# 11.0 Air Quality

## 11.1 Introduction

11.1.1 This chapter presents the approach and findings of the Air Quality Environmental Impact Assessment (EIA). The chapter sets out the methodology followed, provides a review of the baseline air quality in the vicinity of the proposed site and surrounding area, it then presents the results of the assessment of air quality associated with the proposed development in order to determine the anticipated magnitude and significance of impact. Mitigation measures are presented and discussed to minimise the air quality impacts associated with the proposals during the operational phase of the development.

11.1.2 The areas incorporated within this assessment are the surrounding highway network that has been included within the Transport Assessment for the Proposed Development.

11.1.3 Additional technical data related to the Air Quality Assessment is presented in Technical Appendix 11.1.

## 11.2 Methodology and Scope

### Policy Background

### European Legislation

11.2.1 European air quality legislation is consolidated under Directive 2008/50/EC, which came into force on 11th June 2008. This Directive consolidates previous legislation which was designed to deal with specific pollutants in a consistent manner and provides new air quality objectives for fine particulates. The consolidated Directives include:

- **Directive 1999/30/EC** – the First Air Quality "Daughter" Directive – sets ambient air limit values for nitrogen dioxide ($NO_2$) and oxides of nitrogen ($NO_X$), sulphur dioxide ($SO_2$), lead (Pb) and particulate matter ($PM_{10}$ and $PM_{2.5}$);
- **Directive 2000/69/EC** – the Second Air Quality "Daughter" Directive – sets ambient air limit values for benzene (C6H6) and carbon monoxide (CO); and,
- **Directive 2002/3/EC** – the Third Air Quality "Daughter" Directive – seeks to establish long-term objectives, target values, an alert threshold and an information threshold for concentrations of ozone ($O_3$) in ambient air.

11.2.2 The fourth daughter Directive was not included within the consolidation and is described as:

- **Directive 2004/107/EC** – sets health-based limits on polycyclic aromatic hydrocarbons (PAHs), cadmium (Cd), arsenic (As), nickel (Ni) and mercury (Hg), for which there is a requirement to reduce exposure to as low as reasonably achievable.

### UK Legislation

11.2.3 The Air Quality Standards Regulations (Amendments 2016) seek to simplify air quality regulation and provide a new transposition of the Air Quality Framework Directive, First, Second and Third Daughter Directives and also transpose the Fourth Daughter Directive within the UK. The Air Quality Limit Values are transposed into the updated Regulations as Air Quality Standards, with attainment dates in line with the European Directives. SI 2010 No. 1001, Part 7 Regulation 31 extends powers, under Section 85(5) of the Environment Act (1995), for the Secretary of State to give directions to Local Authorities (LAs) for the implementation of these Directives.

11.2.4 The UK Air Quality Strategy is the method for implementation of the air quality limit values in England, Scotland, Wales and Northern Ireland and provides a framework for improving air quality and protecting human health from the effects of pollution.

11.2.5 For each nominated pollutant, the Air Quality Strategy sets clear, measurable, outdoor air quality standards and target dates by which these must be achieved; the combined standard and target date is referred to as the Air Quality Objective (AQO) for that pollutant. Adopted national standards are based on the recommendations of the Expert Panel on Air Quality Standards (EPAQS) and have been translated into a set of Statutory Objectives within the Air Quality (England) Regulations (2000) SI 928, and subsequent amendments.

11.2.6 The AQOs for pollutants included within the Air Quality Strategy and assessed as part of the scope of this report are presented in Table 7.1 along with European Commission (EC) Directive Limits and World Health Organisation (WHO) Guidelines.

**Table 11.1 Air Quality Standards, Objectives, Limit and Target Value**

| Pollutant | Applies | Objective | Concentration Measured as[10] | Date to be achieved and maintained thereafter | European Obligations | Date to be achieved and maintained thereafter | New or existing |
|---|---|---|---|---|---|---|---|
| $PM_{10}$ | UK | 50µg/m$^3$ by end of 2004 (max 35 exceedances a year) | 24-hour mean | 1st January 2005 | 50µg/m$^3$ by end of 2004 (max 35 exceedances a year) | 1st January 2005 | Retain Existing |
| | UK | 40µg/m$^3$ by end of 2004 | Annual mean | 1st January 2005 | 40µg/m$^3$ | 1st January 2005 | |
| Nitrogen Dioxide ($NO_2$) | UK | 200µg/m$^3$ not to be exceeded more than 18 times a year | 1 Hour Mean | 31st December 2005 | 200µg/m$^3$ not to be exceeded more than 18 times a year | 1st January 2010 | Retain Existing |
| | UK | 40µg/m$^3$ | Annual Mean | 31st December 2005 | 40µg/m$^3$ | 1st January 2010 | |

