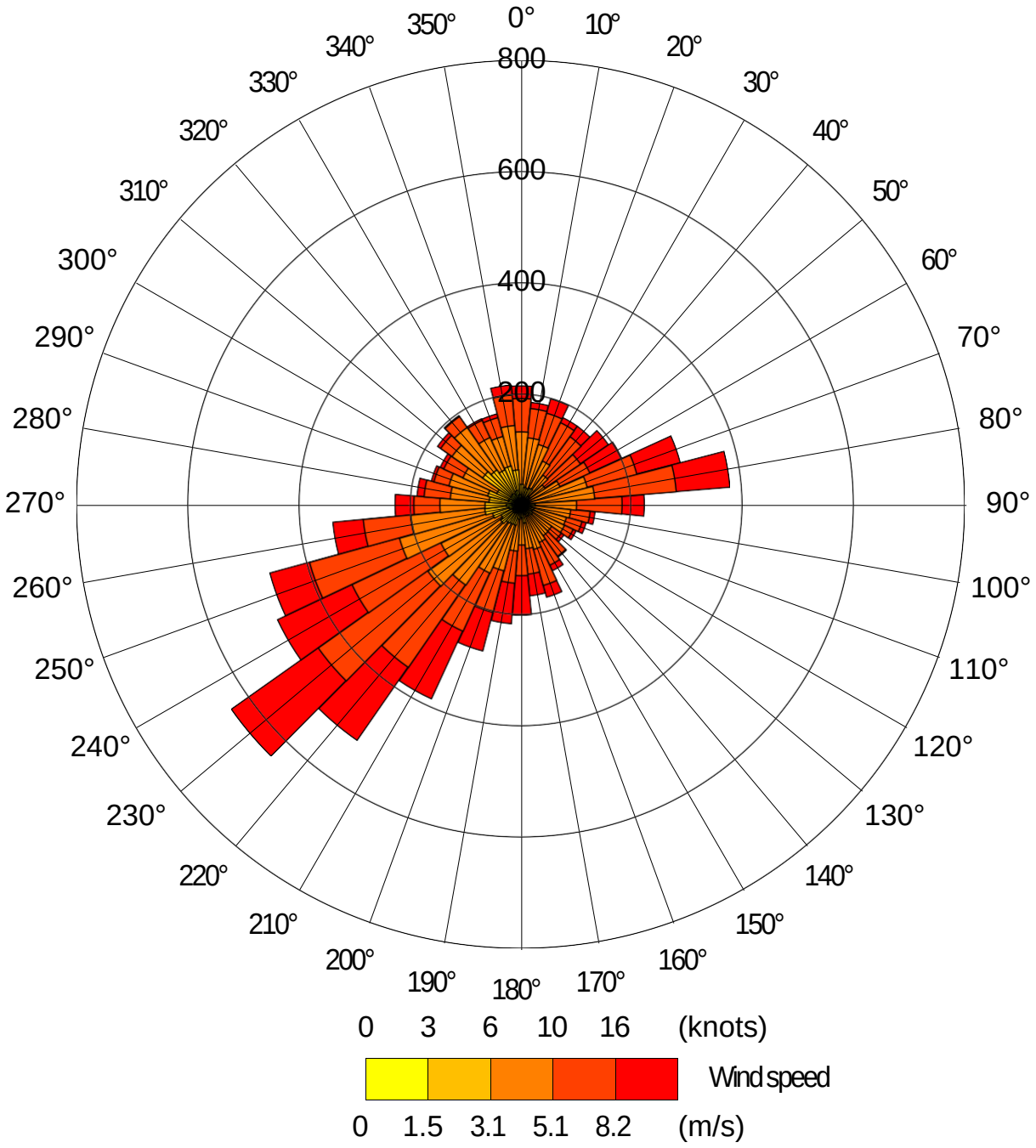

Figure 6.6 Wind Rose derived from meteorological data recorded at Lydd (2018)

Assumptions on future trends in emissions

6.2.110 A report produced in 2011 on behalf of Defra '*Trend in* NO_x *and* NO_2 *emissions and ambient measurements in the UK*' (Ref 6.32) considered NO_2 monitoring data from across the UK and suggested that reductions in roadside concentrations slowed in the years leading up to the publication. It was agreed amongst many air quality professionals that the future predictions of NO_2 concentrations may have been underestimated in the Defra tools which were available at that time. The underestimation was most pronounced in the near future years of the Defra tools at the time. Defra have periodically updated the associated air quality tools (new EFT, background maps, NO_x/ NO_2 converter) with the aim of closing this 'gap' between forecast and monitored NO_2 trends which has addressed the underestimation to a degree. However, to provide further confidence, future NO_2 levels have been uplifted

to avoid any underestimation in the years covered by the Defra tools (2018-2030). National Highways issued advice in DMRB LA 105 which provides an approach which uplifts the modelled outputs derived from the Defra tools; this is known as the 'Long Terms Trends (LTT) adjustment'.

6.2.111 The Long Term Trends NO_2 gap analysis is based on adjustment of the opening year modelled concentrations for both the without and the with proposed Development scenarios using 2018 modelled base year NO_2 concentrations and an alternative projection factor (based on a projected base year, which is the base year traffic data with opening year emissions and backgrounds) as outlined in DMRB LA 105. National Highways has provided a gap analysis tool (LTTE6v1.1) to assist with the calculation.

6.2.112 There is evidence showing that emissions from vehicles, particularly diesels, do not perform to their prescribed European standards (up to Euro 5/V) on the road. There is limited evidence on Euro 6/VI performance in the real world. The use of the approach advocated by DMRB LA 105 in undertaking the air quality assessment for the proposed Development ensures that the modelling is not overly optimistic.

6.2.113 Whilst there is an expectation that there will be a substantial improvement in real world emissions from Euro 6/VI vehicles compared to previous Euro Standards, the guidance makes allowance for potential under-estimates in the emissions from the latest Euro 6/VI vehicles currently entering the UK fleet.

6.2.114 The Long Term Trends uplift adjustment was applied to the operational phase 2024 and 2030 scenarios in this assessment.

6.2.115 For the year 2044 scenario the emissions and backgrounds were assumed to be 2030, which is the latest year available in the suite of tools issued by Defra. The year 2044 has therefore been modelled using 2030 tools which essentially assumes that there is no decrease in per vehicle emission rates and pollutant background concentrations between 2030 and 2044; this is highly conservative considering the government's anticipated de-carbonisation of the transport network by 2050[22]. Therefore, using the 2030 tools in the 2044 assessment year is likely to lead to a sizeable overestimation of impacts in this year and therefore reflects a worst case approach. For these reasons it was decided that it would be inappropriate to apply the LTT adjustment to the 2044 results for all of the various assessments which utilise NO_x/NO_2 concentrations.

Model Verification

6.2.116 The air quality monitoring data collected across the air quality study area, both by local authorities and by Arcadis, has been used within the air quality assessment to ensure the modelling predicted pollution concentrations reasonably across the study area. This is a process called model verification and has been undertaken in accordance with the principles outlined in LAQM.TG (16).

6.2.117 Concentrations of NO_2 are predicted at the monitoring locations for the Base Year (2018) and compared against the concentrations measured in those locations. Where the modelling under/over predicts pollutant concentrations, an adjustment factor is derived which is then applied to the future modelling predictions to correct for any systematic bias. This approach is intended to address any limitations in the ability of the model to predict the dispersion of pollutants away from the roads and limitations in the emission factors used.

6.2.118 The verification has shown that the model tends to under-predict concentrations of road NO_x, a common feature with roads models. Two geographical verification zones were delineated, each with its own factor to adjust the modelled output. The first zone was for those receptors in ABC and the second zone was for those receptors which

were located within F&HDC. The detailed verification procedure used in this assessment is presented in ES Appendix 6.2.

Impact Characterisation

6.2.119 The impacts of the proposed Development have been assessed in accordance with the IAQM (2017) development control guidance. The characterisation of local air quality effects on human receptors during operation is dependent upon the percentage change in concentration and the total concentration, relative to the relevant air quality objective(s) (presented in Table 6-5). The impact descriptors relative to the change metrics and air quality assessment levels are presented in Table 6-12. The table is used by rounding the change in percentage pollutant concentration to a whole number, making it clear which category the impact falls within.

Table 6-12: IAQM Impact Descriptors for Individual Receptors (Table 6.3 of IAQM (2017) Land-Use Planning & Development Control: Planning for Air Quality)

Long Term Average Concentration at Receptor in Assessment Year	% Change in Concentration Relative to annual Air Quality Assessment Level (AQAL)			
	1	2-5	6-10	>10
75% or less of AQAL	Negligible	Negligible	Slight	Moderate
76 – 94% of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109% of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

6.2.120 The relevant Air Quality Assessment Level (AQAL) is 40 µg/m^3 as an annual mean for both NO_2 and PM_{10} and 20 µg/m^3 as an annual mean for $PM_{2.5}$, as this reflects the current annual mean AQS objectives and limit values for each pollutant, respectively.

6.2.121 Impacts of PM_{10} on the achievement of the daily PM10 AQS objective can be calculated by using a derived annual mean AQAL value of 32 µg/m^3 for the annual mean based on the number of days exceeding a daily mean concentration of 50 µg/m3 being no more than 35 times per year. (The equation in LAQM.TG16 shows an annual mean of 32 µg/m3 equating to 35 days at or above 50 µg/m3

6.2.122 The impacts are assessed for individual human receptors which are defined in paragraphs 6.2.67 and 6.2.68.

6.2.123 It is expected that the long-term average concentration for most of the receptors in the respective future baseline years would be less than 75% (30 µg/m^3) of the AQAL.

6.2.124 When assessing the suitability of air quality for the introduction of new receptors, the IAQM guidance suggests that impacts are best described in relation to '*whether or not an air quality objective will not be met, or is at risk of not being met*.' Therefore, those on-site receptors which will occupy the new development will be considered in this context. This assessment considers a potential exceedance of any AQS objective at

a future receptor within the application site as '**Significant'**, unless provision is made to reduce exposure.

6.2.125 Impacts at existing receptors alongside the local road network which would be affected by the proposed Development will be described as detailed in Table 6-12.

Assessing Significance of Effect

6.2.126 The IAQM notes that the impact descriptors in Table 6-12 are for individual receptors only and the overall significance of effect should be determined using professional judgement, taking into account the degree of impact and factors such as:

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

6.2.127 The IAQM guidance notes that an individual property exposed to a moderately adverse impact might not be considered a significant effect, but many hundreds of properties exposed to a slight adverse impact could be. This indicates that the IAQM guidance avoids the use of prescriptive approaches and places an emphasis on professional judgement.

6.2.128 This judgement is made through professional judgment with consideration of the basis of the magnitude of impact and consideration of the themes discussed in this section. The guidance does not provide a framework to evaluate a defined significance of effect, rather whether the effect is considered to be significant or not on the basis of the above guidance.

Assessing risk of non-compliance with the UK Limit Values during the Operational Phase

6.2.129 Defra assesses and reports to the Secretary of State on the status of air quality in the UK, by reference to the Limit Values for each pollutant. For the purposes of Defra assessment and reporting, the UK is divided in to 43 zones and agglomerations (hereafter referred to as zones). The main pollutant of concern with respect to compliance is NO_2 as there are widespread exceedances of the NO_2 annual mean Limit Value in the UK.

6.2.130 The assessment of compliance with the Directive is undertaken using both monitoring (Defra AURN Network) and modelling from Defra's Pollution Climate Mapping (PCM) model. To determine the study area for the compliance risk assessment, the study area for the local air quality assessment is compared with the PCM model network as modelled by Defra.

6.2.131 Defra utilises the PCM model to report for the purposes of compliance with the Limit Values. The most recent iteration of the PCM model has been used in this chapter. The current PCM Modelled data provides concentrations for all years between 2018-2030.

6.2.132 IAQM do not currently offer any guidance with regards to the assessment of compliance risk, therefore this aspect of the air quality assessment has utilised the compliance risk assessment methodology detailed in DMRB LA 105.

6.2.133 The methodology recommends that the user overlays the ARN (as per the DMRB traffic change criteria, detailed in para 6.2.17) to analyse whether it overlaps with any PCM links. LA 105 recommends compliance risk is assessed in those locations where

the two road networks intersect, this is known as the Compliance Risk Road Network (CRRN).

6.2.134 The next step is to identify whether or not there are any qualifying features adjacent to the CRRN. Qualifying features include public access (e.g. footpath) and sensitive receptors (e.g. residential properties, schools etc) within 15m of the running lane / kerbside.

6.2.135 The Defra PCM modelling is modelled at a national scale. The modelling undertaken for the proposed Development is clearly more locally focused and, as such, is verified at a local level rather than a national level. Consequently, there are differences in the results. The assessor should therefore model a validation point 4m from the edge of the running lane for the future baseline year for each link assessed. This is to allow comparison between the PCM outputs (which are modelled at a distance of 4m) and the outputs of the air quality assessment. If the assessment results at the 4m point are significantly higher than the PCM outputs (i.e. greater than 10%) it is recommended that the assessor uses the local air quality model predictions instead of the reported NO_2 concentrations from the PCM model to inform the compliance risk assessment.

6.2.136 The impact of the proposed Development (i.e. the change in concentrations at receptors) on compliance in the assessed future years is undertaken in accordance with DMRB LA 105, whereby the concentrations in the Defra PCM model for each of the operational phase assessment years that align to the PCM outputs (i.e. 2024 and 2030) of the proposed Development are used to determine which roads exceed the Limit Value.

6.2.137 The 2044 scenario was not used to compare to the PCM concentrations as Defra have not generated PCM outputs beyond 2030. Additionally, the 2044 outputs generated in the air quality assessment are based on 2030 emission rates and background concentrations and would therefore represent a potentially large overestimate of the likely impacts of the proposed Development plus Framework Masterplan scenario (as explained in para 6.2.43).

6.2.138 A zone can only become compliant when locations throughout that zone meet the relevant Limit Value. DMRB LA 105, however, considers the impact of a scheme on the individual links in the PCM model within the zone. DMRB LA 105 guides the user to provide the answers to three key questions:

- Would the development result in a compliant zone becoming non-compliant?
- Would it delay Defra's data for achieving compliance?
- Would it result in an overall increase in NO_2 concentration on PCM links that exceed?

6.2.139 The answers to these questions provide an indication as to whether the proposed Development represents a risk to the UK's compliance with the Directive. If the answer to these questions is no, then it can be concluded that the proposed Development does not represent a risk to the UK's reported compliance with the Limit Values.

6.2.140 If a development is assessed as having a high risk of non-compliance (i.e. if the answers to the questions above is yes), DMRB provides guidance on the production of a Scheme Air Quality Action Plan containing actions designed to further mitigate impacts and so reduce the risk of the scheme impacting on compliance.

6.2.141 Defra updated the UK air quality action plans during 2017 which utilised PCM concentrations from 2015. The proposed Development and air quality study area resides within the south-east Agglomeration Zone (UK0031). Defra's assessment for the zone indicates that the annual limit value for NO_2 is likely to be achieved by 2023 through the introduction of measures included in the baseline. However, combined

with policy measures detailed in the 2017 UK Plan for tackling roadside nitrogen dioxide concentrations, it is expected that the zone would be compliant by 2022.

6.2.142 Since the publication of the air quality action plans in 2017, Defra have released updated baseline PCM projections using a reference year of 2018 which show that the zone would not be compliant until 2025. The outcome of the assessment of whether the proposed Development presents a risk to the south-east Agglomeration Zone achieving compliance with the Limit Values within the reported timescales (using the 2018 reference year PCM projections) has also been used in this chapter to inform the evaluation of whether the proposed Development's impacts are considered to be Significant.

