

11. AIR QUALITY AND ODOUR

Introduction

- 11.1 This chapter of the ES assesses the likely significant effects of the Development on the environment in respect of Air Quality, including dust and odour.
- 11.2 This chapter should be read in conjunction with the two technical appendices which have been produced as stand-alone detailed assessments:
- Appendix 11.1: Odour Assessment Technical Report and
 - Appendix 11.2: Air Quality Assessment Technical Report.
- 11.3 These technical appendices form an integral part of the ES and include detailed information relating to odour, dust and air quality which has not been reproduced in its entirety within this chapter. For purposes of these assessments, 'dust' refers to the larger particles associated with disamenity, whilst the smaller particles are referred to as particulate matter (PM).
- 11.4 This chapter has been prepared by Hoare Lea. Details and experience of the team involved in the air quality assessment are provided in Appendix 1.2.

Policy Context

National Planning Policy Framework

- 11.5 The National Planning Policy Framework (NPPF)ⁱ 2019 sets out planning policy for England. It includes advice on when air quality should be a material consideration in development control decisions. Relevant sections are set out below:
- 11.6 Paragraph 170:
- "Planning policies and decisions should contribute to and enhance the natural and local environment by: preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality."*
- 11.7 Paragraph 180:

"Planning policies and decisions should also ensure that new

development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development."

11.8 Paragraph 181:

"Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

11.9 Paragraph 183:

"The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities."

11.10 Paragraph 54:

"Local planning authorities should consider whether otherwise unacceptable development could be made acceptable through the use of conditions or planning obligations. Planning obligations should only be used where it is not possible to address unacceptable impacts through a planning condition."

11.11 The NPPF is supported by Planning Practice Guidance (PPG)ⁱⁱ. The PPG states that:

11.12 Paragraph 001 (Reference ID: 32-001-20140306):

"Defra carries out an annual national assessment of air quality using modelling and monitoring to determine compliance with EU Limit Values. It is important that the potential impact of new development on air quality is taken into account in planning where the national assessment indicates that relevant limits have been exceeded or are near the limit."

11.13 Paragraph 005 (Reference ID: 32-005-20140306):

"Whether or not air quality is relevant to a planning decision will depend on the Proposed Development and its location. Concerns could arise if the development is likely to generate an air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)."

11.14 The PPG also sets out the information that may be required in an air quality assessment, stating that:

11.15 Paragraph 007 (Reference ID: 32-007-20140306):

"Assessments should be proportional to the nature and scale of development proposed and the level of concern about air quality, and because of this are likely to be locationally specific."

11.16 It also provides guidance on options for mitigating air quality impacts, and makes clear that:

11.17 Paragraph 008 (Reference ID: 32-008-20140306):

"Mitigation options where necessary will be locationally specific, will depend on the Proposed Development and should be proportionate to the likely impact."

Local Planning Policy

The Arun Local Plan 2011-2031

11.18 The Site is located within the administrative boundary of Arun District Council (ADC). The Arun Local Plan 2011-2031ⁱⁱⁱ sets out the planning framework for the district for the period between 2011 and 2031. Policy QE DM3 Air Pollution of the Local Plan refers to air quality:

"All major Development proposals will be required to assess the likely impacts of the Development on air quality and mitigate any negative impacts by:

- a. Ensuring the Development is located within easy reach of established public transport services;*
- b. Maximising provision for cycling and pedestrian facilities;*
- c. Encouraging the use of cleaner transport fuels on site, through the inclusion of electric car charging points; and*

d. Contributing towards the improvement of the highway network where the development is predicted to result in increased congestion on the highway network.

Development proposed nearby any Air Quality Management Area (AQMA) declared within the District within the Plan period, will require an air quality assessment to identify likely impacts of upon the designated area. Developers will be required to ensure delivery of the actions set out within any Air Quality Action Plan.

Industrial Development which is regulated by environmental permits (that creates or results in dust, smell, fumes, smoke, heat, radiation, gases, steam or other forms of pollution) must be located in such a position which ensures that the health, safety and amenity of users of the Site or surrounding land is not put at risk and the quality of the environment would not be damaged or put at risk.

Developments shall also be consistent with all other Local Plan policies."

11.19 Section 12 of the Local Plan relates to housing allocations. Policy H SP2c provides specific guidance relating to individual Sites, such as Ford (SD8).

'...Development proposals in the Ford Strategic Allocation will provide at least 1,500 dwellings over the plan period. The Site is functionally connected to Arun Valley SPA and Development should avoid adverse effects on this designated area. Development proposals must demonstrate compliance with the following key design and infrastructure requirements:

....

j. take into account the siting of Ford Wastewater Treatment Works, including the outcomes of an odour assessment, and not prejudice the operation of or the expansion of the treatment plant as required to accommodate future growth in the District.'