National Planning Practice Guidance

11.2.7 The National Planning Policy Framework (NPPF) principally brings together and summarises the suite of Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) which previously guided planning policy making. The NPPF broadly retains the principles of PPS:23: Planning and Pollution Control and states that:

*'Planning policies should sustain compliance with and contribute towards EU limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new developments in Air Quality Management Areas is consistent with the local air quality action plan'*

11.2.8 The National Planning Practice Guidance (NPPG) web-based resource was launched by the Department for Communities and Local Government (DCLG) on 6 March 2014 to support the National Planning Policy Framework and make it more accessible. A review of PPG: Air Quality identified the following guidance:

*"When deciding whether air quality is relevant to a planning application, local planning authorities should consider whether the development would:*

*Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.*

*Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.*

*Give rise to potentially significant impact (such as dust) during construction for nearby sensitive locations."*

11.2.9 This is applicable to the Proposed Development. The following chapter provides the results of the air quality impacts assessment of the Proposed Development, and provides evidence that there are no local areas affected by the proposals.

North Dorset District Council Local Policies

11.2.10 No specific policies were identified relating to Air Quality in the North Dorset Local Plan.

## Assessment Methodology

11.2.11 The operational phase assessment consists of the quantified predictions of the change in nitrogen dioxide and particulate matter for the operational phase of the development due to changes in traffic movement. Predictions of air quality at the site have been undertaken for the operational phase of the development using ADMS 4.0.

11.2.12 The significance of the effects during the operational phase of the development is based on the latest guidance produced by EPUK and IAQM in January 2017. The guidance lays a basis for a consistent approach that could be used by all parties associated with the planning process to professionally judge the overall significance of the air quality effects based on severity of air quality impacts.

11.2.13 The construction phase assessment utilises the IAQM Guidance on the Assessment of Dust from Demolition and Construction document published in February 2014.

## Receptor Sensitivity

## Effect Magnitude

11.2.14 Table 11.2 provides the criteria used for the classification of the magnitude of likely significant air quality impacts.

**Table 11.2 Method for Assessing Magnitude of Likely Significant Impacts on Air Quality**

| Magnitude(1) | Description | Examples |
|---|---|---|
| Large | Impact resulting in a considerable change in baseline environmental conditions with severe undesirable/desirable consequences on the receiving environment. | • Air quality varies between the do minimum and do something by more than 10% of the air quality criterion (Emissions).<br>• Substantial risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction). |
| Medium | Impact resulting in a discernible change in baseline environmental conditions with undesirable/desirable conditions | • Air quality varies between the do minimum and do something by 5 - 10% of the air quality criterion (Emissions).<br>• Moderate risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction). |
| Small | Impact resulting in a discernible change in baseline environmental conditions with undesirable/desirable conditions that can be tolerated. | • Air quality varies between the do minimum and do something by 1 - 5% of the air quality criterion (Emissions).<br>• Slight risk that emissions will generate statutory nuisance complaints, resulting in formal action (Construction). |
| Imperceptible(2) | Very low discernible change in baseline environmental conditions. | • Air quality varies between the do minimum and do something by less than 1-2% of the air quality criterion (Emissions).<br>• Little or no cause for nuisance complaints to be made (Construction). |
| Neutral | No change in baseline conditions | • Air quality varies between the do minimum and do something by less than 0.5% of the air quality criterion (Emissions). |

NOTE (1) An impacts magnitude can be either positive or negative, except for imperceptible.
(2) If the assessor is certain that a receptor or attribute of a feature will suffer no impact whatsoever then the term 'No Impact' can be used in the place of 'Imperceptible Impact'. However, it is not usually possible to determine 'No Impact' in many cases with 100% certainty so the term 'Imperceptible' should be used in these cases.

11.2.15 It is recognised that likely significant air quality impacts can operate over a range of geographical areas and therefore a geographical scale may be taken into account in describing the scale/magnitude of the likely significant impact.

## Receptor Sensitivity

11.2.16 Receptors can demonstrate different sensitivities to changes in their environment. For the purpose of this assessment sensitivity is determined as Very High, High, Medium or Low as detailed in Table 11.~~Table 11.~~Table 11.~~.~~.