Methodology for Assessing Impacts

6.2.143 The ecological assessment has been carried out in accordance with the methods and principles detailed in the IAQM's (2020) designated sites guidance.

6.2.144 Annual mean NO_x concentrations have been predicted at designated sites within 200m of the modelled road network. These sites have been considered as a series of receptors (spaced at 10m intervals) extending into the site from the closest point between the designated site and the nearest affected road (out to a distance of 200m from the road). The ecological receptor transects are shown in Figure 6.4 (ES Appendix 6.1).

6.2.145 Additionally, a 500m by 500m grid made up of 400 receptor points (spaced at 30m intervals) has been used to assess concentrations around the A20 tunnel portal running through the Folkestone to Etchinghill SSSI and SAC. As the points are gridded in a square, some points fall outside of the SAC/SSSI boundaries or directly on roads; any results from these points have been disregarded.

6.2.146 The effects of the changes in air quality at ecological sites is considered in (Chapter 7: Biodiversity). The scope of this chapter is limited to producing quantitative estimates of the change in NOx and nitrogen deposition at those designated sites identified in Table 6-7 that allows some of the impacts on sites to be screened out as **Not Significant.**

6.2.147 The assessment of changes in NO_x concentrations and N deposition in designated sites has included the following stages (following the IAQM methodology):

- Identification of designated sites within 200 m of the DMRB LA105 affected road network, which have designated features sensitive to air pollutants. If the site is found to not be specifically affected by the source, then no further assessment is required.
- Calculation of annual mean NO_x concentrations and N deposition at the designated sites with and without the proposed Development. This is often determined by modelling the dispersion of the emissions and estimating dry deposition of nitrogen at the designated site receptor with and without the proposed Development. This stage involves the following processes;
- Obtaining total average nitrogen deposition from the Air Pollution Information System (APIS) for the 5km by 5km grid square(s) corresponding with the designated site receptor over a three-year period;
  - Averaging Defra background NO2 concentrations across the corresponding APIS 5km^2 grid square(s);
  - Determining the road contribution to NO2 dry deposition by subtracting the 5km2 average Defra background from the receptor dry deposition result; and
  - Adding the road contribution to nitrogen deposition to the APIS average total nitrogen deposition and comparing with the relevant critical load.

- Where related changes in nitrogen deposition (as a result of the proposed Development) are expected to be less than or equal to 1% of the site relevant lower critical load then impacts are expected to be **Not Significant.** Where the change is greater than 1%, the impact is sufficiently large that it cannot be screened out and therefore it could have a potential **Significant** effect and warrants further interpretation by the project ecologist.

6.2.148 This information has used in (Chapter 7: Biodiversity) to use their expertise to determine whether or not there is, in fact, a likely **Significant** effect of the proposed Development on the habitat to ascertain the likelihood of damage.

Deferring to the Local Plan HRA for ecological sites with a European designation

6.2.149 The IAQM ecological guidance states that for impacts on sites with a European designation (SAC or SPA), the assessor should first consider whether the air quality issues have been considered in the Local Plan Habitats Regulation Assessment (HRA). Additionally, it states that if this has been done then it is appropriate and in line with government guidance to defer to that over-arching Local Plan assessment. Deferring 'upwards' to the Local Plan also addresses the undesirable situation of having multiple traffic and air quality models for a single local authority area and the potential for the modelling inconsistencies that would follow.

6.2.150 The only site with a European designation in the operational phase local air quality study area is the Folkestone to Etchinghill SAC. The proposed Development is included as an allocation in both the F&HDC Places and Policies Local Plan and Core Strategy Review (CSR) to the end of the respective Local Plan and Core Strategy Review periods in 2031 and 2037.

6.2.151 The CSR HRA (Ref 6.33) carried out on behalf of F&HDC in December 2018 by LUC concluded that there would be no adverse effects on European sites (including Folkestone to Etchinghill SAC) by the end of the CSR period in 2037 in a high growth scenario whereby 8,000 residential units would be built out over the period (including 5,925 at the proposed Development).

6.2.152 An addendum to the CSR HRA was published by LUC in November 2019 (Ref 6.34). It stated that the addendum report was produced in response to proposed changes to the Folkestone & Hythe CSR, which contained a new housing need figure following the publication of the Government's new standard methodology for calculating housing need. This served to increase the allocated number of residential units at the proposed Development to 6,375 by 2037, however the overall number of units built out across the CSR period is 7,700, which is below the 8,000 unit scenario assessed in the CSR HRA. The HRA addendum therefore concluded that as the overall housing quantum was lower, the findings of the CSR HRA would remain valid and that impacts from air pollution to European sites identified within the HRA will be adequately mitigated for and will not lead to adverse effects on integrity either alone or in-combination with other plans and projects.

6.2.153 Therefore in line with the IAQM guidance, assessment of impacts on ecological sites from the operation of the proposed Development should be deferred upwards to the CSR HRA.

6.2.154 For impacts on European sites in 2044 (i.e. beyond the CSR period), it is highly likely that the assessment approach adopted in this chapter (i.e. using 2030 emission rates with 2044 traffic (due to the horizon year of the Defra tools)) would produce overly worse case results as emission rates are expected to decrease over time. It would be inappropriate to undertake a HRA using such results given the inherent uncertainty associated with making predictions so far into the future. In any case the air quality issues would be explored in the future with a greater degree of certainty when the F&HDC are required to publish a local plan document that covers the period up to and

beyond 2044. This future assessment would include information which the current 2044 traffic data used in the assessment presented in this chapter does not contain such as the traffic effect of any updated F&HDC local plan, or the local plans of neighbouring local authorities (the current 2044 assessment has accounted for future growth with generic annual growth factors).

6.2.155 Predicted impacts at Folkestone to Etchinghill SAC have been quantified in 2024, 2030 and 2044 for use in (Chapter 7: Biodiversity) to ascertain the likelihood of damage in the context of environmental impact assessment. For effects on site integrity from air quality, the HRA undertaken for the proposed Development defers to the findings presented in the CSR HRA.

Damage Cost Assessment Methodology

6.2.156 During the consultation stage a request was made by F&HDC's Environmental Health team to produce a damage cost assessment for the proposed Development. It was agreed that a non-binding indicative damage cost assessment would be carried out using Defra's Damage Cost Appraisal tool covering the five-year period commencing from completion of the proposed Development in 2042 (i.e. excluding Framework Masterplan).

6.2.157 The IAQM (2017) development control guidance provides an outline methodology of the steps involved in generating a development specific damage cost:

- Identify opening year trip rate –information taken from the Transport Assessment (ES Appendix 16.4). Expected to be 38,714 trips per day associated with the operation of the site
- Assume an average distance travelled of 10km
- Calculate the additional emissions of NOx and PM_{10} (tonne/annum) based on Emission Factor Toolkit, assuming a speed of 50kph
- Multiply emissions by 5 to assume emissions of a 5-year timespan
- Use the HM Treasury and Defra IGCB damage cost approach to provide a valuation of the excess emissions, using the currently applicable values for each pollutant – The latest Damage Cost Appraisal Toolkit (March 2021) allows the user to input NOx and $PM_{2.5}$, therefore PM_{10} emissions are converted to $PM_{2.5}$ using a conversion factor of 0.642
- Sum the Central Present Values for NOx and $PM_{2.5.}$

6.2.158 The damage cost assessment is presented in paragraphs 6.5.112 to 6.5.117.

Sensitivity Testing

Operational Impact of proposed Development on Canterbury AQMA No.3

6.2.159 The scoping opinion received from F&HDC indicated that they acknowledged CCC's request for the assessment of the impact of the proposed Development on the Canterbury No.3 AQMA to be considered as part of the wider air quality assessment.

6.2.160 The traffic microsimulation did not extend out to Canterbury and the only data available within CCC's jurisdiction was for two roads (Nackington Road and Old Dover Road located west of Nackington Road) which were included in the Arcadis transport planning team's scope. Without and with proposed Development flows were provided for these links in each of 2024, 2030 and the 2044 plus Framework Masterplan scenario.

6.2.161 It was decided that the modelling of the impact of the proposed Development on those receptors nearest to Old Dover Road would represent the best available means of

estimating the impact of the development on the Canterbury No.3 AQMA as Old Dover Road flows into the AQMA.

6.2.162 Changes in traffic flows on Old Dover Road and Nackington Road in 2024 and 2030 were minimal (<100 AADT, <25 HDV); these years were therefore not quantitatively assessed (as per the IAQM screening criteria).

6.2.163 In 2044, an increase of 222 and 448 vehicles per day was predicted on Old Dover Road and Nackington Road respectively (changes in HDV flow were negligible). As detailed in the previous paragraph, Old Dover Road flows into the Canterbury No.3 AQMA via the Riding Gate roundabout where traffic disperses across the A28 Upper Bridge Street, Watling Street and A28 Rhodaus Town, therefore it would be expected the increase in vehicle flow from the proposed Development plus Framework Masterplan on these roads would be smaller than on Old Dover Road. Therefore the assessment only considered receptors located along Old Dover Road as the other roads which reside within the AQMA will have a negligible impact.

6.2.164 A note summarising the approach, assessment methodology and results is presented in ES Appendix 6.7. The findings are also summarised as part of the appraisal of operational phase impacts on local air quality for 2044 in paragraph 6.5.90.

Development Specification Quanta

6.2.165 A sensitivity test has been undertaken to establish the likely impact of traffic changes caused by the maximum quantum of development (as set out in the Development Specification, ES Appendix 4.1, and Chapter 4: The Site and the proposed Development).

6.2.166 Furthermore, the sensitivity test scenarios account for the inclusion of an additional link road in the proposed town centre. This connects the high street by Westenhanger rail station to the road through the business park. The strategic transport model used for the main assessment did not include for this route to be connected for through traffic as it was not proposed at the time. See Chapter 2: EIA Approach and Methodology for further details of the link road.

6.2.167 The Illustrative Accommodation Schedule (ES Appendix 4.4) and Illustrative Masterplan (ES Appendix 4.5) form the basis of the traffic data used in the air quality chapter, and therefore form the basis of the air quality results presented in the subsequent sections of this document.

6.2.168 There is a necessity within the transport model to use the Illustrative Accommodation Schedule (ES Appendix 4.4) and Illustrative Masterplan (ES Appendix 4.5) due to the requirement to identify the location of trip start and end points. However, the quantum of development set out within the Illustrative Accommodation Schedule (ES Appendix 4.4) is lower than that for which approval is requested within the Development Specification (ES Appendix 4.1).

6.2.169 In order to confirm that the transport and transport related assessments are valid for the full quantum of development, for which approval is requested, sensitivity testing has been undertaken. The sensitivity test scenarios comprise:

- Scenario 1: Quantum for approval 2044 (proposed Development - 8,500 residential units)
- Scenario 2: Quantum for approval 2044 (proposed Development plus Framework Masterplan – 10,000 residential units)
- Scenario 3: Quantum for approval 2030 (proposed Development plus Framework Masterplan – 10,000 residential units)

6.2.170 Further detail can be found in Chapter 2: EIA Approach and Methodology.

6.2.171 Analysis proportionate to the risk of material changes to the findings associated with the air quality impact of the Illustrative Masterplan (ES Appendix 4.5) traffic flows was undertaken for each of the above scenarios. Scenario 1 does not include the additional 1,500 residential units associated with completion of the 2044 Framework Masterplan and therefore the traffic flows are almost universally lower in Scenario 1 than has been assessed in this chapter in accordance with the Illustrative Masterplan (ES Appendix 4.5). Consequently, the overall residual effect on operational air quality would be less than that associated with the Illustrative Masterplan (ES Appendix 4.5) and no further analysis is required.

6.2.172 Dispersion modelling was undertaken for the scenario 2 and 3 traffic datasets using the same methods as the Illustrative Masterplan (ES Appendix 4.5) owing to the increased levels of traffic associated with those scenarios. However, only annual mean NO_2 concentrations were modelled for local air quality effects as the Illustrative Masterplan (ES Appendix 4.5) modelling demonstrates that impacts on particulate matter were universally negligible. Additionally, nitrogen deposition was recalculated at the ecological sites in the air quality study area using the scenario 2 and 3 datasets. The threshold for perceptible impacts is a change of >1% of the site relevant lower critical load, which means relatively minor increases in nitrogen deposition can lead to exceedances of this threshold and therefore sensitive to change.

6.2.173 Scenario 2 leads to an increase in overall traffic flows across the road network of approximately 0.4% as compared to the with proposed development scenario of the Illustrative Masterplan (ES Appendix 4.5). This is considered relatively marginal, however NO_2 concentrations were remodelled for all human and ecological receptors to establish the impact of the Scenario 2 traffic flows on air quality. The modelling demonstrated that Scenario 2 would produce almost identical results to the Illustrative Masterplan (ES Appendix 4.5) in terms of local air quality. The local air quality modelling results associated with Scenario 2 are presented in ES Appendix 6.8. Whilst there were some very slight increases and decreases in concentrations, none of these were sufficiently large to change the IAQM impact descriptor attributed to any of the receptors as part of the work undertaken for the Illustrative Masterplan (ES Appendix 4.5). As with the 2044 Illustrative Masterplan results, the same single receptor was categorised as slight adverse (OTT117), and the same single receptor was categorised as slight beneficial (OTT090) – the remainder of the receptors were all categorised as negligible.

6.2.174 Therefore, in terms of local air quality and impacts on human receptors, the traffic flows associated with Scenario 2 do not result in effects that are materially different to those resulting from the traffic flows associated with the Illustrative Masterplan (ES Appendix 4.5). The conclusion still remains that the predicted air quality effects of the proposed Development on local air quality in 2044 are **not significant**.

6.2.175 The additional traffic on some roads in Scenario 2 causes the number of roads which meet the DMRB traffic change criteria (for purposes of screening whether ecological assessment is required) to increase. However, none of the additional roads which meet the criteria are within 200m of a site with a relevant ecological designation; therefore no consideration of additional ecological sites is required. Nitrogen deposition at the qualifying ecological receptors was re-calculated (based on the remodelled results) to account for the additional traffic associated with Scenario 2. The increase in nitrogen deposition at total of three additional individual transect points (rather than whole transects) exceeded 1% of the site-relevant lower critical load in addition to the 39 points which exceeded the lower critical load in the Illustrative Masterplan (ES Appendix 4.5) modelling results). The results were reviewed and it is

concluded that air quality effects on ecological sites in Scenario 2 were still to be considered as '**not significant'**.

6.2.176 Scenario 3 comprises the Development Specification (ES Appendix 4.1) floorspace traffic in the construction peak year of 2030. Scenario 3 leads to an increase in overall traffic flows across the road network of approximately 0.2% as compared to the 2030 with proposed development scenario of the Illustrative Masterplan (ES Appendix 4.5). This is considered marginal, however NO_2 concentrations were remodelled for all human and ecological receptors to establish the impact of the Scenario 3 traffic flows on air quality. The modelling demonstrated that Scenario 3 would produce almost identical results to the Illustrative Masterplan (ES Appendix 4.5) in terms of local air quality. The local air quality modelling results associated with Scenario 3 are presented in ES Appendix 6.8. The maximum difference between the Illustrative Masterplan (ES Appendix 4.5) and Scenario 3 with proposed Development concentrations at any single receptor was 0.2µg/m^3. None of the concentration changes were sufficiently large to change the IAQM impact descriptor attributed to any of the receptors as part of the work undertaken for the Illustrative Masterplan (ES Appendix 4.5). As with the 2030 Illustrative Masterplan (ES Appendix 4.5) results, the same three receptors (OTT117, OTT118 and OTT124) were categorised as slight adverse, and the same two receptors (OTT090 and OTT134) were categorised as slight beneficial; the remainder of receptors were categorised as negligible.