11.20 Policy QE SP1 'Quality of the environment' also relates to the potential for odour from the Ford Wastewater Treatment Works:

'The Council requires that all Development contributes positively to the quality of the environment and will ensure that Development does not have a significantly negative impact upon residential amenity, the natural environment or upon leisure and recreational activities enjoyed by residents and visitors to the District.

The location of existing industrial and commercial uses, including waste management uses, must be taken into consideration when assessing proposals for Development sensitive to noise, light, odour and outputs to air. This is to ensure that land allocated for these uses are protected and to ensure that the amenity of new Developments and facilities is safeguarded from the impacts of incompatible land uses.'

European Legislation

- 11.21 The European Union (EU) directive on ambient air quality and cleaner air for Europe (2008/50/EC)^{iv} sets legally binding limits for pollutant concentrations. This directive was made law in England through the Air Quality Standards Regulations 2010^v and subsequent amendments.

National Legislation

- 11.22 Part IV of the Environment Act 1995 places a duty on the Secretary of State for the Environment to develop, implement and maintain an Air Quality Strategy with the aim of reducing atmospheric emissions and improving air quality. The latest Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published in 2007^{vi}, and provides the framework for improving air quality based on a combination of international, national and local measures to reduce emissions and improve air quality. Part IV of the Environment Act 1995 also includes a statutory duty for local authorities to regularly and systematically review and assess air quality within their boundaries against a series of objectives and appraise Development and transport plans against these assessments. This has become known as Local Air Quality Management.
- 11.23 The Air Quality Strategy sets out national air quality objectives in order to improve air quality in the UK. These air quality objectives have been used for comparison in this assessment and those relevant to the Development are detailed in Table 11.1 below.

Table 11.1: Air Quality Objective (AQOs)

Pollutant	Concentration	Measured as	Equivalent percentile
NO ₂	40 µg/m ³	Annual mean	-
	200 µg/m ³	1-hour mean	99.79 th percentile of 1-hour-means (equivalent to 18 1-hour exceedances)
PM ₁₀	40 µg/m ³	Annual mean	-
	50 µg/m ³	24-hour mean	90.41 th percentile of 24-hour-means (equivalent to 35 24-hour exceedances)
PM _{2.5}	25 µg/m ³	Annual mean	-

- 11.24 In accordance with statutory Department for Environment, Food & Rural Affairs (DEFRA) technical guidance for Local Air Quality Management (LAQM(TG16))^{vii}, the air quality objectives should be assessed at locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective.
- 11.25 A summary of examples of relevant exposure for the objectives presented in Table 11.1 are shown below in Table 11.2.

Table 11.2: Examples of Relevant Public Exposure

Objective Averaging Period	Relevant Locations	Objectives should apply at:	Objectives should not apply at:
Annual mean	Where individuals are exposed for a cumulative period of 6 months in a year	Building facades of residential properties, schools, hospitals etc	Facades of offices, hotels, gardens of residences, kerbside sites
24-hour mean	Where individuals may be exposed for eight hours or more in a day	As above together with hotels and gardens of residential properties	Kerbside sites where public exposure is expected to be short term
1-hour mean	Where individuals might reasonably be expected to spend one hour or longer	As above together with kerbside Sites of regular access, car parks, bus stations etc	Kerbside sites where public would not be expected to have regular access

- 11.26 In the UK there are no statutory numerical standards for assessing the acceptability of predicted odour impacts from quantitative odour impact assessments. On this basis, odour impact criteria are typically based upon guideline documents (predominately based on research from outside of the UK), case law and research which differ depending on the regime i.e. planning (to avoid significant detriment to amenity) or permitting (to avoid unacceptable pollution).
- 11.27 The numerical criteria applied have largely been derived from the findings of a limited number of research studies where modelled odour impacts have been compared to the findings of quality of life surveys to provide a dose-effect relationship. These dose-effect studies have only been undertaken for a limited number of odour types; however, they have been used as the foundation for the setting of acceptable odour criteria in many countries.
- 11.28 The actual acceptable level of impact will be dependent on a number of factors including the nature (offensiveness) of the odour and the broad sensitivity of the population. To account for this, differing numerical criteria are often set depending on the offensiveness of the odour.

Regional Legislation

Sussex Air Quality Guidance

- 11.29 Air quality and emissions mitigation guidance for Sussex (2019)^{viii} was developed by members of the Sussex Air Quality Partnership (Sussex-air). The guidance supports the principles of the partnership to improve air quality across Sussex and encourage emissions reductions to

improve the environment and health of the population.

11.30 The stated purpose of this guidance is to:

- '1) provide clarity to how authorities intend interpreting relevant Local Plan policies,*
- 2) provide advice for developers and their consultants on how to assess and mitigate the impact that new development may have on local air quality;*
- 3) detail a consistent approach by developers and Local Planning Authorities (LPAs) to*
 - Address impacts on local air quality*
 - Ensure optimum scheme design (related to air quality) and*
 - Avoid unnecessary delays in the planning process.'*

11.31 This guidance includes an air quality screening checklist, however as an Air Quality (AQ) assessment has been requested, this is not required. It also outlines mitigation measures.