6.2.177 Therefore, in terms of local air quality and impacts on human receptors, the traffic flows associated with Scenario 3 do not result in effects that are materially different to those resulting from the traffic flows associated with the Illustrative Masterplan (ES Appendix 4.5). The conclusion would still remain that the predicted air quality effects of the proposed Development on local air quality in 2030 are **not significant**.

6.2.178 The additional traffic on some roads in Scenario 3 causes the number of roads which meet the DMRB traffic change criteria to increase. However, none of the additional roads which meet the criteria are within 200m of a site with a relevant ecological designation; therefore no consideration of additional ecological sites is required. Nitrogen deposition at the qualifying ecological receptors was re-calculated (based on the remodelled results) to account for the additional traffic associated with Scenario 3. As compared to the 2030 Illustrative Masterplan (ES Appendix 4.5) results, no additional points exceeded the 1% of the site relevant lower critical load criterion. In terms of the magnitude of impacts the largest increase in Nitrogen deposition at a given receptor between the Illustrative Masterplan (ES Appendix 4.5) results and Scenario 3 results was 0.01kg/Na/ha/yr which indicates the two sets of results are almost identical and therefore not materially different. The results were reviewed and it is concluded that air quality effects on ecological sites in Scenario 3 are still to be considered as '**not significant**'.

6.2.179 Compliance with the government's annual mean Limit Value for NO_2 was not re-assessed for the Scenario 3 dataset as there would only be a risk of non-compliance if there was a perceptible increase at qualifying features with a total with proposed Development concentration of >40µg/m^3 or where the PCM model showed an exceedance of the same value. The highest PCM concentration in the study area is 17.1µg/m^3 and the highest modelled concentration at a qualifying receptor with the Illustrative Masterplan (ES Appendix 4.5) dataset was 21.1µg/m^3. It is therefore unrealistic to suggest there would be any possibility of exceeding the Limit Value given the marginal predicted increase in traffic associated with the Scenario 3 traffic dataset. It should be reiterated that assessment of the risk of non-compliance with the government's Limit Values was not assessed as part of the work informed by the

Illustrative Masterplan (ES Appendix 4.5) traffic 2044 dataset as Defra have not generated PCM outputs beyond 2030.

6.2.180 Therefore, in all scenarios for all receptors the sensitivity test concludes that the main assessment is appropriate and robust.

Limitations and Assumptions

Limitations

Proposed on-site Wastewater Treatment Works and Odour

6.2.181 There is currently insufficient detail in terms of design and input parameters to undertake a quantitative odour assessment which would involve dispersion modelling. A qualitative risk-based assessment has been undertaken as a means of estimating possible odour effects, however a quantitative odour assessment is to be undertaken during Tier 3 to ensure that there are no unacceptable impacts as a result of odour from the operation of the plant. This would be secured by planning condition. F&HDC's environmental health team were consulted on this approach and had no objections.

6.2.182 The qualitative assessment is based on the limited information regarding the general nature of the proposed WwTW. Therefore a number of assumptions were made, and professional judgement was applied. The findings of the recommended quantitative odour assessment will supersede the findings of the qualitative assessment presented in this chapter as and when it is published.

Stack Emissions from Gas Combustion Plant at Permitted Waste Facility

6.2.183 The SLR Consulting Environmental Statement (Ref 6.23) which accompanied the Permitted Waste Facility (PWF) at Otterpool Quarry included an aspirational plan to operate a gas combustion plant as a means of generating power and heat from excess gasses generated by the anaerobic digestion plant. Any emissions from this plant would need to be vented by a stack.

6.2.184 However, the PWF ES was limited to a discussion of the applicable planning system and that for any operation of the plant to occur, a Pollution Prevention and Control (PPC) permit would need to be sought from the Environment Agency (section 5.2 of Chapter 5: Air Quality Assessment). The ES served to defer any assessment of this plant to the point in time that the PWF site applicant would apply for a PPC permit.

6.2.185 After the PWF ES was submitted, Kent County Council requested further modelling be undertaken which defined the likely quantitative impacts associated with the operation of the PWF. A further assessment (Ref 6.35) was carried out by SLR Consulting which quantified impacts of NO_2 and PM_{10} at human and ecological receptors. The assessment demonstrated that process contributions were imperceptible (i.e. less than 1% of the air quality objectives/critical level) at all of the assessed human and ecological receptors.

6.2.186 At the time of publication, it is understood that the PWF site applicant has not applied for a PPC permit. Should the applicant seek permission to operate, it is envisaged that they would employ Best Available Technology (BAT) measures to minimise any impacts as means of successfully gaining a PPC permit.

6.2.187 For these reasons emissions from the PWF gas combustion plant can be considered negligible and would not require consideration in terms of cumulative effects.

6.2.188 It should be noted that the Infrastructure Assessment (ES Appendix 2.7) indicates that it is unlikely that the PWF will be realised. It is instead expected that different built development will be delivered in the location of the PWF, namely that of the Otterpool Park proposals. The OPA proposes a number of land uses that could be provided there (including Use Classes C2, C3, E, F, B2, C1 and Sui Generis) and the final use

will be confirmed at Tier 2 through the submission of a spatial plan for the relevant Indicative Phase (i.e. via Design Codes and a Phase specific Masterplan) and subsequently through Tier 3 Reserved Matters applications.

Assessment of Air Quality Impacts on European Sites

6.2.189 Natural England were contacted regarding approach to assessment of air quality impacts on European sites (Folkestone to Etchinghill SAC) with regards to deferring to the findings of the local plan HRA (the justification for which is provided in paragraph 6.2.150 onwards. Natural England acknowledged receipt of the initial query. No response had been received at the time of writing; therefore it has been assumed to be acceptable to defer to the findings of the HRAs completed on behalf of F&HDC in support of the People and Policies Plan and the adopted Core Strategy Review.

Retention of Existing on-site Receptors

6.2.190 There are 23 existing properties within the application site boundary in a residential use (refer to Chapter 4: The site and proposed Development for the full list), of this two have been identified as retained, nine as demolished and twelve which may be demolished or retained, a final decision on which will be made at Tier 2.

6.2.191 In terms of construction dust impacts, the construction dust risk assessment seeks to define the level of mitigation and control required to eliminate/minimised dust impacts. As the site has been categorised as a high risk (the highest level of risk possible), the most stringent dust suppression and prevention methods are recommended and are to be integrated into the CoCP (ES Appendix 4.17). Therefore, a worst case assessment regarding the potential maximum amount of demolition has been undertaken in this chapter.

6.2.192 In terms of the operational phase local air quality impacts from traffic emissions, 8 of these receptors which may be retained at Tier 2 are located adjacent to the A20 Ashford Road between the B2067 and Newingreen. The remainder of the receptors are located further back from the road and impacts will be no greater than the reported results at receptors closer to the road network. Analysis of the traffic flows on A20 between the B2067 and Newingreen adjacent to the receptors in each of 2024, 2030 and 2044 shows that there is a decrease in traffic in the with proposed Development scenario; this is due to rerouting once the development becomes operational. Therefore as pollutant concentrations would decrease, retention of the receptors would not lead to additional locations being subject to adverse effects and would not lead to a material change to the conclusions reached in the effects section of this chapter which assumes the receptors would be demolished.

6.2.193 Additionally with reference to the local air quality results generated for existing and future receptors across the entirety of the air quality study area, there is sufficient confidence that effects at nearby receptors are overwhelmingly negligible and inclusion of receptors (which may be retained at Tier 2) into the dispersion model is not required.

Assumptions

6.2.194 A number of notable assumptions have been made in the operational phase assessment. These are summarised below:

- The operational phase assessments assume that all of the assessed on-site future receptor locations are fully built out in each of the with proposed Development scenarios. This allows the operational phase traffic impact associated with each of the assessment years to be evaluated across the application site.
- Each future baseline traffic scenario assumes a future baseline environment without the proposed Development. For instance, in 2044, the ‘without

Development' scenario assumes that no part of the application site is represented in the traffic data, even though in reality most of the site would be operational. This approach means that the predicted increases in traffic and air pollution will be worst case as the future baseline concentrations will be lower.

- As discussed in paragraphs 6.2.42 and 6.2.43, 2030 emission rates and background concentrations have been used to carry out the 2044 operational phase assessment as EFT v10.1 has a horizon year of 2030. Therefore the 2044 assessment is considered to be worst case as emissions rates and background concentrations are likely to decrease between 2030 and 2044 due to government policy and the integration of greater numbers of cleaner vehicles (in terms of lower emissions) into the traffic fleet as a result of the ongoing decarbonisation of the transport sector from 2030.
- The construction dust assessment assumes that all proposed construction activities may take place on the application site boundary. This is a conservative approach that has been adopted to ensure that potential impacts at receptors within 350m of the application site boundary have been considered. It is assumed that exhaust emissions from plant will be minimised with the application of the mitigation measures detailed in ES Appendix 6.3.
- With regards to compliance risk, in 2044, it is highly unlikely that any Agglomeration Zone in the UK will be at risk of non-compliance with the existing air quality Limit Values.

6.3 Baseline

Existing Baseline

Folkestone & Hythe District Council Air Quality

6.3.1 As required by the Environment Act (1995), F&HDC has undertaken a Review and Assessment of air quality within its area of jurisdiction. This process has indicated that concentrations of all pollutants considered within the Air Quality Strategy are below the relevant AQS objectives and, as such, no AQMAs have been declared within the local authority's area to date.

6.3.2 F&HDC undertakes monitoring of nitrogen dioxide (NO_2) concentrations using passive diffusion tubes at 16 locations across its district. A review of the F&HDC 2020 Annual Summary Report (ASR) (Ref 6.36) indicated that diffusion tube monitoring was carried out at 26 locations during 2019, which represents the most recent year of published data. The monitored annual mean NO_2 concentrations are shown in Table 6-13.

Table 6-13: Folkestone & Hythe DC Annual Mean NO_2 Concentrations 2015-2018

Monitoring Site	Type	National Grid Reference (X,Y)	Annual Mean NO_2 Concentrations (µg/m^3)				
			2015	2016	2017	2018	2019
DT1: Cheriton Place, Folkestone	Roadside	622584, 135820	20.0	21.5	23.5	25.4	21.0
DT2: Cheriton Road, Folkestone	Roadside	622400, 136100	23.3	28.6	27.9	19.6	25.7
DT3: Coldharbour House, B2067, Lympne	Background	609964, 135279	13.7	14.9	16.5	12.0	11.8
DT4: Stone Street, Stanford North	Urban Background	612995, 138525	17.4	19.6	19.9	18.1	17.8
DT5: Blackbull Road, Folkestone	Roadside	622734, 136769	28.6	30.4	30.2	29.7	27.9
DT6: Martello Cottages, Hythe	Roadside	614547, 133993	24.3	25.1	23.2	23.2	25.3
DT7: Wear Bay Road, Folkestone	Roadside	622396, 136976	18.8	20.7	22.5	17.2	17.7
DT8: Ashford Road, Newingreen	Roadside	612694, 136190	20.2	22.7	21.4	21.3	22.4
DT9: Cherry Garden Avenue, Folkestone	Roadside	621248, 137352	25.8	28.7	29.5	28.8	30.0
DT10: Martinfield Cottage, Lydd Road, Romney	Roadside	604011, 124948	15.3	18.8	16.2	16.5	16.6
DT11: Swann Way, Hawkinge	Roadside	621437, 139594	17.7	17.4	22.5	19.8	19.3

Monitoring Site	Type	National Grid Reference (X,Y)	Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
			2015	2016	2017	2018	2019
DT12: Horn Street, Hythe	Kerbside	618860, 135899	19.5	20.0	19.2	18.8	16.2
DT13: Kennett Lane, Stanford	Rural	612481, 137978	NA	14.0	18.5	16.7	13.6
DT14: Princes Parade	Roadside	618727, 134797	NA	NA	NA	15.8	16.3
DT15: Dixwell Road	Roadside	621361, 135511	NA	NA	NA	NA	24.3
DT16: Seabrook Road	Roadside	618680, 134977	NA	NA	NA	NA	18.1

6.3.3 Table 6-13 shows that the 2019 F&HDC NO_2 concentrations range from 12 to 30 $\mu g/m^3$, with the majority falling between 16 and 25 $\mu g/m^3$. This shows that the NO_2 concentrations are well below the annual mean AQS objective of 40 $\mu g/m^3$. Between 2015 and 2019 the monitored results show that there was no real upward or downward trend and that concentrations have remained stable.

6.3.4 The 2020 ASR provides the most up to date data and therefore the most recent indication of the Air Quality in F&HDC. Site DT9 (7km to east of proposed Development) was 30 $\mu g/m^3$ in 2019 which is the highest concentration in F&HDC.

6.3.5 A number of the F&HDC sites, for the traffic and air quality baseline year of 2018, were used in the model verification process provided they met the criteria stipulated in 6.2.28.

Ashford Borough Council Air Quality

6.3.6 ABC has undertaken a review and assessment of air quality within its area of jurisdiction. This process has indicated that concentrations of all pollutants considered within the Air Quality Strategy are below the relevant AQS objectives and as such, no AQMAs have been declared within the local authority's area to date.

6.3.7 A review of the ABC 2019 Annual Summary Report (ASR) (Ref 6.37) indicated that diffusion tube monitoring of nitrogen dioxide (NO_2) concentrations using passive diffusion tubes was carried out at 21 locations across its borough. The monitored annual mean NO_2 concentrations are shown in Table 6-14.

Table 6-14: Ashford BC Annual Mean NO_2 Concentrations 2015-2018

Monitoring Site	Type	National Grid Reference (X,Y)	Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
			2015	2016	2017	2018	2019
AS15/16/17	Motorway	603393,142073	32.6	32.8	36.4	30.5	27.7
AS18/19/20	Suburban	601321,143568	26.5	27.4	27.9	26.3	23.8
AS24	Roadside	600778,142910	20.5	22.0	21.5	19.9	18.3
AS27	Roadside	600794,142320	18.2	20.8	18.6	18.0	17.4
AS31	Roadside	601828,141461	20.7	22.3	24.3	18.4	19.6
AS33	Urban	599826,143084	21.2	21.8	21.7	19.6	18.4

Monitoring Site	Type	National Grid Reference (X,Y)	Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
			2015	2016	2017	2018	2019
AS35	Urban	599513,142110	20.1	20.8	22.2	19.4	18.1
AS37	Urban	600488,141277	26.8	25.7	26.5	25.1	25.1
AS40	Urban	603229,142795	19.7	18.9	19.1	16.3	15.5
AS42	Urban	601020,142434	21.3	21.1	20.6	19.2	19.9
AS43	Urban	600665,142703	20.9	22.1	22.1	20.1	18.9
AS44	Urban Background	603800,141792	21.6	24.1	19.7	18.9	18.9
AS45	Urban Background	604207,141387	-	25.6	20.3	19.4	19.4
AS46	Motorway	603311,142192	-	-	21.6	24.1	23.8
AS47	Other	604583, 140961	-	-	-	14.4	14.0
AS48	Other	604733, 140878	-	-	-	13.8	13.2
AS49	Roadside	604005, 141616	-	-	-	-	37.1
AS50	Urban Background	601707, 142748	-	-	-	-	23.4
AS52	Urban Background	601211, 142990	-	-	-	-	34.7
AS53	Urban Background	601055, 142972	-	-	-	-	33.3
AS54	Roadside	601065, 143048	-	-	-	-	30.1
AS55	Urban Background	600361, 143234	-	-	-	-	23.7
AS56	Urban Background	600667, 143016	-	-	-	-	22.4
AS57	Urban Background	600877, 142694	-	-	-	-	28.8
AS58	Urban Background	600865, 142588	-	-	-	-	26.8
AS59	Roadside	601096, 142114	-	-	-	-	25.1
AS60	Roadside	600946, 142205	-	-	-	-	29.4
AS61	Urban Background	601150, 142342	-	-	-	-	31.1

Monitoring Site	Type	National Grid Reference (X,Y)	Annual Mean NO_2 Concentrations (µg/m^3)				
			2015	2016	2017	2018	2019
AS62	Urban Background	600191, 143560	-	-	-	-	19.8
AS63	Roadside	599263, 142471	-	-	-	-	29.1
AS64	Urban Background	599391, 141842	-	-	-	-	21.2
HE1e	Roadside	599298, 145188	-	-	-	17.0	18.0
HE2e	Roadside	594818, 149759	-	-	-	18.7	19.4
HE3e	Roadside	595216, 149249	-	-	-	24.9	22.8
HE4e	Roadside	597003, 146561	-	-	-	19.2	19.2
HE5e	Roadside	599183, 144730	-	-	-	29.7	26.7

6.3.8 Table 6-14 demonstrates that the 2019 ABC NO2 concentrations range from 13.2 to 31.1 µg/m3. The majority of sites are below 30 µg/m3. This shows that the NO2 concentrations are well below the annual mean AQS objective of 40 µg/m3. Between 2015 and 2019, most available monitored results show a decrease in NO2 concentrations.

6.3.9 The 2020 ASR provides the most up to date data and therefore the most recent indication of the Air Quality in ABC. Site AS49 (located 7km northwest of proposed development, adjacent to A20) was 37.1 µg/m^3 in 2019 which is the highest concentration in ABC.

Arcadis Air Quality Monitoring

6.3.10 A six-month air quality monitoring survey was undertaken by Arcadis in the vicinity of the application site in order to better inform baseline air quality. In April 2017, 16 NO_2 diffusion tubes were deployed in the vicinity of the application site.

6.3.11 As per the monitoring recommendations in LAQM TG16, bias adjustment and annualisation were carried out on the monitored data. A locally derived bias adjustment factor was adopted as there was less than nine months of data. The local bias adjusted factor was derived using three diffusion tubes co-located at the Maidstone Rural automatic monitor. The bias adjustment factor was calculated to be 0.71, suggesting that the diffusion tubes were over-reading NO_2 concentrations. The factor was then applied to the raw monitored results.

6.3.12 The data was then annualised as per best practice detailed in LAQM (TG 16). The final bias adjusted and annualised results are shown in Table 6-15.

Table 6-15: Bias Adjusted and Annualised Results of the Arcadis Diffusion Tube Monitoring (2018)

Site ID	X	Y	Data Capture for Six Months (%)	2018 annualised and bias adjusted annual mean NO_2 concentration (µg/m^3)
O1	613638	136970	100	21.4
O2	612805	136835	100	12.3

Site ID	X	Y	Data Capture for Six Months (%)	2018 annualised and bias adjusted annual mean NO_2 concentration (µg/m^3)
O3	612680	136185	100	20.8
O4	612475	135827	100	12.9
O5	610636	137872	33	19.2
O6	611833	134980	100	12.3
O7	612239	135341	83	16.8
O8	611282	136670	83	21.9
O9	610701	137674	83	25.5
O10	609421	137755	83	10.1
O11	610794	137453	100	21.5
O12	610931	136834	100	14.4
O13	610978	135614	100	15.3
O14	612068	135514	100	10.1
O15	612887	137513	67	24.3
O16	609262	136590	100	9.2

6.3.13 Table 6-15 demonstrates that annual mean NO_2 concentrations were well below the annual mean AQS objective of 40 µg/m^3 indicating a reasonably good level of existing air quality in the vicinity of the application site.

Defra Background Maps

6.3.14 Predictions of total pollutant concentrations include contributions from local emissions sources (such as roads, chimney-stacks, etc.) and local background concentrations. In many situations, the background contribution may represent a significant or dominant proportion of these concentrations. Background concentrations for regulated pollutants are expected to decline in future years as a result of government policies/legislation to reduce pollution emissions.

6.3.15 In order to establish a prediction of total concentrations of pollutants, road source contributions are combined with a background concentration.

6.3.16 Defra Technical Guidance LAQM.TG(16) recommends the use of empirically derived national background estimates available from the Defra website, which provide estimated background pollutant concentrations for each 1km by 1km grid square in the UK.

6.3.17 The application site and air quality study area are located across a number of grid squares. Data for the grid squares that cover the application site were downloaded from the Defra website for the purposes of the assessment. The unadjusted background concentration predictions for each grid square during 2018 are presented in Table 6-16.

Table 6-16: Unadjusted Defra Modelled Background Concentrations for 2018

Grid Square (X,Y)	2018 Predicted Background Concentration (µg/m^3)		
	NO_2	PM_{10}	$PM_{2.5}$
611500, 137500	11.9	17.0	10.2
612500, 137500	12.2	16.2	10.1
611500, 136500	9.3	14.1	9.0
612500, 136500	9.8	14.8	9.3

6.3.18 Table 6-16 indicates that background NO_2, PM_{10} and $PM_{2.5}$ concentrations are low across the application site when considered in the context of the respective AQS objectives. It is acknowledged that Defra background maps of NO_2/NOx are often overly optimistic as they generally assume a greater decrease in pollutant concentrations over time than is actually the case when compared to monitoring data. A report published by Air Quality Consultants (2020) (Ref 6.38) compared concentrations recorded at automatic monitors to the modelled Defra background concentrations at 81 suitable sites across the UK (excluding inner London). The comparison found that monitored background concentrations are approximately 16% higher for NO_2 than the equivalent modelled background concentrations. Therefore, an uplift factor of 1.16 was applied to the Defra background maps, to each pollutant, which covered the relevant study areas.

6.3.19 As the background NO_x, $PM_{2.5}$, and PM_{10} maps provide data for the individual pollutant sectors (e.g. motorway, trunk A-roads, primary A-roads, minor roads and industry), the components relating to in-grid square road traffic were removed for those road types being explicitly modelled. This was done to avoid double counting of road emissions. The NO_x contribution of the in-grid road sectors were removed from the uplifted total NO_x background concentrations. The adjusted total NO_x background concentration was then converted to NO_2 for use in the assessment. This was undertaken using the NO_2 Adjustment for NO_x Sector Removal tool (v8.0, August 2020). This calculator was used to adjust the 2018, 2024 and 2030 background concentrations. Defra tools were configured to 2030 for the purposes of the 2044 modelled scenario as the horizon year in the tools is 2030.

Ecological Sites

6.3.20 Elevated NO_x concentrations and nitrogen (N) deposition can adversely affect ecosystems. The IAQM (2020) designated sites guidance recommends that a number of ecological site designations may be considered in any assessment of ecological impacts from air quality. Such designations include

- Sites with European Designations; Special Areas of Conservation (SACs), Special Protection Areas (SPAs), and Ramsar sites;
- Sites with national designations; Special Sites of Special Scientific Interest (SSSI), Ancient Woodland (AW); and
- Sites with a local designation; Local Nature Reserves (LNR) and Nature Improvement Areas.

6.3.21 Critical loads for the deposition of nitrogen, which represent the exposure below which there should be no significant harmful effects on sensitive elements of the ecosystem (according to current knowledge), have been established for specific habitats. Table

6-17 shows ecological sites within the assessment study area together with their critical loads and baseline deposition rates for nitrogen.

6.3.22 Baseline rates of nitrogen deposition have also been obtained from APIS. Existing rates of nitrogen deposition currently exceed minimum critical loads in the majority of the ecological sites. It should be noted that no information on critical loads is available from APIS for ancient woodland sites (unless the woodland is located within an SAC/SSSI or other site where critical loads can be looked up from APIS), therefore the project ecologist recommended using the critical load range associated with Broadleaved Deciduous Woodland (10-20 kg N ha^{-1} yr^{-1}).

Table 6-17: Summary of Baseline Information at Ecologically Designated Receptors

Ecological Site	Site Designation	Most Nitrogen Sensitive Feature	N Critical Load (kg N ha^{-1} yr^{-1})	Average background N Deposition (kg N ha^{-1} yr^{-1}) 2018
Hatch Park	SSSI	Broad-leaved, mixed and yew woodland	10-15	32.2
Lympne Escarpment (West Transect)	SSSI	Broad-leaved, mixed and yew woodland	15-20	24.4
Lympne Escarpment (East Transect)		Calcareous Grassland	15-25	13.9
Folkestone to Etchinghill Escarpment	SAC	Semi-natural dry grasslands and scrubland facies on calcareous substrates	15-25	19.6
	SSSI	Broad-leaved, mixed and yew woodland	15-20	34.3
Folks Wood	AW	Broadleaved Deciduous Woodland	10-20	28.8
Bockhanger Wood	AW	Broad-leaved, mixed and yew woodland	10-15 (site overlaps with Hatch Park SSSI, therefore critical load was referenced from APIS)	32.2
Park Wood	AW	Broadleaved Deciduous Woodland	10-20	30.8
Kiln Wood	AW	Broadleaved Deciduous Woodland	10-20	28.8
Harringe Brooks Wood	AW	Broadleaved Deciduous Woodland	10-20	28.8
House Wood	AW	Broadleaved Deciduous Woodland	10-20	28.8
Bartholomew's Wood	AW	Broadleaved Deciduous Woodland	10-20	28.8
Cowtye Wood	AW	Broadleaved Deciduous Woodland	10-20	26.9

Ecological Site	Site Designation	Most Nitrogen Sensitive Feature	N Critical Load (kg N ha^{-1} yr^{-1})	Average background N Deposition (kg N ha^{-1} yr^{-1}) 2018
Grange Alders/ Oakbanks	AW	Broadleaved Deciduous Woodland	10-20	26.9
Killing Wood	AW	Broadleaved Deciduous Woodland	10-20	34.3
Lympne Park Wood	AW	Broad-leaved, mixed and yew woodland	15-20 (site overlaps with Lympne Escarpment SSSI, therefore critical load was referenced from APIS)	24.4
Perry Wood	AW	Broadleaved Deciduous Woodland	10-20	28.8
Hoads Wood	AW	Broadleaved Deciduous Woodland	10-20	29.3
Unnamed Ancient Woodland 1	AW	Broadleaved Deciduous Woodland	10-20	29.3
Unnamed Ancient Woodland 2	AW	Broadleaved Deciduous Woodland	10-20	29.4
Unnamed Ancient Woodland 3	AW	Broadleaved Deciduous Woodland	10-20	29.4
Ashford Green Corridors	LNR	Broadleaved Deciduous Woodland	10-20	31.8

6.3.23 The Otterpool Quarry SSSI lies within the application site boundary, although it is assumed not to be dust or nitrogen sensitive as its citation from Natural England relates to geological features rather than any flora or fauna-based features. The Lympne Escarpment SSSI lies approximately 240m south of the Framework Masterplan boundary and has been considered as a relevant ecological receptor. Additionally, Folks Wood and Harringe Brooks Wood have been considered as relevant low-sensitivity ecological receptors as they are ancient woodlands that dust and nitrogen deposition could potentially affect.

6.3.24 In the past, the now withdrawn DMRB Interim Advice Note (IAN) 61/05 advised that baseline deposition rates should be reduced by 2% per year to account for ongoing reductions in NO_x and NO_2 emissions. However, monitoring of nitrogen deposition rates undertaken in recent years does not back this up. Therefore, the baseline deposition rates have been used in the future year scenarios, and the assessments assume no reduction in background nitrogen deposition rates over time.

Future Baseline

6.3.25 The future baseline is the situation that would prevail should a proposed Development not proceed. The future baseline is further defined by the assessment scenario that the topic adheres to. The future baseline for air quality has identified the following.

Defra Background Maps

6.3.26 NO_2/NO_x data for the grid squares that cover the application site were uplifted using the factor as described in paragraph 6.3.20. The uplifted and sector removed on-site background concentrations for each of the future baseline years and each of the assessed pollutants are presented in Table 6-18. The current horizon year of Defra's predicted background concentrations is 2030, therefore the assessment year of 2044 uses the 2030 predicted background concentrations.

Table 6-18: Adjusted and Sector-Removed Defra Modelled Background Concentrations for 2024, 2030 and 2044 (2030)

Grid Square (X,Y)	Year	Predicted Background Concentration (µg/m³)		
		NO_2	PM_{10}	$PM_{2.5}$
611500, 137500	2024	10.1	15.6	9.94
612500, 137500		10.3	14.8	9.57
611500, 136500		10.0	12.9	8.53
612500, 136500		10.2	13.5	8.88
611500, 137500	2030 (also used for the 2044 assessment year)	8.44	15.4	9.74
612500, 137500		8.67	14.6	9.36
611500, 136500		8.47	12.6	8.32
612500, 136500		8.70	13.3	8.68

6.3.27 Table 6-18 demonstrates that background pollutant concentrations used in the assessment are low across the site in each of the assessment years.

6.4 Design and Mitigation

6.4.1 The following section sets out:

- The embedded design measures, including good practice approaches, relied on in this assessment; and
- The potential significant effects remaining after the application of embedded design measures and good practice approaches, and any additional mitigation required to address these potential significant effects.

6.4.2 The potential significant effects prior to additional mitigation are identified in the Assessment Summary table.

6.4.3 Environmental considerations have influenced the proposed Development throughout the design development process, from early options assessment through to refinement of the Project design. An iterative process has facilitated design updates and improvements, informed by environmental assessment and input from the Project design teams, stakeholders and public consultation.

6.4.4 Impacts would be reduced by measures embedded into the design of the development, as well as by additional mitigation, and together these measures would act to avoid, reduce and mitigate effects. The measures have been summarised by whether they are embedded design mitigation (measures that form part of the design, developed through the iterative design process and good practice standard approaches and actions commonly used on development projects to avoid or reduce environmental impacts, typically applicable across the whole Development), which are

secured through the documents for approval, or additional mitigation (any additional Development-specific measures needed to avoid, reduce or offset potential impacts that could otherwise result in effects considered significant in the context of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017) secured, for example, by planning condition or legal agreement.

Embedded Design Measures

Construction

6.4.5 The IAQM Guidance on the assessment of dust from demolition and construction dictates that the extent and nature of the embedded design mitigation should be first defined by assessing the level of unmitigated risk of dust effects. Once these have been defined, significance of residual effects is then established assuming the embedded design mitigation is implemented. Those mitigation measures detailed in the guidance commensurate with a high-risk site have been adopted as part of the Outline CoCP (ES Appendix 4.17). These have been adapted for the proposed Development based on the risk of dust effects in Table 6-21 and are detailed in full in ES Appendix 6.3. The proposed mitigation measures are summarised below:

- Site Management (logging of incidents/complaints)
- Monitoring (site inspections, soiling checks, compliance with Dust Management plan, etc)
- Preparing and Maintaining the site (locate dust causing activities away from receptors, barriers, cleaning, enclosed specific operations with high potential for dust production, cover stockpiles, etc)
- Operating vehicle/machinery and sustainable travel (no idling, use mains electricity, travel plan etc)
- Operations (employ dust suppression, use enclosed chutes, minimise drop heights, etc)
- Demolition measures (damp down, avoid explosive blasting, soft strip interiors before demolition, etc)
- Earthworks measures (revegetate promptly, use hessian mulches and cover with topsoil, etc)
- Construction measures (avoid scabbling, keep aggregates damp, ensure fine powder materials are delivered enclosed and stored in silos, ensure bags are sealed after use)
- Trackout measures (wash access and local roads, avid dry sweeping of large areas, ensure vehicle-borne materials are covered, install hard surface haul routes, wheel washing, etc).