11.32 This document includes a requirement for the damage costs to be calculated and mitigation measures costing at least that amount be included in the Development. The results of this have not been included in the chapter but are included in Appendix 11.2.

Assessment Methodology

11.33 A staged approach has been adopted; this ensures that the approach taken for the assessment of risk is proportional to the risk of an unacceptable impact being caused. As such, where a simple review of the situation shows that risk of a health or disamenity impact is negligible, this will be sufficient. In cases where the risk cannot be regarded as insignificant, a more detailed assessment may be required, such as a quantitative screening assessment or an advanced dispersion modelling exercise.

11.34 The assessment methodology was agreed with Mr Colin Giddings (Senior Environmental Health Officer), of ADC in May 2018, as shown in Appendix 11.3. The following sections outline the methodology utilised in the assessment.

Dust Assessment

11.35 Given the requirement for construction activities, there is a potential risk for the generation of dust. For such operations the common concern regarding dust emissions is their potential disamenity effect.

11.36 A qualitative risk-based assessment of the dust generation potential of the operations has

been carried out using the method detailed in the 2016 Institute of Air Quality Management (IAQM) document 'Assessment of dust from demolition and construction v1.1'^{ix}.

- 11.37 The potential impact at receptors, taking into account the number of dwellings at different distances from the Site boundary, as shown in Figure 11.1, was assessed to identify appropriate mitigation measures.

Traffic Emissions Impact Assessment

- 11.38 The Development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the Site during both the construction phase and operational phase of the development as well as the potential to expose future users to poor air quality.
- 11.39 Traffic data including 24-hour Annual Average Daily Traffic (AADT) flows and fleet composition (% heavy duty vehicles) was provided by i-Transport, the appointed Transport Consultants for the project. A diurnal profile was also included within the model to represent variations in traffic flow throughout the day. Separate inputs were provided for weekdays, Saturday and Sunday and this information was obtained from the Department for Transport (DfT) data.
- 11.40 It is currently anticipated that the Development will be completed by 2030. However, for the purpose of the assessment, traffic data for a future year of 2031 has been provided by i-Transport, in line with the completion of the Local Plan however in Defra's Emission Factor Toolkit (EFT), emission factors are only available up to 2030. It has been confirmed with i-Transport, that the traffic data provided for the 2031 future year scenario is also representative of the traffic predicted to be on the network in 2030. It is predicted that between 2030 and 2031 that there will be a 1% growth in traffic flows and therefore utilising 2031 traffic data for a 2030 scenario is an overestimation and provides a robust assessment of air quality impacts. Air quality is predicted to improve in the future and therefore the adoption of an earlier modelling year has resulted in conservative results.
- 11.41 Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.1.1.0). The results have been verified against ADC monitoring data. The full methodology and inputs are described in Appendix 11.2 which accompanies this chapter. Impacts have been compared against the criteria detailed in Table 11.3.
- 11.42 A diurnal profile was also included within the model to represent variations in traffic flow throughout the day. Separate inputs were provided for weekdays, Saturday and Sunday and this information was obtained from DfT data. Flows on a total of 36 road links were modelled

and these are shown in Appendix 11.2 (Section 6).

11.43 Potential impacts during the operational phase have been defined by predicting nitrogen dioxide (NO₂) and particulate matter (PM) concentrations at relevant locations. Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 4.1.1.0).

11.44 Air quality impacts have been predicted at 47 receptors, as shown in Figure 11.2.

11.45 The predicted impacts have been assessed against the relevant air quality objectives (AQOs, see Table 11.1) and are described for individual receptors using the criteria in the Environmental Protection UK/IAQM guidance^x. The terms used in the guidance have been changed to be consistent with those used in this ES, and the adapted impact descriptors are shown in Table 11.3. In Appendix 11.2 the original Environmental Protection UK/IAQM descriptors have been used. These are negligible, slight, moderate and substantial instead of negligible, minor, moderate and major.

Table 11.3: Impact Descriptors for Individual Receptors

Concentration at Receptor in Assessment Year	Predicted Concentration Change as Percentage of Air Quality Objective (AQO) (%)			
	1	2 - 5	6 - 10	> 10
75% or less of AQO	Negligible	Negligible	Minor	Moderate
76 - 94% of AQO	Negligible	Minor	Moderate	Moderate
95 - 102% of AQO	Minor	Moderate	Moderate	Major
103 - 109% of AQO	Moderate	Moderate	Major	Major
110% or more of AQO	Moderate	Major	Major	Major

11.46 These descriptors are for the air quality impact at individual receptors. To assess where there is likely to be a significant effect on human health professional judgement is used taking into account a range of factors including:

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

11.47 The IAQM would normally regard moderate and major impacts to give rise to significant effects, with minor and negligible impacts not giving rise to significant effects.

Odour Assessment

- 11.48 A detailed odour impact assessment is included as Appendix 11.1 to this ES which details the consultations undertaken with Southern Water and ADC along with odour complaint history from the Ford Wastewater Treatment Works.
- 11.49 UK guidance identifies a range of odour impact criteria depending primarily on the nature of the odour (i.e. its pleasantness/unpleasantness) and the likelihood of causing unacceptable impacts based on the 98th percentile of predicted hourly average odour concentrations over a year.
- 11.50 The odour assessment follows the method described in The Institute of Air Quality Management *Guidance on the Assessment of Odour for Planning* (2018)^{xi}. A Site visit was undertaken and, in conjunction with discussions with Southern Water (the operator of the Ford Wastewater Treatment Works (WwTW)), emission rates were agreed and dispersion modelling completed using the BREEZE AERMOD modelling software.
- 11.51 The predicted impacts have been assessed against the relevant IAQM odour effect descriptors for odours of a 'moderate' offensiveness, such as those from the Ford WwTW where the most offensive odour sources are covered with the air extract to odour control systems.
- 11.52 The IAQM descriptors in Table 11.4 have been amended to be consistent with those used in this ES. In Appendix 11.1 the IAQM descriptors have been used. These are negligible, slight, moderate and substantial instead of negligible, minor, moderate and major.

Table 11.4: Odour Effect Descriptors

Odour Exposure Level C ₉₈ OU _E /m ³	Low Sensitivity	Medium Sensitivity	High Sensitivity
>10	Moderate	Major	Major
5-10	Minor	Moderate	Major
3-5	Negligible	Minor	Moderate
1.5-3	Negligible	Negligible	Minor
>1.5	Negligible	Negligible	Negligible

Limitations and Assumptions

- 11.53 The construction dust assessment is based on the available information at this time, as described in Chapter 5 of this ES. At the time of writing, full details are not available (this is common at the outline planning application stage) and as such, conservative assumptions have been made and it is envisaged that a detailed Dust Management Plan (DMP) would be required prior to works commencing.

- 11.54 The detailed traffic emissions assessment is based on current best practice and has utilised ADMS-ROADS to model the surrounding road links using flows associated with the Development and baseline trip information provided by the appointed Transport Consultant (i-transport). Although the roads assessment is based on this data, model verification from ADC monitoring data ensures that the 2017 modelled scenario reflects the monitoring.
- 11.55 The greatest uncertainty relating to traffic emission modelling is the potential for reductions in vehicle exhaust emissions through time. The assessment as presented in Appendix 11.2 takes a 'worst case' approach in that it utilises 2017 base year emission factors for both future year scenarios. This assumes that there will be no improvement in vehicle technology or emissions before the Development is completed.
- 11.56 In relation to odour, a site visit and discussions with Southern Water, the operator of the Ford Wastewater Treatment Works (WwTW) were undertaken. The odour emissions were modelled based, in part, on hydrogen sulphide (H₂S) monitoring data for the works as supplied by Southern Water (see Appendix 11.1). At the time of writing, the Ford WwTW is undergoing refurbishment which prevents additional monitoring (either at source or 'sniff testing') to be undertaken. The emission rates used in the detailed assessment are higher than would be expected for the Ford WwTW and are therefore cautious in nature.
- 11.57 The detailed dispersion modelling is based on meteorological data from Shoreham Airport the closest meteorological station to the Site. The use of this data was agreed with ADC. Notwithstanding this, the odour assessment includes additional sensitivity testing using meteorological data from Thorney Island.
- 11.58 It is noted that part of the eastern boundary, in the northern extent of the Site is located adjacent to the Grundon Waste Management Waste Transfer Station (WTS). The WTS is a permitted facility (permit number: EPR/DB3304HB) and therefore it has been assumed that the facility is operating in line with its permit and any odour associated with the operations is managed by this permit. Odour impacts from the Grundon Waste Management WTS have therefore not been considered further within this ES.

Baseline Conditions

Location and Setting

- 11.59 The description of the Site and the Development is included within Chapter 3 of this ES.

Dust

- 11.60 The Site is currently a large former airfield. There are some surrounding industries (such as the Viridor Materials Recycling Facility and agricultural operations), however there are no activities which would be regarded as being potentially large material sources of dust emissions.

Air Pollutants

- 11.61 In 2017, the most recent year that monitoring data is available for, ADC operated a network of 15 nitrogen dioxide (NO₂) diffusion tubes. A summary of recent NO₂ monitoring results from the monitoring locations with most relevance to the Site is presented within Table 11.5 below. A visual representation of the monitoring locations is available in Appendix 11.2.