Operation – Odour effects from operation of on-site WwTW

6.4.6 Whilst the design for the WwTW has not been finalised, it is likely that the design would incorporate Best Available Technology (BAT) and Best Practice Measures (BPM) as has been implemented on similar schemes elsewhere. This should be explored fully in the quantitative assessment of odour from the WwTW which is to be carried out at Tier 3 (and secured by planning condition) when the design has been matured.

6.4.7 The operator of the proposed WwTW will be Severn Trent Connect (STC). STC have an aspiration to implement a contemporary treatment process which results in little or

no off-site odour issues. It is likely that implemented design will incorporate the following aspects which would serve to control odour:

- The introduction of influent at the bottom of reactor tanks where it would be gently mixed with the settled biomass using the hyperboloid mixer. The sludge blanket remains undisturbed, whilst the clean effluent in the top of the tank is discharged.
- Thickened sludge is to be stored in an aerated sludge storage tank and periodically aerated using a coarse bubble aeration grid to prevent the sludge thickening too much at the bottom of the tank and to prevent the sludge becoming septic and causing odour issues.
- The use of sealed tanks where possible.

Operation – Vehicular emissions

6.4.8 The design of the proposed Development incorporates a number of measures that have served to reduce the operational air quality impact of the proposed Development. These are mainly measures that serve to reduce the number of vehicle trips generated or that encourage active travel and the use of more sustainable modes of transport which are consistent with the principles of the Transport Strategy (ES Appendix 16.5);

- Minimising reliance upon motor vehicle use
- Promoting alternative transport options
- Inclusion of integrated cycle paths into surrounding environments
- Inclusion of pedestrian walkways into surrounding environments
- Inclusion of electric charging points
- Implementation of a Travel Plan
- Integration of public transport provisions
- Reduce the need to travel by providing relevant on-site facilities.

Additional Mitigation

6.4.9 An iterative appraisal of the proposed Development taking into account the embedded design measures and good practice was undertaken to identify any potentially significant effects that would require additional mitigation (see Table 6-31). The proposed Development, during both construction and operation, is not considered to have the potential to cause significant adverse effects due to air quality and therefore no additional mitigation measures have been identified.

6.4.10 A quantitative odour assessment is to be undertaken for the proposed on-site WwTW at Tier 3; this will provide confidence around odour effects from the operation of the WwTW and will identify if any additional mitigation is required beyond the outline design; this would be secured by planning condition.

6.5 Assessment of Residual and Cumulative Effects

6.5.1 The following section sets out the residual effects following the implementation of the embedded measures and additional mitigation set out above.

6.5.2 However, this is not the case for the construction phase dust risk assessment, for which the predicated methodology dictates that unmitigated risk of effects should be calculated as a means of determining the level of embedded design mitigation. However, the presented residual significance of effect associated with the construction dust assessment is based on the application of the aforementioned embedded measures.

Construction Phase Dust Risk Assessment

6.5.3 Construction vehicle exhaust emissions have been considered as part of the 2024 and 2030 operational phase local air quality assessments. Construction would be ongoing as the phases of the proposed Development are built out and occupied.

6.5.4 The proposed construction period associated with the build out of the proposed Development is expected to take place over approximately 19 years (2023-2042).

6.5.5 Construction phase impacts are anticipated (if unmitigated) from dust emitted by construction activities and vehicle movements. The potential risk of dust impacts on human health, amenity (dust soiling) and ecological receptors has been assessed in accordance with IAQM's (2014) Construction Dust guidance as per the summary in section 6.3 and in full in ES Appendix 6.3.

6.5.6 The undertaking of activities such as demolition, excavation, ground works, construction and storage of materials has the potential to result in fugitive dust emissions throughout the construction phase. Vehicle movements both on-site and on the local road network also have the potential to result in the re-suspension of dust from highway surfaces.

6.5.7 The potential for impacts at sensitive locations depends significantly on local meteorology during the undertaking of dust generating activities, with the most significant effects likely to occur during dry and windy conditions.

6.5.8 In accordance with IAQM guidance, the following sections assess the magnitude of potential dust emissions and the sensitivity of area for the likely construction activities (demolition, earthworks, construction and trackout). From this the likely level of risk is then assessed, followed by the recommended mitigation.

6.5.9 The desk-study undertaken to inform the baseline identified there are a number of sensitive receptors (e.g. residential properties) within 350m of the application site boundary. It should be noted that the potential for impacts depends significantly on the distance between the dust generating activity and receptor location. Risk was predicted based on a worst-case scenario of works being undertaken at the application site boundary closest to each sensitive area. Therefore, actual unmitigated risk is likely to be lower than that predicted during the majority of the construction phase.

Dust Emissions Magnitude

6.5.10 **Demolition:** There are approximately 90 buildings expected to be demolished within the application site boundary as part of the site enabling works. Chapter 17: Waste and Resource Management states that the total volume of demolished buildings is

likely to be greater than 50,000m^3. Therefore, in accordance with IAQM guidance, the magnitude of potential dust emissions from demolition is classified as large.

6.5.11 **Earthworks:** The total site area is over 10,000m^2 therefore in accordance with IAQM guidance the magnitude for potential dust emissions from earthworks is classified as large.

6.5.12 **Construction:** The total building/infrastructure volume to be constructed is over 100,000 m^3 with the potential use of dusty materials. It is also likely that concrete batching may be required on site. Therefore, in accordance with IAQM guidance, the magnitude of potential dust emissions from construction is classified as large.

6.5.13 **Trackout:** The maximum number of additional construction HDV movements per day is estimated to be over 50 as an AADT. Therefore, in accordance with IAQM guidance, the magnitude of potential dust emissions from trackout is classified as large.

6.5.14 The magnitude of dust emissions for each construction phase activity is summarised in Table 6-19.

Table 6-19: Construction Phase Dust Emissions Magnitude

Activity	Dust Emission magnitude
Demolition	Large
Earthworks	Large
Construction	Large
Trackout	Large

Sensitivity of Area

6.5.15 Based on the criteria outlined in IAQM guidance, the sensitivity of area for dust soiling impacts is expected to be high as there are a large number (>100) of existing receptors which fall within the application site boundary (such as those in Newingreen and Barrow Hill, Sellindge).

6.5.16 The sensitivity of area for human health is dependent on the number of existing receptors, the distance of receptors from the application site boundary and the existing background concentrations of PM_{10}. The sensitivity of the area for dust soiling uses professional judgement to identify the sensitivity of people and their property to soiling.

6.5.17 The highest on-site background concentration for PM_{10} was obtained from the Defra website and identified as being 17.0 µg/m^3 for 2018 (as per Table 6-16). Therefore, in accordance with the criteria outlined in the IAQM guidance, the sensitivity of the area to human health impacts is medium as there are more than 100 receptors (with existing receptors alone) within 20m of the Framework Masterplan site boundary and the background concentration is <24 µg/m^3.

6.5.18 The sensitivity of the existing area to ecological impacts was deemed to be low owing to the distance of relevant ecological receptors.

6.5.19 The sensitivity of the existing environment to the specific construction dust impacts is summarised in Table 6-20.

Table 6-20: Existing Sensitivity of Area to Potential Construction Dust Impacts

Potential effect	Sensitivity of the surrounding area			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	Medium	High	High	High
Human health	Low	Medium	Medium	Medium
Ecological	Low	Low	Low	Low

Risk of Dust Effects (prior to embedded measures)

6.5.20 The risk of effects in the absence of environmental measures was then defined based upon the interaction between the magnitude of emission and the highest level of area sensitivity for each construction activity. The risk of dust effects was determined, as presented in Table 6-21.

Table 6-21: Summary of Risk of Unmitigated Construction Phase Dust Impacts

Potential Effect	Risk			
	Demolition	Earthworks	Construction	Trackout
Dust soiling	High Risk	High Risk	High Risk	High Risk
Human health	Medium Risk	Medium Risk	Medium Risk	Medium Risk
Ecological	Medium Risk	Low Risk	Low Risk	Low Risk

6.5.21 As indicated in Table 6-21, the potential risk of dust soiling is high for demolition, earthworks, construction and trackout activities. The potential risk of human health impacts is medium for each activity. The potential risk of dust impacts to ecological sites is medium for demolition and low for earthworks, construction and trackout activities. The assessment has therefore indicated that the maximum risk of unmitigated dust effects is high.

Measures to avoid Construction Phase Effects

6.5.22 The IAQM Guidance on the assessment of dust from demolition and construction provides potential mitigation measures to reduce impacts as a result of fugitive dust emissions during the construction phase. Therefore, those mitigation measures detailed in the guidance commensurate with a high risk site have been adopted as part of the Outline CoCP (ES Appendix 4.17). These have been adapted for the proposed Development based on the risk of dust effects in Table 6-21 and are detailed in full in ES Appendix 6.3.

Significance of Construction Phase Dust Effects

6.5.23 Without mitigation, the construction phase would likely result in a high magnitude of impact on receptors of high sensitivity. With regards to the EIA Regulations, this effect would be considered Significant. Therefore, those mitigation measures detailed in ES Appendix 6.3 are incorporated into the Outline CoCP (ES Appendix 4.17) and serve to reduce likely effects to a negligible level. The mitigation measures proposed in the Outline CoCP (ES Appendix 4.17) are considered as embedded design mitigation and

therefore the assessment of effects for the construction phase with these measures implemented is considered **Not Significant.**

Operational Phase Qualitative Odour Risk Assessment

6.5.24 A qualitative odour assessment was undertaken for the proposed on-site WwTW which is to be located in development area HT.5 in the northwest corner of the OPA site. The outline siting of the WwTW has taken into consideration distance to existing and future receptors.

6.5.25 The exact specification of the on-site WwTW is not yet known, but the design is being progressed by Severn-Trent Connect and will adopt a contemporary design incorporating BPM and BAT which will evolve through the respective design stages. Further detail on the outline method can be found in ES Appendix 15.2 of the Environmental Statement (Water Cycle Study).

6.5.26 The first aspect of the odour risk assessment is to define the Source Odour Potential (SOP). WwTWs are associated with highly odorous waste that generally has a low detection threshold and would generally be categorised as having a large SOP, however this assumes there is open air treatment with no mitigation measures beyond good management and best practice. The proposed system is likely to incorporate Best Available Technology and containment which means that the SOP will be reduced down to a medium or low level. For the purpose of this assessment it is assumed that the SOP will be medium and that a level of mitigation is in place. This level of SOP is to be applied to each receptor in the assessment. As the exact location of the WwTW odour sources within development area HT.5 is unknown, it has been assumed that odours are emitted from the edge of the development area boundary to provide a worst-case assessment.

6.5.27 The second aspect of the risk assessment is to consider the general pathway effectiveness. This will vary from receptor to receptor based on distance, orientation in terms of wind direction/frequency, topography, and how effective the dispersion is. The qualitative odour assessment has considered odour effects at receptors within 500m of the edge of the HT.5 development area boundary. This is because odour pathways can generally be considered ineffective at distances beyond 500m. The Anglian Water Asset Encroachment Risk Methodology considers the risk of their existing WwTW assets to new developments up a distance a 400m, so there is a reasonable precedent for considering odour pathways ineffective beyond 400-500m. It should be noted that the Anglian Water methodology is a one size fits all approach and considers existing assets which may have been in place for a number of years and therefore may account for older/obsolete processes/technologies and larger sites.

6.5.28 The area within 500m of the proposed WwTW is currently sparsely populated and mostly made up of agricultural land, with most of the sensitive receptors located between 450-500m to the north-east in Sellindge. Analysis of the Wind Rose for Lydd during 2017 and 2018 (see Figure 6.6) shows that the prevailing wind in the region originates in the south west. The receptors in Sellindge are therefore categorised as downwind, however they are considered remote from the source given the extended distances from source. Therefore, the pathway from source to receptor is considered to be ineffective at the Sellindge receptors.

6.5.29 The nearest receptor is White Lodge on Harringe Lane which is located 209m to the north of HT.5. The pathway from source to receptor in this location would be considered moderately effective given the receptor can be considered local to the source. Possible locations of on-site future receptors constructed as part of the proposed Development in development areas HT.1 and HT.3 have been considered

to be subject to an ineffective pathway given the distance (>440m to southeast) and orientation (upwind).

6.5.30 The sensitivity of all receptors (with the exception of Potten Farm) is considered to be high as they currently (or could foreseeably) experience enjoyment of a high level and amenity. Potten Farm is a working farm and therefore the enjoyment of amenity would not be reasonably expected in this location.

6.5.31 The findings of the qualitative odour assessment at each receptor are summarised in Table 6-22.

Table 6-22: Summary of Risk of Residual Odour effects

Receptor Location in relation to proposed WwTW	SOP	Effectiveness of Pathway	Odour Exposure	Receptor Sensitivity	Likely Effect
White Lodge, Harringe Lane, 209m to north (upwind)	Medium	Moderate	Low Risk	High	Slight Adverse
Potten Farm, Sellindge, 500m north east (downwind)	Medium	Ineffective	Negligible Risk	Low	Negligible
Property off Bulls Lane, Sellindge, 450m north east of site (downwind)	Medium	Ineffective	Negligible Risk	High	Negligible
Property off Bulls Lane, Sellindge, 490m north east of site (downwind)	Medium	Ineffective	Negligible Risk	High	Negligible
New Property in The Lees, Sellindge, 500m north east of site (downwind)	Medium	Ineffective	Negligible Risk	High	Negligible
Edge of Development Area HT.1, 460m south east of site (upwind)	Medium	Ineffective	Negligible Risk	Potentially high	Negligible
Edge of Development Area HT.3, 440m south of site, (upwind)	Medium	Ineffective	Negligible Risk	Potentially high	Negligible
Harringe Court Cottages, 500m to south of site (upwind)	Medium	Ineffective	Negligible Risk	High	Negligible

6.5.32 Of the 8 locations assessed, 7 are considered to have a negligible residual risk of odour effects. A single receptor at White Lodge on Harringe Lane is considered to have a slight adverse residual risk of odour effects.

Conclusions and Commitments: Odour from proposed on-site WwTW

6.5.33 It is concluded that the overall risk of effects from odour associated with the proposed on-site WwTW is **Not Significant**. There is a solitary receptor where the likely effect is slight adverse, however this receptor is isolated and is not representative of any further exposure. Odour effects at the receptors in Sellindge have been predicted to be negligible owing to their distance (>400m) from the source.

6.5.34 A full quantitative odour assessment incorporating dispersion modelling will be carried out once the design and specification has been finalised. This approach has been agreed with F&HDC and the requirement for a quantitative odour assessment should

be secured as a planning condition for Tier 3. The findings of the recommended quantitative assessment would supersede the conclusions of the qualitative risk assessment presented in this chapter.

Residual Effects from Operation on Local Air Quality

6.5.35 This section summarises the expected impacts from the increase in road traffic associated with the operation of the proposed Development in 2024, 2030 and 2044.

6.5.36 It should be noted that construction vehicle movements have been integrated into the 2024 and 2030 with proposed Development traffic outputs that were used to calculate the changes in air pollutant concentrations.