Table 11.5: NO₂ Monitoring Results, ADC

Monitoring Location	Monitored NO ₂ Concentration (µg/m ³)		
	2015	2016	2017
2 - Litt02	25.8	24.4	25.3
3 - Yap03	12.9	12.9	16.9
4 - Litt04	16.1	22.9	27.1
8 - Ford08	17.1	16.6	18.5

- 11.62 Table 11.5 indicates that the annual mean AQO of 40µg/m³ was achieved at all monitoring locations during recent years. ADC do not undertake PM₁₀ monitoring within the vicinity of the Site.
- 11.63 Background pollutant concentration data on a 1km x 1km spatial resolution is provided by the National Air Quality Information Archive (NAQIA) based upon the background mapping undertaken by DEFRA to support LAQM.
- 11.64 Mapped background concentrations of NO₂ and PM were downloaded for grid squares x499500, y102500 and x499500, y103500 for the base year (2017), opening year (2024) and future year (2030). These grids cover the southern and northern parts of the Site respectively. This data is presented in Table 11.6 below.

Table 11.6: Estimated Annual Mean Background Concentrations

Grid Square	Pollutant	Predicted Concentrations (µg/m ³)		
		2017	2024	2030
499500, 102500	NO ₂	10.1	8.0	7.2
	PM ₁₀	14.9	13.8	13.8
	PM _{2.5}	9.6	8.7	8.7
499500, 103500	NO ₂	10.5	8.7	8.1
	PM ₁₀	15.0	13.8	13.9

Grid Square	Pollutant	Predicted Concentrations ($\mu\text{g}/\text{m}^3$)		
		2017	2024	2030
	PM _{2.5}	9.5	8.6	8.6

11.65 As shown in Table 11.6, the background concentrations are well below the relevant objectives for these pollutants.

Odour

11.66 Ambient odour is not a pollutant that is measured in the UK as it is not possible to accurately obtain a background concentration using standard monitoring techniques. However complaint data for odour has been used to identify if odour has previously been detected in the area close to the Site.

11.67 ADC provided a history of complaint history in October 2018 which showed a total of 9 complaints since 2012 as follows:

- 2018: 2 (both notifications from Southern Water, not complaints);
- 2017: 1 (received March);
- 2016: 2 (received August and October);
- 2015: 5 (all during a period 23rd June until 7th July);
- 2014: 0;
- 2013: 1; and
- 2012: 0.

11.68 The limited complaints have been received from occupiers in Ford and Yapton. It is not known what event at the treatment works resulted in the complaints.

Likely Significant Effects

Construction Phase

Dust

11.69 The construction phases are broken down into 4 different activities with the potential to generate dust:

- Demolition;
- Earthworks;
- Construction; and
- Trackout.

- 11.70 The Site covers approximately 88.27 hectares and is over 1.7km in length (north to south). The risk of dust impact will therefore only be greatest when works are closest to existing properties on the western and southern boundaries of the Site. As detailed in Chapter 5, the anticipated programme of demolition and construction will occur in a phased manner, starting in 2020/2021 and ending in 2029/2030.
- 11.71 There are human receptors located within 50m of the boundary of the Site and 50m of the route(s) used by construction vehicles, as shown in Drawing AQ1 of Appendix 11.2. There are however no notable ecological receptors close to the Site and therefore an impact assessment on ecological receptors has been scoped out. According to the IAQM Dust Guidance the risk for human receptors cannot therefore be considered as 'negligible' and an assessment is required.

STEP2a: Dust Emission Magnitude

- 11.72 There are no buildings on the Site which will require demolition prior to construction of the Development. There are no potential dust emissions therefore associated with demolition activities.
- 11.73 In relation to earthworks, the total Site area is greater than 10,000m² and there may be the requirement for material movement from Site during operation of the Development. As noted above, the Site itself is over 1.7km long (north to south) and the risk of dust impact to existing receptors will be greatest when works are closest to the western and southern boundaries of the Site. The phasing of the Development will also mean the introduction of new receptors within 20m of other areas being constructed.
- 11.74 The potential dust emission magnitude as a result of earthworks is 'large'.
- 11.75 Based on the size of the Development, the new buildings are anticipated to have a total volume greater than 100,000m³. The potential dust emission magnitude as a result of construction is therefore 'large'.
- 11.76 Details of the construction traffic numbers, which depend on the phasing of Development, and the number of houses and scale of infrastructure constructed in any one year is provided in Chapter Chapter 5 of this ES: Construction Methodology and Phasing. The peak construction traffic will occur in the period 2021/22 - 2026/27, when a maximum of 670 light duty vehicles (LDVs) and 124 heavy duty vehicles (HGV) are expected to access and egress the Site, per day. The unpaved road length is likely to be greater than 100m at stages of the construction

works, given the Site orientation. The potential dust emission magnitude as a result of track out is therefore 'large'.

STEP2b: Sensitivity of the Area

- 11.77 The closest existing receptors to the Site are located adjacent to the northern, southern and western boundaries of the Site. Hence the sensitivity of the area to dust soiling effects on people and property as a result of earthworks and construction activities is considered to be 'high' in these locations. Within the Site there would be new housing close to other areas being constructed. The sensitivity of existing receptors will be (at worst) 'medium' for all other directions due to their commercial / industrial uses.
- 11.78 There are several residential receptors within 20m of the anticipated Site access route along Yapton Road. The sensitivity of the area to dust soiling effects on people and property as a result of trackout activities is therefore considered to be 'high'.
- 11.79 Given the low baseline PM₁₀ and PM_{2.5} concentrations, the sensitivity of the area to human health impacts is considered to be 'low'.

STEP2c: Risks

- 11.80 The risk of dust soiling during earthworks is likely, during specific stage of Site preparation, to be 'high risk' at the closest receptors before mitigation is considered. The risk of human health impacts during earthworks is considered to be 'low risk' before mitigation is considered.
- 11.81 The risk of dust soiling during construction on the northern, southern and western boundaries of the Site must be regarded as 'high risk' before mitigation is considered. This risk will reduce with distance from the relevant boundaries of the Site unless new receptors are introduced within 350m of other areas subject to large scale earthworks. The risk of human health impacts during construction is considered to be 'low risk' before mitigation is considered.
- 11.82 The risk of dust soiling impacts during trackout activities must be regarded as 'high risk' before mitigation is considered. The risk of human health impacts during trackout activities is considered as 'low risk' before mitigation is considered.

Construction Vehicles

- 11.83 Construction traffic will include machinery working within the Site, often referred to as 'non-road mobile machinery' (NRMM) and vehicles accessing and egressing the Site. The number

of vehicles will be dependent upon the phase of working and therefore requirements at any one time.

- 11.84 As described above, the volume of construction traffic varies over time. The peak traffic will occur in the period 2021/22 - 2026/27 when a maximum of 670 light duty LDV and 124 HGV are expected to access and egress the Site per day as detailed in Chapter 5. This number will reduce significantly on days when construction operations are limited (such as Sundays). These vehicles will use the road network appropriate to the phase of Development and agreed routing arrangements. This will be offset by fewer Development trips as occupation of later phases will not have occurred. As such, it is considered that impacts as a result of construction phase traffic will not be significant.

Odour

- 11.85 There will be no construction phase odour effects as none of the construction activities represent a significant source of odour.

Operational Phase

Dust

- 11.86 The Development includes no operations which are likely to generate dust.

Traffic

- 11.87 The Development has the potential to affect existing air quality as a result of road traffic exhaust emissions associated with vehicles travelling to and from the Site. Potential impacts have been defined by predicting concentrations of pollutants at relevant locations using dispersion modelling. The relevant pollutants assessed are nitrogen dioxide (NO₂), particulate matter with an aerodynamic diameter of less than 10µm (PM₁₀) and particulate matter with an aerodynamic diameter of less than 2.5µm (PM_{2.5}).
- 11.88 Impacts have been compared against the AQOs for NO₂, PM₁₀ and PM_{2.5}. The results show that predicted levels of all pollutant concentrations are predicted to be below the relevant AQOs at all receptors in both the 'with Development' and 'without Development' scenarios.
- 11.89 When comparing the results against the criteria in Table 11.3, all predicted impacts in terms of human health are negligible and therefore there will not be a significant effect on human health. Furthermore, there will be no significant effects within any Air Quality Management

Area.

Odour

- 11.90 The operation of the Development (i.e. occupied) will not generate any odour. However, the Development layout has been constrained by the odour emissions from the Ford WwTW. This odour constraint is detailed in Appendix 11.1. The odour impact contours and a 100m buffer from the boundary of the WwTW to account for calm wind conditions are shown on Figures 11.3 and 11.4.
- 11.91 Figure 11.3 shows the maximum extent of the odour impact contours associated with the WwTW and Figure 11.4 shows the average (over five years) extent of the odour contours. The 3 OU_E/m³ contour (expressed as the 98th percentile of 1-hour average odour concentrations) is considered to be a reasonable criterion given the nature of the odour from the sources at the Ford WwTW which are not controlled (i.e. the aeration lanes and final tanks). This does not mean that residents would never experience odours from the works, but this criterion is suggested by the IAQM as being appropriate for a site such as the Ford WwTW. This criterion is supported by several planning appeal decisions.
- 11.92 The odour modelling is based on the assumption that the odour control units at the Ford WwTW will remain in good order and will prevent the most odorous emissions from being released untreated from the WwTW.
- 11.93 As a result of the odour impacts predicted, the residential aspect of the Development has been placed outside of the 3 OU_E/m³ contour zone which has resulted in the changed shape of the southern attenuation parcel in the Development. This is shown in Figure 11.5. The placement of sensitive receptors outside of the 3 OU_E/m³ contour zone results in a negligible to slight impact in line with the impact descriptors for "Moderately Offensive" odours detailed Institute of Air Quality Management document 'Guidance on the assessment of odour for planning'.