6.5.37 All modelled scenarios in 2024, 2030 and 2044 include committed developments and take into account growth from regional housing and job forecasts. Therefore, the assessed scenarios are inherently cumulative in nature.

6.5.38 Additionally, the 2044 scenario includes the construction of the additional 1,500 residential units and supporting infrastructure associated with the proposed Framework Masterplan. The 2044 assessment therefore represents the completed proposed Development quantum (8,500 units) plus the Framework Masterplan quantum, when combined, represents 10,000 residential units. As discussed in paragraph 6.2.43, the 2044 assessment has been modelled using 2044 proposed Development plus Framework Masterplan traffic flows.

6.5.39 Concentrations were predicted for NO_2, PM_{10} and $PM_{2.5}$. A total of 334 locations across the modelled road network (those detailed in Figure 6.7 (presented in ES Appendix 6.1) were assessed. These locations were those receptors closest to roads with the greatest predicted increase in traffic flow and/or where existing pollutant concentrations were highest.

6.5.40 Of the 334 modelled receptors, 124 were ‘future on-site receptors’ i.e. in locations which would eventually comprise of residential, mixed-use or school land use within the application site boundary. As these receptors would not exist until the site is built out, the IAQM guidance suggests that impacts at such locations are best described in relation to ‘whether or not an air quality objective will not be met, or is at risk of not being met’ when assessing the suitability of air quality for the introduction of new receptors.

6.5.41 The remaining 210 receptors were existing receptors that are either located within the application site and will not be demolished as part of the proposed Development, or existing receptors that are located outside of the application site. The change in pollutant concentration and resultant total concentration will determine whether the proposed Development impact at a given existing receptor will be negligible, small, moderate or substantially adverse/beneficial.

Residual Effects from Operation on Local Air Quality (2024)

6.5.42 The purpose of the 2024 operational assessment was to ascertain whether pollutant levels at the site were suitable for new exposure whilst taking into account the additional traffic on the local road network due to those parts of the proposed Development that are to be built and operational by 2024. The year of 2024 represents the first year that the application site would be occupied and is also the year that per vehicle emissions rates and background concentrations are highest (as compared to 2030 and 2044). Additionally, the 2024 operational assessment includes the

construction traffic associated with the ongoing build out of the remaining indicative phases.

6.5.43 As discussed in paragraphs 6.2.111 and 6.2.115 the 2024 modelled outputs were uplifted as per DMRB LA 105.

6.5.44 The 2024 without and with proposed Development impacts are presented in full at each receptor for each pollutant in ES Appendix 6.5.

Impact on Existing Receptors

6.5.45 Table 6-23 summarises the changes in annual mean NO_2 associated with the 2024 operational phase on existing receptors located on the local road network affected in the context of the IAQM impact descriptors (as per Table 6-12). Figure 6.7 (presented in ES Appendix 6.1) also demonstrates the location and IAQM descriptor ascribed to existing receptors.

Table 6-23: Summary of annual mean NO_2 impacts at existing receptors aggregated by IAQM descriptor (2024)

IAQM Descriptor	Number of Receptors	
	Adverse	Beneficial
Substantial	0	0
Moderate	0	0
Slight	2	1
Negligible	207	

6.5.46 There are two existing receptors (OTT117 and 124) (see Figure 6.7 in ES Appendix 6.1) where the impact is categorised as slight adverse. Receptor OTT117 has an increase of 3 µg/m^3 and receptor 124 has an increase of 0.9 µg/m^3. Both receptors are located in Pedlinge, east of the crossroads where the A20 Ashford Road meets the A261 Hythe Road and Stone Street. The increase of 3 µg/m^3 at receptor OTT117 is attributable to an increase in traffic flows (~5,000 vehicles) along the A261 Hythe Road, east of the aforementioned crossroads. The increase in traffic is likely due to the Otterpool residents travelling to and from Hythe. The total NO_2 annual mean concentration is less than 25 µg/m^3 which is well below the annual mean AQS objective of 40 µg/m^3. Therefore, in the context of the IAQM impact descriptors, the total concentration is sufficiently low, that a 3 µg/m^3 increase is regarded as a slight adverse impact rather than a substantial or moderate adverse impact.

6.5.47 There is one receptor (OTT090) where the impact is slight beneficial (i.e. pollutant concentrations decrease). This receptor is located at Pedlinge Court Cottage on Aldington Road, c. 65 m south of the Hythe Road and Aldington Road junction. The decrease at this receptor is -3.8 µg/m^3, resulting in a concentration of 14.5 µg/m^3 with the proposed Development. This is attributable to a decrease in traffic flows (~4,400 vehicles) on Aldington Road. The decrease in traffic is likely due to an increase in vehicles travelling on Hythe Road as opposed to Aldington Road, as a result of road improvements associated with the proposed Development to the A20.

6.5.48 The change in NO_2 concentrations at all other existing receptors is sufficiently low to be considered as a negligible impact in terms of the IAQM descriptors. The highest with proposed Development concentration at any of the existing receptors is at OTT040 which is located 25m south of the M20 at the northern end of Cheriton. The

concentration is predicted to be 32.2 µg/m^3 in 2024 which is 7.8 µg/m^3 lower than the annual mean AQS objective for NO_2. The residual impact at OTT040 is negligible.

6.5.49 LAQM TG.16 states that exceedances of the 1-hour AQS objective for NO_2 are unlikely to occur where the annual mean is less than 60 µg/m^3. The total concentration at OTT040 demonstrates that the proposed Development would not cause any receptors to exceed the 1-hour AQS objective for NO_2.

6.5.50 Annual mean PM_{10} and $PM_{2.5}$ impacts at existing receptors are negligible as all increases are less than or equal to 0.5 µg/m^3. Annual mean concentrations at all receptors are well below the annual mean AQS objectives for PM_{10} and $PM_{2.5}$.

6.5.51 Following the procedure in paragraph 7.93 of LAQM.TG16, the likelihood of potential exceedances of the 24-hour PM_{10} AQS objective can be inferred from the PM_{10} annual mean concentration. It is concluded that there would be no exceedances due to the universal low nature of the annual mean PM_{10} concentrations as all receptors would be less than 20µg/m^3. The impact of changes at each of the receptors in terms of the 24-hour PM_{10} AQAL are therefore categorised as negligible.

6.5.52 A full list of the without and with proposed Development concentrations and IAQM impact descriptors is presented in ES Appendix 6.5 for NO_2, PM_{10} and $PM_{2.5}$.

Future (on-site) Receptors

6.5.53 A total of 124 future receptors were modelled on site across the proposed Development. The highest on-site 'with proposed Development' total NO_2 concentration is 18.6 µg/m^3 at FUT122. It is acknowledged that the area that this modelled future receptor is representative of would not be developed and built by 2024. However, it demonstrates that the rest of the site is well below the annual mean AQS objective for NO_2 and is therefore suitable for habitation in 2024.

6.5.54 The highest on-site PM_{10} concentration is 16.5 µg/m^3 at a number of future receptors which is well below the annual mean AQS objective for PM_{10} which is also 40 µg/m^3. Additionally, the highest on-site annual mean $PM_{2.5}$ concentration is 9.8 µg/m^3; this is well below the guideline target of 25 µg/m^3. Therefore, in terms of particulates (both PM_{10} and $PM_{2.5}$) the site is suitable for human habitation and would not create any new exposure to poor air quality.

6.5.55 A full list of total on-site concentrations for the modelled future receptors for each of NO_2, PM_{10} and $PM_{2.5}$ is presented in ES Appendix 6.5.

Conclusions

6.5.56 The operation of the partially built proposed Development in 2024 is not expected to result in any significant adverse effects on local air quality.

6.5.57 The sensitivity of all receptors modelled is considered to be high, and the magnitude of change (in terms of risk), is considered to be slight adverse at two receptors (OTT117 and OTT124), slight beneficial at one receptor (OTT090) and negligible at the remaining 207 existing receptors. As the changes in concentrations at existing receptors are negligible for the vast majority of receptors for all pollutants and the total concentrations across the application site are well below relevant annual mean AQS objectives, indicating that the occupants of the site in 2024 would be subject to an acceptable standard of air quality, the effects are therefore likely to be **Not Significant**.

Residual Effects from Operation on Local Air Quality (2030)

6.5.58 The purpose of the 2030 assessment was to quantify and appraise impacts associated with the build out of the peak construction year in combination with the impacts of the additional vehicles generated by the operation of approximately 35% of residences and supporting infrastructure. The year of 2030 represents a year where there is the

potential be a large number of additional vehicles on the local road network from both operational phase vehicles and construction vehicles.

6.5.59 The purpose of the 2030 assessment was to quantify the impacts in the year with the highest construction vehicle flows alongside operational phase traffic associated with the partially built proposed Development (approximately 35% complete).

6.5.60 The 2030 outputs were uplifted following the methodology detailed in DMRB LA 105.

6.5.61 The 2030 without and with proposed Development impacts are presented in full at each receptor for each pollutant in ES Appendix 6.5.

Impact on Existing Receptors

6.5.62 Table 6-24 summarises the changes in annual mean NO_2 associated with the 2030 operational phase on existing receptors located on the local road network affected in the context of the IAQM impact descriptors. Figure 6.7 (presented in ES Appendix 6.1) also demonstrates the location and IAQM descriptor ascribed to existing receptors.

Table 6-24: Summary of annual mean NO_2 impacts at existing receptors aggregated by IAQM descriptor (2030)

IAQM Descriptor	Number of receptors	
	Adverse	Beneficial
Substantial	0	0
Moderate	0	0
Slight	3	2
Negligible	205	

6.5.63 There are three existing receptors (OTT117, 118 and 124) (see Figure 6.7 of ES Appendix 6.1) where the impact is categorised as slight adverse. Receptor OTT117 has an increase of 3.3 µg/m^3 and receptor OTT118 has an increase of 2.2 µg/m^3. These receptors are both located in Pedlinge, east of the crossroads where the A20 Ashford Road meets the A261 Hythe Road and Stone Street. The largest increase, of 3.3 µg/m^3, at receptor OTT117 is attributable to an increase in traffic flows (~8,000 vehicles) along the A261 Hythe Road east of the aforementioned crossroads. The increase in traffic is likely due to the Otterpool residents travelling to Hythe and vice versa. The total NO_2 annual mean concentration is less than 25 µg/m^3 which is well below the annual mean AQS objective of 40 µg/m^3. Therefore, in the context of the IAQM impact descriptors, the total concentration is sufficiently low that a 3.3 µg/m^3 increase is regarded as a slight adverse impact rather than a substantial or moderate impact.

6.5.64 OTT124 is located immediately north of the M20 on Stone Street in Stanford and is predicted to increase by 0.9µg/m^3 to a total concentration of 30.9µg/m^3; this represents the highest with proposed Development concentration at an existing receptor in 2030. This is cause by an increase in traffic on the M20.

6.5.65 The total concentration at OTT124 demonstrates that the proposed Development would not cause any receptors to exceed the 1-hour AQS objective for NO_2 in 2030 as it is well below the required indicative metric of 60 µg/m^3 (refer to paragraph 6.5.50).

6.5.66 There are two receptors where the impact is categorised as slight beneficial (i.e. pollutant concentrations decrease); these are OTT090 and OTT134.

6.5.67 OTT090 is located at Pedlinge Court Cottage on Aldington Road, c. 65 m south of the Hythe Road and Aldington Road junction. The decrease at this receptor is -3.9 µg/m^3,

resulting in a concentration of 13.5 µg/m^3 with the proposed Development, which is attributable to a decrease in traffic flows (~5,500 vehicles) on Aldington Road. The decrease in traffic is likely due to an increase in vehicles travelling on Hythe Road as opposed to Aldington Road, as a result of road network improvements to the A20.

6.5.68 There is also expected to be a slight beneficial impact on OTT134 which is located on Otterpool Lane, north of the junction meeting Aldington Road and immediately south of the proposed Development. The decrease at this receptor is -2.2 µg/m^3 which is attributable to a decrease in traffic flows (~4,800 vehicles) towards the south end of Otterpool Lane. The decrease in traffic is likely due to vehicles utilising the road network improvements associated with the A20.

6.5.69 The change in NO_2 and total NO_2 concentrations at all other existing receptors is sufficiently low and is to be considered to have a negligible impact in terms of the IAQM descriptors.

6.5.70 Annual mean PM_{10} and $PM_{2.5}$ impacts at existing receptors are negligible as all increases are less than or equal to 0.9 µg/m^3 and the total concentrations are low. Annual mean concentrations at all receptors are well below the annual mean AQS objectives for PM_{10} and $PM_{2.5}$. Additionally, there are predicted to be no exceedances of the 24-hour PM_{10} AQs objective as the highest annual mean PM_{10} concentration at an existing receptor in 2030 is 18.7 µg/m^3. The impact of changes at each of the receptors in terms of the 24-hour PM_{10} AQAL are therefore categorised as negligible.

Future on-Site Receptors

6.5.71 The highest on-site with proposed Development total NO_2 concentration is 17.5 µg/m^3 at FUT122. This demonstrates that the rest of the site is well below the annual mean AQS objective for NO_2 and is therefore suitable for habitation in 2030.

6.5.72 The highest on-site PM_{10} concentration is 16.5 µg/m^3 at two of the future receptors which is well below the annual mean AQS objective for PM_{10}. Additionally, the highest on-site annual mean $PM_{2.5}$ concentration is 9.5 µg/m^3; this is well below the guideline target of 25 µg/m^3. Therefore, in terms of particulates (both PM_{10} and $PM_{2.5}$) the site is suitable for human habitation and the development of the site would not lead any unacceptable exposure to poor air quality.

6.5.73 A full list of total on-site concentrations for the modelled future receptors for each of NO_2, PM_{10} and $PM_{2.5}$ is presented in ES Appendix 6.5.

Conclusions

6.5.74 The operation of the partially built proposed Development in 2030 is not expected to result in any significant adverse impact on local air quality. The slight adverse impacts (associated with two receptors) are not sufficient in magnitude or quantity to suggest that the proposed Development would result in a long term significant adverse effect on local air quality.

6.5.75 The sensitivity of all receptors modelled is considered to be high, and the magnitude of change (in terms of risk), is considered to be slight adverse at three receptors (OTT117, OTT118 and OTT124), and slight beneficial at two receptors (OTT090 and OTT134) and negligible at the remaining 205 existing receptors. As the changes in concentrations at existing receptors are negligible for the vast majority of receptors for all pollutants and the total concentrations across the application site are well below relevant annual mean AQS objectives, indicating that the occupants of the site in 2030

would be subject to an acceptable standard of air quality, the effects are therefore likely to be **Not Significant.**

Residual Effects from Operation on Local Air Quality (2044)

6.5.76 The 2044 operational assessment represents a highly conservative appraisal of air quality impacts as discussed in paragraph 6.2.43. The assessment assumes an increase in flows on the local road network associated with the full operation of the proposed Development plus Framework Masterplan in 2044.

Impact on Existing Receptors

6.5.77 Table 6-25 summarises the changes in annual mean NO_2 associated with the 2044 operational phase on existing receptors located on the local road network affected in the context of the IAQM impact descriptors. Figure 6.7 of ES Appendix 6.1 also demonstrates the location and IAQM descriptor ascribed to existing receptors.