Mitigation Measures

Construction Phase

Dust

- 11.94 The risk of dust impacts at stages of the earthworks, construction and trackout must be regarded as 'high risk', as the most significant risk rating, before mitigation is considered and

therefore the appropriate mitigation measures detailed in section 8.2 of the IAQM *'Guidance on the assessment of dust from demolition and construction v1.1'* should be considered in this case.

11.95 Specific measures would be detailed within a Site Construction Environmental Management Plan (CEMP) which should be approved by ADC before construction commences on Site. The level of detail will depend on the risk and should include, as a minimum, the highly recommended measures the IAQM guidance. The desirable measures in the IAQM guidance should be included as appropriate for the Site. It is important that the CEMP include good dust management measures including recording, investigating and resolving dust complaints in a timely manner,

11.96 A full list of mitigation measures are included within Appendix 11.2 and include but not be limited to:

- Undertake daily on-Site and off-Site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to ADC when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and windowsills within 100m of the Site boundary, with cleaning to be provided if necessary;
- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the agreement of ADC, where appropriate;
- Ensure an adequate water supply on the Site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate;
- Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate;
- Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable; and
- Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.

Construction Vehicles

11.97 NRMM must be kept in good order and serviced in accordance with the manufacturers' requirements. No additional construction traffic mitigation is required.

Odour

- 11.98 The construction works are not anticipated to generate any significant odour, therefore no mitigation is required.

Operational Phase

Dust

- 11.99 The Development includes no operations which are likely to generate dust, therefore no mitigation is required.

Traffic

- 11.100 The Development includes sustainable transport measures aimed at minimising Development traffic and promoting other methods of travel. These are described in detail in Chapter 10 of this ES. The air quality assessment is based on the numbers of traffic movements with such measures in place. As such, there will be mitigation embedded within the design of the Development.
- 11.101 Based on the assessment results, which show that all predicted impacts are negligible and therefore 'not significant', no further air quality mitigation is required.

Odour

- 11.102 The operational (i.e. occupied) Development will not generate any odour. However, the adjacent Ford WwTW is a potential odour source and this impact has been modelled as detailed in Appendix 11.1. The results of this modelling have been taken into account in the design of the Development to ensure an appropriate distance between residential development and the Ford WwTW.

Residual Effects

Construction Phase

Dust

- 11.103 The IAQM document '*Assessment of dust from demolition and construction*' describes that,

where suitable mitigation is applied, the residual effect will normally be 'not significant' and therefore negligible. This is the case with this Development where robust mitigation measures are proposed.

- 11.104 Full and final details of this mitigation will be provided to ADC before construction works commence. This should be produced by the Principal Contractor, taking into account the results and mitigation recommendations of this assessment.

Traffic

- 11.105 For the reasons given above and within the appended Technical Report (Appendix 11.2), it is considered that air quality impacts from construction vehicles are negligible.

Odour

- 11.106 The construction phase will not generate significant odour therefore the residual effect is negligible.

Operational Phase

Dust

- 11.107 The Development includes no operations which are likely to generate dust. As such, there will be no residual effects.

Traffic

- 11.108 Impacts at all receptors are predicted to be negligible (see Table 11.3 and Appendix 11.X) and therefore 'not significant'. Furthermore, there will be no significant air quality impacts within any Air Quality Management Area. As such, the residual effects will be negligible and 'not significant'.

Odour

- 11.109 The operational (i.e. occupied) Development will not generate any odour. However, the adjacent Ford WwTW is a potential odour source, and this has been taken into account in the design of the Development. The residual effects will be 'not significant' assuming that the odour control units at the WwTW will remain in good order and will prevent the most odorous emissions from being released untreated from the site.

Cumulative Effects

Construction Phase

Dust

- 11.110 A number of consented and proposed planning applications have been considered within the assessment including the ADC secondary school and sixth form, proposed to be located to the immediate northwest of the Site boundary. Should the construction phases of the cumulative developments overlap in time and space with those of the Development then there is potential for moderate adverse cumulative effects. The implementation of appropriate mitigation measures will ensure that cumulative impacts on dust soiling and human health will be negligible and therefore 'not significant'.

Traffic

- 11.111 Similar to the above, there is potential for cumulative construction traffic impacts as a result of consented and proposed planning applications in vicinity of the Site. The implementation of appropriate mitigation measures will ensure that cumulative impacts from construction traffic will be negligible and therefore 'not significant'.

Odour

- 11.112 There will be no cumulative construction phase odour effects, as this phase of the Development will not generate significant odour. The cumulative effects are therefore negligible and 'not significant'.