Table 6-25: Summary of annual mean NO_2 impacts at existing receptors aggregated by IAQM descriptor (2044)

IAQM Descriptor	Number of receptors	
	Adverse	Beneficial
Substantial	0	0
Moderate	0	0
Slight	1	1
Negligible	208	

6.5.78 There is one existing receptor (OTT117) (see Figure 6.7 of ES Appendix 6.1) where the impact is slight adverse. This receptor is located in Pedlinge, east of the crossroads where the A20 Ashford Road meets the A261 Hythe Road and Stone Street. The increase at this receptor is 2.7 µg/m^3 which is attributable to an increase in traffic flows (~10,000 vehicles) along the A261 Hythe Road east of the aforementioned crossroads. The increase in traffic is likely due to the Otterpool residents travelling to Hythe and vice versa. The total NO_2 annual mean concentration is less than 25 µg/m^3 which is well below the annual mean AQS objective of 40 µg/m^3. Therefore, in the context of the IAQM impact descriptors, the total concentration is sufficiently low that a 2.7 µg/m^3 increase is regarded as slight adverse rather than a substantial or moderate impact.

6.5.79 There is one receptor (OTT090) where the impact is slight beneficial (i.e. pollutant concentrations decrease). The receptor is located at Pedlinge Court Cottage on Aldington Road, c. 65 m south of the Hythe Road and Aldington Road junction. The decrease at this receptor is -2.5 µg/m^3 which is attributable to a decrease in traffic flows (~5,300 vehicles) on Aldington Road. The decrease in traffic is likely due to an increase in vehicles travelling on Hythe road as opposed to Aldington Road, as a result of road network improvements to the A20 associated with the proposed Development plus Framework Masterplan.

6.5.80 The highest total concentration at any of the existing receptors is at OTT040 which is located north of Cheriton and immediately south of the M20. The concentration at OTT040 increases by 1.1 µg/m^3 to a total of 17.5 µg/m^3 in the with proposed Development plus Framework Masterplan 2044 scenario. This is attributable to an increase in AADT of approximately 4,900 vehicles per day on the westbound

carriageway of the M20 which is located 30m to the south. The residual impact at OTT040 is categorised as negligible in terms of the IAQM descriptors.

6.5.81 The change in total NO_2 concentrations at all other existing receptors is sufficiently low to be considered as a negligible impact in terms of the IAQM descriptors.

6.5.82 The total concentration at OTT040 demonstrates that the proposed Development plus Framework Masterplan would not cause any receptors to exceed the 1-hour AQS objective for NO_2 in 2044 as it is well below the required indicative metric of 60 µg/m^3.

6.5.83 Annual mean PM_{10} and $PM_{2.5}$ impacts at existing receptors are categorised as negligible as all increases are less than or equal to 1.1 µg/m^3 and the total concentrations are low. Annual mean concentrations at all receptors are well below the annual mean AQS objectives for PM_{10} and $PM_{2.5}$. Additionally, there are predicted to be no exceedances of the 24-hour PM_{10} AQs objective as the highest annual mean PM_{10} concentration at an existing receptor in 2044 is 19.0 µg/m^3. The impact of changes at each of the receptors in terms of the 24-hour PM_{10} AQAL are therefore categorised as negligible.

Future On-Site Receptors

6.5.84 The highest on-site with proposed Development plus Framework Masterplan total NO_2 concentration is 14.3 µg/m^3 at FUT122. This demonstrates that the rest of the site is well below the annual mean AQS objective for NO_2 and is therefore suitable for habitation in 2044.

6.5.85 The highest on-site PM_{10} concentration is 17 µg/m^3 at FUT110 which is well below the annual mean AQS objective for PM_{10}. Additionally, the highest on-site annual mean $PM_{2.5}$ concentration is 9.9 µg/m^3; this is well below the guideline target of 25 µg/m^3. Therefore, in terms of particulates (both PM_{10} and $PM_{2.5}$) the site is suitable for human habitation and the development of the site would not lead any unacceptable exposure to poor air quality.

6.5.86 A full list of total 2044 on-site concentrations for the modelled future receptors for each of NO_2, PM_{10} and $PM_{2.5}$ is presented in ES Appendix 6.5.

Impact on Canterbury AQMA No.3

6.5.87 The results of the sensitivity test presented in ES Appendix 6.7 demonstrate that the operation of the proposed Development plus Framework Masterplan will have a negligible impact on air quality in Canterbury near to the AQMA. The maximum predicted increase in annual NO_2 is 0.3 µg/m^3, and the highest predicted concentration is 18.5 µg/m^3. Therefore, in the context of the IAQM impact descriptors, the impact at each modelled receptor is categorised as negligible in 2044. It is therefore concluded that there will be **No Significant** air quality effects in Canterbury as a result of the operation of the proposed Development plus Framework Masterplan in 2044, or indeed in 2024 and 2030 where the traffic changes are not large enough to warrant quantitative assessment.

Conclusions

6.5.88 The operation of the fully developed proposed Development (inclusive of the Framework Masterplan) is not expected to result in any significant residual effect on local air quality. The slight adverse impacts (associated with one receptor) are not sufficient in magnitude or quantity to suggest that the proposed Development plus Framework Masterplan scenario would result in a long term **Significant** adverse effect on local air quality.

6.5.89 The sensitivity of all receptors modelled is considered to be high, and the magnitude of change (in terms of risk), is considered to be slight adverse at one receptor (OTT117), slight beneficial at one receptor (OTT090) and negligible at the remaining

208 existing receptors. As the changes in concentrations at existing receptors are negligible for the vast majority of receptors for all pollutants and the total concentrations across the application site are well below relevant annual mean AQS objectives, indicating that the occupants of the site in 2044 would be subject to an acceptable standard of air quality, the effects are therefore likely to be **Not Significant**.

6.5.90 The 2044 operational assessment on local air quality demonstrates that even with worst case assessment assumptions, **No Significant** effects are anticipated.

Compliance Risk Assessment

6.5.91 Increases in NO_2 associated with the operation of the proposed Development were compared to Defra's PCM link concentrations for the Defra baseline projections scenario. This is worst case as this scenario only considers the impact of those measures and policies which have been formally adopted, and not those which are aspirational.

6.5.92 Analysis of the 2024 PCM links and the 2024 DMRB LA105 affected road network (as defined in para 6.2.16) showed that there are no areas where the two road networks overlap. Therefore, no further assessment of compliance risk is required for the 2024 assessment year.

6.5.93 In 2030 the Defra PCM link with the highest concentration in the Agglomeration Zone is part of the A35 in Southampton (approximately 185km to the west of the proposed Development) and is projected to have a concentration of 29.5 µg/m^3. This link will not be impacted on by the proposed Development.

6.5.94 Analysis of the Defra PCM links that overlap with the 2030 operational phase affected road network indicates there are two areas which would require assessment. The first PCM link (Census ID 802037955) is on the M20 near Ashford and has a concentration of 17.7 µg/m^3 during 2030. The relevant qualifying features were found to be a residential garden north of the M20 and a footpath to the south.

6.5.95 The second PCM link (Census ID: 802048175) is on the A259 Scanlons Bridge Road in Hythe and has a concentration of 12.1 µg/m^3 in 2030. The relevant qualifying features were found to be footpaths to the east and west of this link.

6.5.96 Table 6-26 demonstrates the impact of the operation of the proposed Development on the qualifying features adjacent to the two PCM links.

Table 6-26: Summary of impact on qualifying features as a result of proposed Development

PCM Census ID	Assessed qualifying feature ID and type	Without proposed Development annual mean NO_2 concentration 2030 (ug/m3)	With proposed Development annual mean NO_2 concentration 2030 (ug/m3)	Change
802037955	PCM_north_M20_g *Garden*	20.4	20.5	+0.1
	PCM_south_M20_4mfp *Footpath*	21.0	21.1	+0.1
802048175	PCM_west_kerb *Footpath*	15.2	15.5	+0.3
	PCM_east_kerb *Footpath*	19.4	19.8	+0.4

6.5.97 Table 6-26 shows that the total concentration in the with proposed Development scenario is well below the limit value in 2030. Increases in NO_2 at features adjacent to both PCM links are predicted to be 0.4µg/m³ or less and are regarded as imperceptible in accordance with the methodology detailed in DMRB. Therefore, in accordance with DMRB LA 105, there is no risk to the reported date of compliance with the Air Quality Directive as a result of the operation of the proposed Development in 2030.

6.5.98 In 2044, it is unlikely that any Agglomeration Zone in the UK will be at risk of non-compliance with the Directive. The 2044 scenario was not used to compare to the PCM concentrations as Defra have not generated PCM outputs beyond 2030. Additionally, the 2044 outputs generated in the air quality assessment are based on 2030 emission rates and background concentrations and would therefore represent an unrealistically large overestimate of the likely impacts of the proposed Development plus Framework Masterplan.

Residual Effects from Operation on Ecological Receptors

6.5.99 The ecological outputs for 2024 and 2030 were uplifted using the long-term trends process as previously explained. Year 2044 was not uplifted as it would produce overly pessimistic results, and also the long-term trends calculation can only be applied as far as 2030 in the tool provided by National Highways.

6.5.100 The 2018 background nitrogen deposition rates were used for each assessment year as the IAQM guidance suggests that background nitrogen deposition rates are not universally decreasing and there is no strong evidence to suggest otherwise. It is likely that the traffic sector contribution to background nitrogen deposition rates will decrease over time as a result of government policy and the uptake of cleaner vehicles. However, assuming no decrease in nitrogen deposition rates represents a conservative approach.

6.5.101 As described in the methodology section, annual mean NO_x concentration and nitrogen deposition rates concentrations were modelled in ecological sites using roadside transects spaced at 10m intervals. A receptor grid (with a 10m spatial resolution) was modelled over the A20 tunnel portal for Folkestone to Etchinghill Escarpment SAC/SSSI. The full set of results are shown in ES Appendix 6.6 and the key results are reported in this section.

Assessment of NOx impacts on ecological sites

6.5.102 Table 6-27 details those sites where parts of the modelled transect(s) are expected to experience an increase of greater than 0.3 µg/m³ (i.e. >1% of the critical level of 30µg/m³) in annual mean NOx. The table lists the sites and details which assessment years the site exceeds the 1% criterion.

Table 6-27: Summary of sites and years where increase in NOx concentrations exceeded 1% of the critical level

Site	2024	2030	2044
Folks Wood AW	Y	Y	Y
Park Wood AW	N	N	Y
Folkestone to Etchinghill SSSI/SAC (Transect and 10m Grid)	N	N	Y
Lympne Escarpment SSSI	N	N	Y

Site	2024	2030	2044
House Wood AW	N	N	Y
Perry Wood AW	N	N	Y
Hatch Park SSSI	N	N	Y
Ashford Green Corridors (All sites) LNR	N	N	Y
Kiln Wood AW	N	N	Y
Bartholomew's Wood AW	N	N	Y
Cowtye Wood AW	N	N	Y
Grange Alders/Oak Banks AW	N	N	Y
Perry Wood AW	N	N	Y
Hoad's Wood AW	N	N	N
Unnamed AW 1	N	N	N
Unnamed AW 2	N	N	N
Unnamed AW 3	N	N	N
Killing Wood AW	N	N	N
Harringe Brooks Wood AW	N	N	N

6.5.103 In any given assessment year, where NOx impacts have been found to be less than 1% of the critical level, the impact has been regarded as insignificant and requires no further consideration. A full list of the quantified NOx impacts at each site is provided in ES Appendix 6.6.

6.5.104 The changes in NO_x have been converted to NO_2 and nitrogen deposition following the IAQM methodology, and the corresponding nitrogen deposition rates are presented in the following sections.

Assessment of Nitrogen Deposition on Ecological sites in 2024

6.5.105 During 2024, the only site where there was an increase in nitrogen deposition which exceeded 1% of the site specific lower critical load was Folks Wood AW. The contribution from the operation of the proposed Development exceeded 1% at each point along the transect to a distance of 80m from the A261. The largest increase along the transect is expected at the closest point of the site to the A261 (at a distance of 2m from the road) where the increase in nitrogen deposition is 1.32kg N/ha/yr; this represents 13.2% of the lower critical load. This is as a result of the increase in traffic along the A261 during 2024, and the proximity of the site to the A261. The total nitrogen deposition rate exceeds the lower critical load in both the without and with proposed Development scenarios in 2024.

6.5.106 The contribution of the proposed Development at the remainder of the sites is ≤ 1% of the lower critical load during 2024.

Assessment of Nitrogen Deposition on Ecological sites in 2030

6.5.107 During 2030, the only site where there was an increase in nitrogen deposition which exceeded 1% of the site specific lower critical load was Folks Wood AW. The contribution from the operation of the proposed Development exceeded 1% at each point along the transect to a distance of 80m from the A261. The largest increase along the transect is expected at the closest point of the site to the A261 (at a distance of 2m from the road) where the increase in nitrogen deposition is 1.54kg N/ha/yr; this represents 15.4% of the lower critical load. This is as a result of the increase in traffic along the A261 during 2024, and the proximity of the site to the A261. The total nitrogen deposition rate exceeds the lower critical load in both the without and with proposed Development scenarios in 2030.

6.5.108 The contribution of the proposed Development at the remainder of the sites is ≤ 1% of the lower critical load during 2030.

Assessment of Nitrogen Deposition on Ecological sites in 2044

6.5.109 A number of sites showed an increase in nitrogen deposition greater than 1% of the relevant lower critical load. This is due to the largest increases in traffic as a result of the operation of the completed proposed Development plus Framework Masterplan in 2044.

6.5.110 Table 6-28 demonstrates the maximum absolute increase in nitrogen deposition along a site specific modelled transect or grid where a site was predicted to increase by 1% or more of the lower critical load in 2044.

Table 6-28: Nitrogen Deposition at Ecological Sites

Site	Maximum Increase in Nitrogen Deposition (kg N ha yr)	Increase as a percentage of lower critical load	Comments
Folks Wood AW	1.12	11.2%	>1% at each transect point up to 100m from A261
Lympne Escarpment SSSI	0.35	2.3%	Exceeds 1% within 10m of Lympne Hill (two points nearest to the road). Lympne Hill is the name of the minor road.
Folkestone to Etchinghill SSSI/SAC (10m Grid)	0.20	1.3%	Adjacent to east portal of eastbound carriageway of A20, approx. 7m from road edge. Exceedance of the 1% of the lower critical load is confined to three other 10m points within 20m of the eastern edge of the A20 around the tunnel portal. The increase at each of these points is between 1.1-1.2% of the lower critical load. Therefore, the extent is limited, and the increases are relatively small.
Folkestone to Etchinghill SSSI/SAC (Transect)	0.17	1.2%	Increase at closest point of transect is >1% of lower critical load, remainder of points are <1%.
House Wood AW	0.18	1.8%	>1% at each point in transect

Site	Maximum Increase in Nitrogen Deposition (kg N ha yr)	Increase as a percentage of lower critical load	Comments
Perry Wood AW	0.14	1.4%	>1% at each transect point from closest point to road (132m) to 190m.
Bartholomew's Wood AW	0.17	1.7%	>1% at each transect point from closest point to road (5m) to 20m.
Cowtye Wood AW	0.14	1.4%	>1% at closest point to road at 10m on both north and south transects bisected by Ashford Road
Grange Alders/Oak Banks AW	0.12	1.2%	>1% at each transect point from closest point to road (170m) to 200m.

6.5.111 Details of the location and magnitude of exceedances of the 1% critical load and critical level threshold have been considered in the (Chapter 7: Biodiversity) for each year in order to determine the impact on the integrity of the habitat at each site. The increase in NO_x and nitrogen deposition predicted in 2044 is likely to be highly pessimistic, since the air quality predictions assume no air quality improvements between 2030 and 2044. Conclusions on the significance of effect on these ecological sites is provided in (Chapter 7: Biodiversity) of this ES.

Damage Cost Assessment

6.5.112 A non-binding indicative damage cost assessment has been carried out using Defra's Damage Cost Appraisal tool covering the five-year period that follows the full operation and associated trip rate of the 8,500 unit proposed Development in 2042 (i.e. excluding Framework Masterplan).

6.5.113 The damage cost appraisal provides a basis for defining the financial commitment required for offsetting emissions through the implementation of measures that reduce the overall emissions associated with transport generated by the proposed Development.

6.5.114 In order to offset the damage cost, residential electric vehicle charging units would be required. Otterpool Park will be exploring the implementation of site-wide electric vehicle charging, which will serve as an effective contributor to offsetting the damage cost.

6.5.115 In reality a number of measures that serve to offset emissions could be potentially incorporated in the design such as support for and promotion of car clubs, contributions to low emission vehicle refuelling in non-residential areas, financial support to low emission public transport options, and improvements to cycling and walking infrastructure. The combination of these measures along with the electric vehicle charging is likely to far outweigh the damage cost. Further details of these measures can be found in the Transprot Strategy (ES Appendix 16.5) and the Energy Strategy (ES Appendix 4.9).

6.5.116 However, at outline planning stage, the proposed Development design is not mature enough to be able to guarantee the feasibility, quantity or uptake of the aforementioned offsetting measures. Additionally, the number generated is subject to a great deal of uncertainty owing to being based on trip rate, emission rate, and per tonne damage cost predictions that are a considerable distance into the future as the predicated

methodology states that the damage cost should be based on the first five years after the proposed Development is completed (in this case the period between 2042 and 2046 inclusive).

6.5.117 To address this, it has been agreed with F&HDC's Environmental Health Officer that development zone-specific damage cost assessments will be carried out at Tier 3 as and when there is more certainty in terms of the design as the different areas are built out. This will have the additional advantage of being based on near future emission rates and economic projections that will be subject to less uncertainty.

6.6 Cumulative Effects

6.6.1 The air quality assessment of transport impacts is inherently cumulative as all committed developments are included in the traffic model. The air quality assessment therefore provides the predicted cumulative impact of the proposed Development in combination with other committed developments in the area.

6.6.2 The cumulative dust risk assessment is presented below.

Dust Risk Assessment

6.6.3 The maximum risk of unmitigated dust effects is high and therefore the inclusion of other schemes would not change the recommended mitigation measures as the recommended measures represent the most stringent level predicated by the IAQM construction dust guidance.

6.6.4 One of the recommended mitigation measures for high-risk sites is to ensure that regular liaison meetings are held with other high risk construction sites within 500m of the application site boundary to ensure plans are coordinated and dust is minimised. The following potential construction sites which have been permitted reside within 500m of the application boundary are listed in Table 6-29 and are shown in ES Appendix 2.5.

Table 6-29: Construction sites within 500m of the application boundary whereby construction dust could be a cumulative consideration

Application	Map ID No. (ES Appendix 2.5)	Construction Dust considered?	Conclusions	Propose holding regular liaison meetings with adjacent site if construction period overlaps with construction of proposed Development?
SH/08/124, Otterpool quarry, Ashford Road, Sellindge, Ashford, Kent (Permitted Waste Facility)	C3	Yes – but undertaken before IAQM guidance on dust was published.	There are potential for dust impacts during construction but were not categorised as assessment predates guidance. The assessment recommends a number of dust suppressing measures and concludes with implementation of these measures, residual effects would be negligible.	Yes
Y14/0873/SH, Land adjacent to The Surgery, Main Road Sellindge Kent	H	No	Planning condition 26 of Decision – Full Plan states that before commencement of development, A CoCP should be submitted to and approved by FHDC. Condition states the CoCP should provide details of the dust suppression methods.	Yes
Y17/0105/SH, Land Adjoining Enterprise Way Enterprise Way	AJ	Yes – the application is a time extension to an extant permission. The	Assuming use of appropriate mitigation in CoCP, impact of dust in construction phase is 'insignificant'	Yes

Application	Map ID No. (ES Appendix 2.5)	Construction Dust considered?	Conclusions	Propose holding regular liaison meetings with adjacent site if construction period overlaps with construction of proposed Development?
Link Park Lympne Kent		extant permission assessed construction dust.		
Y16/1122/SH, Land Rear Rhodes House Main Road Sellindge Kent	AM	Yes	Concludes that unmitigated risk of dust soiling impacts from earthworks is high. With measures in place, residual effect is negligible.	Yes. If there is overlap with construction of proposed development and undertaking of earthworks at construction site
20/0604/FH, Land at Grove House	AQ	Yes	Concludes site is low risk before mitigation measures are applied. Residual effect is '**Not Significant'**	No
Y15/0880/SH, Land Adjoining The Link Park Lympne Industrial Estate Lympne Kent	AK	Yes	Construction dust residual impacts are N**ot Significant** with implementation of CoCP	Yes

6.6.5 With the implementation of the embedded dust control mitigation measures, secured through the Outline CoCP (ES Appendix 4.17), it is considered that cumulative effects of dust will be **Not Significant.** This is because firstly, dust emissions from the proposed Development are to be controlled with the most stringent level of measures recommended by the IAQM guidance, and residual effects are considered to be **Not Significant.** Secondly, all of the six nearby developments have plans in place or are required to produce plans by way of planning condition, which minimise and control dust to negligible/non-significant levels.

Permitted Waste Facility

6.6.6 The assessment provides the worst case predicted cumulative impact between two proposed land uses; the traffic data which informs the air quality assessment assumes that existing planning permission for the PWF not realised and that instead the PWF site is replaced with 800 residential units and a primary school. The transport planning team produced estimates of traffic (including light and heavy duty vehicles) that the two differing land uses would induce. This is summarised in section 16.6 of (Chapter 16: Transport.) The traffic data for each land use was converted into emission rates and compared. The analysis showed that the traffic generated by residential/education use of the site is associated with greater emission rates on the local road network than those associated with the transport from the operation of the PWF.

6.6.7 The planning application for the PWF and Anaerobic Digestion Facility concluded that the residual risk of potential odour and dust emissions, is negligible at all receptors assessed in both the 2009 ES (Ref 6.23) and in the 2010 air quality assessment (Ref 6.35) which accompanied the application. The proposed Development would not introduce any new residential exposure at locations closer than those assessed in the

PWF ES as the proposed Development would seek to adopt a 250m buffer zone should the Permitted Waste Facility site be realised.

6.6.8 In terms of operational phase dust emissions, the 2009 ES states that dust emissions would be controlled to negligible levels through routine housekeeping (i.e. management of potentially dust generating activities and implementation of dust suppression), and because of separation distances and the prevailing south westerly winds. The proposed Development is not anticipated to result in operational phase dust emissions.

6.6.9 Therefore, it is considered that the cumulative effects with the Permitted Waste Facility, due to operational traffic, dust and odour impacts, would be **Not Significant.** Construction phase dust emissions from the Permitted Waste Facility would be subject to controls as dictated by the applicant's CoCP, therefore cumulative effects during construction would **Not be Significant.**

6.7 Monitoring

6.7.1 Any monitoring requirements have been identified during the construction phase, as set out in the 'Embedded Design Measures' section above and are included within the Outline CoCP.

6.8 Assessment Summary

6.8.1 Table 6-30 provides an assessment summary with respect to air quality, including the potential significant effect with embedded design measures in place, and additional measures required to reach the residual significance of effect.

Table 6-30: Summary Table of Effects

Receptor	Embedded Design Measures	Potential Significant Effect (pre-mitigation)?	Phase	Additional Mitigation	Mitigation Delivery Mechanism	Residual Effect Significance
Ecologically Designated Sites	Implementation of the following measures through the CoCP: Site Management (logging of incidents/complaints) Monitoring (site inspections, soiling checks, compliance with Dust Management plan, etc) Preparing and maintaining the site (locate dust causing activities away from receptors, barriers, cleaning, enclosed specific operations with high potential for dust production, cover stockpiles, etc) Operating vehicle/machinery and sustainable travel (comply with NRMM standards, no idling, use mains electricity, travel plan etc) Operations (employ dust suppression, use enclosed chutes, minimise drop heights, etc) Demolition measures (damp down, avoid explosive blasting, soft strip interiors before demolition, etc) Earthworks measures (re-vegetate promptly, use hessian mulches and cover with topsoil, etc) Construction measures (avoid scabbling, keep aggregates damp, ensure fine powder materials are delivered enclosed and stored in silos, ensure bags are sealed after use) Trackout measures (wash access and local roads, avid dry sweeping of large areas, ensure vehicle-borne materials are covered, install hard surface haul routes, wheel washing, etc)	Increased dust deposition from construction activities = **Not Significant**	C	No additional mitigation required	N/A	Negligible **(Not Significant)**
Human Receptors		Increased dust soiling/increased PM_{10} concentrations from construction activities = **Not Significant**	C	No additional mitigation required	N/A	Negligible **(Not Significant)**
Human Receptors (Odour from proposed WwTW)	Use of BAT/BPM – detail to be provided as and when design is finalised.	Substantial/Moderate Odour effects from operation of WwTW = **Not significant**	O	Quantitative assessment of Odour at Tier 3, secured by planning condition	N/A	**Not significant**

Receptor	Embedded Design Measures	Potential Significant Effect (pre-mitigation)?	Phase	Additional Mitigation	Mitigation Delivery Mechanism	Residual Effect Significance
Ecologically Designated Sites	Refer to Chapter 7: Biodiversity	Increased Nitrogen Deposition and possible breaching of critical levels and loads from increased traffic flows	O/C	Refer to Chapter 7: Biodiversity		
Human Receptors	The design of the proposed Development incorporates a number of measures that have served to reduce the operational air quality impact of the proposed Development, these are mainly measures that serve to reduce the number of vehicle trips generated or that encourage active travel and the use of more sustainable modes of transport which are consistent with the principles of the Transport Strategy (ES Appendix 16.5); •minimising reliance upon motor vehicle use •promoting alternative transport options •inclusion of integrated cycle paths into surrounding environments •inclusion of pedestrian walkways into surrounding environments •inclusion of electric charging points •implementation of a Travel Plan •integration of public transport provisions •reduce the need to travel by providing relevant on-site facilities.	Increased pollutant concentrations in sufficient quantity and magnitude to constitute a **significant** effect on local air quality. Creation of new exposure (on-site future receptors) in areas of poor air quality. Potentially caused by increased traffic flows associated with the application proposals and Framework Masterplan. = **Not Significant**	O/C	No additional mitigation required	N/A	**Not Significant**

Notes: Phase column, Construction = C, Operation = O

6.9 References

Reference	Title
Ref 6.1	The Stationery Office Ltd. (1995) Part IV of the Environment Act (Air Quality), Chapter 25.
Ref 6.2	The Stationery Office Ltd. (2000) The Air Quality (England) Regulation 2000, Statutory Instruments No. 928.
Ref 6.3	The Stationery Office Ltd. (2002) The Air Quality (England) (Amendment) Regulations 2002, Statutory Instruments No. 3042
Ref 6.4	The Stationery Office Ltd. (2007) The Air Quality Standards Regulations 2007, Statutory Instruments No. 64.
Ref 6.5	The Stationery Office Ltd. (2010) The Air Quality Standards Regulations 2010, Statutory Instruments No. 1001.
Ref 6.6	Official Journal of the European Union (2008) Ambient Air Quality and Cleaner Air for Europe (2008/50/EC).
Ref 6.7	HMSO (2018), European Union (Withdrawal) Act 2018. UK: HMSO.
Ref 6.8	HMSO (2019). Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019. UK: HMSO.
Ref 6.9	The Stationery Office Ltd. (2021) Environment Act 2021, Chapter 30
Ref 6.10	The Stationery Office Ltd. (1990) Environmental Protection Act, Chapter 43.
Ref 6.11	Department for Environment, Food and Rural Affairs (2017) Air Quality Plan for tackling roadside nitrogen dioxide concentrations in South East (UK0031)
Ref 6.12	Department for Environment, Food and Rural Affairs (2017) UK plan for tackling roadside nitrogen dioxide concentrations
Ref 6.13	Department for Communities and Local Government (2021), National Planning Policy Framework
Ref 6.14	Folkestone and Hythe District Council (2022) Folkestone and Hythe Council Core Strategy Review
Ref 6.15	Reference not used
Ref 6.16	Folkestone and Hythe District Council (2020) Places and Policies Local Plan
Ref 6.17	Ministry of Housing, Communities & Local Government (2019) *National Planning Practice Guidance.* Available at: https://www.gov.uk/guidance/air-quality--3 (Accessed 15/04/2021)
Ref 6.18	Holman *et al.* (2014) *IAQM Guidance on the assessment of dust from demolition and construction,* Institute of Air Quality Management, London.
Ref 6.19	Moorcroft and Barrowcliffe *et al.* (2017) *Land-use Planning & Development Control: Planning for Air Quality.* v1.2. Institute of Air Quality Management, London.
Ref 6.20	National Highways (2019) HA207/07 Design Manual for Roads and Bridges (DMRB), LA 105 Air quality

Reference	Title
Ref 6.21	Holman et al (2020). *A guide to the assessment of air quality impacts on designated nature conservation sites*. v1.1. Institute of Air Quality Management, London.
Ref 6.22	Bull et al (2018) *IAQM Guidance on the assessment of odour for planning – version 1.1*
Ref 6.23	SLR Consulting (2009). Otterpool Anaerobic Digestion Facility – Additional Information on Odour and Dust Management. Kent County Council Planning Register.
Ref 6.24	Anglian Water (2012) Asset Encroachment Risk Assessment Methodology: Guidance Document
Ref 6.25	Department for Environment, Food and Rural Affairs (2016) Local Air Quality Management Technical Guidance (TG16).
Ref 6.26	Department for Transport (2018) The Road to Zero, Next steps towards cleaner road transport and delivering our Industrial Strategy
Ref 6.27	Committee on the Medical Effects of Air Pollutants (COMEAP) (2018) Associations of long-term average concentrations of nitrogen dioxide with mortality.
Ref 6.28	Committee on the Medical Effects of Air Pollutants (COMEAP) (2018) Statement on the Evidence for Differential Health Effects of Particulate Matter According to Source or Components.
Ref 6.29	Scottish Environment Protection Agency (SEPA, 2010) Odour Guidance 2010
Ref 6.30	Defra (2020) Emissions Factor Toolkit version 10.1. Available at: https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html
Ref 6.31	Defra (2020) NOx to NO2 Calculator (v8.1). Available at: https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html
Ref 6.32	Carslaw, D., Beevers, S. Westmoreland, E. Williams, M. Tate, J. Murrells, T. Stedman, J. Li, Y., Grice, S., Kent, A. and I. Tsagatakis (2011). *Trends in NOx and NO2 emissions and ambient measurements in the UK.* v3.
Ref 6.33	Folkestone & Hythe Proposed Submission Core Strategy Review – Habitats Regulations Assessment (2018)
Ref 6.34	Folkestone & Hythe Core Strategy Review – HRA addendum (2019)
Ref 6.35	SLR (2010) Proposed MRF and AD Plant at Otterpool Quarry, Sellindge, Kent, Atmospheric Dispersion Modelling (on behalf of Countrystyle Recycling Ltd). Kent County Council Planning Register
Ref 6.36	Folkestone and Hythe District Council (2020) 2020 Annual Status Report.
Ref 6.37	Ashford Borough Council (2020) 2020 Air Quality Annual Status Report (ASR).
Ref 6.38	Air Quality Consultants (2020) Calibrating Defra's 2018-based Background NOx and NO2 Maps against 2019 Measurements.

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