Operational Phase

Dust

- 11.113 The Development includes no operations which are likely to generate dust and therefore the cumulative effects are negligible and therefore 'not significant'.

Traffic

- 11.114 The traffic data supplied by i-Transport accounts for a number of committed and proposed developments, agreed during the EIA scoping process and the associated traffic (see Chapter

10). The results of the air quality assessment predict negligible impacts at all existing sensitive and proposed receptor locations. The cumulative effects are therefore 'not significant'.

Odour

11.115 There will be no cumulative odour effects associated with the operational phase of the Development.

Summary

11.116 An air quality, dust and odour assessment has been undertaken using an assessment methodology agreed by ADC. This has included a site survey before detailed dispersion modelling of vehicle pollution and odour, as well as a risk-based assessment for construction dust. All assessments are compliant with the methodology agreed with ADC and relevant guidance.

11.117 The baseline conditions at the Site with respect to air quality have been assessed qualitatively and through a review of published air quality monitoring data from ADC and DEFRA modelled concentrations.

11.118 The Development includes embedded mitigation through design to ensure that residential development is not located immediately adjacent to the Ford WwTW and incorporation of sustainable transport solutions to minimise traffic generation.

11.119 As a result, there are no likely significant effects from traffic pollution or odour during the construction or operation of the Development. However, there is potential for significant construction dust effects without appropriate mitigation.

11.120 There will be the requirement for A Dust Management Plan to be incorporated within a r Construction Environmental Management Plan, will be required. This will incorporate dust mitigation measures during the construction stage of the Development.

11.121 All residual effects will be negligible and insignificant once embedded and construction dust mitigation measures are considered and applied.

11.122 Table 11.8 contains a summary of the likely significant effects of the Development.

Table 11.8: Table of Significance – Air Quality

Potential Effect	Nature of Effect (Permanent/Temporary)	Significance (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)	Mitigation / Enhancement Measures	Geographical Importance*							Residual Effects (Major/Moderate/Minor) (Beneficial/Adverse/Negligible)
				I	UK	E	R	C	B	L	
Construction											
Dust	Temporary	N/A	To be detailed in a Dust Management Plan including those recommended in Appendix 11.2 for demolition, earthworks, construction and trackout activities.							*	Negligible
Traffic	Temporary	Negligible							*		Negligible
Odour	Temporary	Negligible		None required							*
Completed Development											
Dust	Permanent	Negligible	None required							*	Negligible
Traffic	Permanent	Negligible	None required beyond mitigation embedded within the Development						*		Negligible
Odour	Permanent	Negligible	Not required							*	Negligible
Cumulative Effects											
Construction											
Dust	Permanent	Moderate Adverse	To be detailed in a Dust Management Plan							*	Negligible
Traffic	Permanent	Negligible	None required						*		Negligible
Odour	Permanent	Negligible								*	Negligible
Operation											
Dust	Permanent	Negligible	None required							*	Negligible
Traffic	Permanent	Negligible	None required beyond mitigation already embedded within the Development						*		Negligible
Odour	Permanent	Negligible	None required							*	Negligible

*** Geographical Level of Importance**

I = International; UK = United Kingdom; E = England; R = Regional; C = County; B = Borough; L = Local

REFERENCES

-
- i National Planning Policy Framework, Department for Communities and Local Governments, February 2019
 - ii Planning Practice Guidance Notes (PPG) – [online], (Last accessed: 02/01/18), Available: <https://www.gov.uk/guidance/air-quality--3>
 - iii Arun District Council (2018), Adoption Arun Local Plan 2011-2031 (July 2018).
 - iv European Union (2008), Directive 2008/50/EC of the European Parliament and the Council of 21 May 2008 on ambient air quality and cleaner air for Europe, Official Journal of the European Union, L151/1-44.
 - v Statutory Instruments (2010), 2010 No. 1001, Environmental Protection, The Air Quality Standards Regulations 2010.
 - vi DEFRA in partnership with the Scottish Executive. Welsh Assembly Government and Department of Environment Northern Ireland (2007), The Air Quality Strategy for England Scotland, Wales and Northern Ireland. Volume 1.
 - vii DEFRA (2018), Part IV of the Environment Act / Environmental (Northern Ireland) Order 2002 Part III, Local Air Quality Management Technical Guidance (TG16), updated February 2018.
 - viii Sussex Air Quality Partnership, (2019), Air quality and emissions mitigation guidance for Sussex.
 - ix Institute of Air Quality Management IAQM (2016), Assessment of dust from demolition and construction, v1.1.
 - x Environmental Protection UK / Institute of Air Quality Management (2017), Guidance on land-use planning and Development control: Planning for air quality, v1.2.
 - xi Institute of Air Quality Management (2018), Guidance on the assessment of odour for planning.