**Table 11.3 Methodology for Assessing Sensitivity of Receptor**

| Sensitivity | Criteria |
|---|---|
| Very High | • Do Minimum pollutant concentration are 110% and greater than 110% of the relevant AQO (Emissions).<br>• Receptors of very high sensitivity to dust and odour, such as: hospitals and clinics, retirement homes, painting and furnishing, hi-tech industries and food processing (Construction).<br>• Densely populated areas – more than 100 dwellings within 20m of the development site (Construction). |
| High | • Do Minimum pollutant concentration between 103 - 109% of the relevant AQO (Emissions).<br>• Receptors of high sensitivity to dust and odour, such as: schools, residential areas, food retailers, glasshouses and nurseries, horticultural land and offices (Construction).<br>• Densely populated areas – 10-100 dwellings within 20m of the development site (Construction). |
| Medium | • Do Minimum pollutant concentration between 95 - 102% of the relevant AQO (Emissions).<br>• Receptors of medium sensitivity to dust and odour, such as: farms, outdoor storage, light and heavy industry (Construction).<br>• Suburban or edge of town areas (Construction). |

| Sensitivity | Criteria |
|---|---|
| Low | • Do Minimum pollutant concentration between 75-90% of the relevant AQO (Emissions)<br>• All other dust/odour sensitive receptors not identified above (Construction).<br>• Rural/Industrial areas (Construction). |
| Negligible | • Concentration less than 75% of the relevant AQO (Emissions)<br>• Receptor more than 350m away (construction) |

### Effect Significance

11.2.17 The level of significance of each likely impact is determined by combining the likely significant impact risk with the sensitivity of the receptor. Table 11.4 shows how the interaction of magnitude and sensitivity results in the significance of an environmental impact. If the scale of the impact magnitude is negative then the resulting impact is adverse. If the scale of the impact magnitude is positive then the resulting impact is beneficial. The table has been developed by WYG but the matrix combinations and terms used correlate with the significance matrix recommended by Development Control: Planning for Air Quality (2010 Update) Updated guidance from Environmental Protection UK on dealing with air quality concerns within the development control process (April 2010).

**Table 11.4 Impact Significance Matrix**

| Sensitivity of Receptor | Magnitude of Impact | | | | |
|---|---|---|---|---|---|
| | Large | Medium | Small | Imperceptible | Neutral |
| Very High | Substantial | Substantial | Substantial | Moderate | Negligible |
| High | Substantial | Substantial | Moderate | Moderate | Negligible |
| Medium | Substantial | Moderate | Moderate | Slight | Negligible |
| Low | Moderate | Moderate | Slight | Negligible | Negligible |
| Negligible | Moderate | Slight | Negligible | Negligible | Negligible |

11.2.18 Whether air quality impacts are considered Significant or Not Significant is, in part, based on professional judgement. For this assessment, **substantial** and **moderate** adverse impacts are considered Significant. Negligible adverse or slight is considered Not Significant.

### Limitations of the Assessment

11.2.19 Mapped background pollutant concentrations are available from Department for Environment Food and Rural Affairs (DEFRA) website:

- (http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html).

11.2.20 The predicted background concentrations in the Archive decrease year on year based on the predicted progressive positive influence of EU and UK air quality legislation.

11.2.21 The assessment has assumed that there will be improvement in background air quality. In consideration of the methodology for adjusting background concentrations as contained within the Defra LAQM Note on Projecting $NO_2$ concentrations (April 2012). As such, 2014 background concentrations have been used for the model verification and baseline results, whilst 2031 background concentrations have been used for the operational year. Details of background concentrations used for the assessment are presented in the AQA Technical Report.

11.2.22 It should be noted that the background concentration used in the assessment will not affect the predicted marginal increase in pollutant concentrations as a result of the development which the assessment is based upon.

Traffic Data

11.2.23 The Traffic and Transport data has been based on completion of the Proposed Development by 2021 and 2031, as this is the worst case in terms of the traffic impact on the highway network. However, it is likely that there will be a time where construction and employees of the proposed development are present on the site at the same time. It is not possible to predict the occupancy of the development as this is based on numerous variables such as market conditions. Therefore, no analysis of the dual construction and occupation of the site has been undertaken.

Emission Factors

11.2.24 The Emission Factor Toolkit (version 7.0) for road traffic emission factors was utilised to predict emission rates for the operational phase assessment.

## 11.3 Baseline Environment

### Existing baseline

11.3.1 Baseline air quality in the vicinity of the Proposed Development site has been defined from a number of sources, as described in the following sections.

Air Quality Review and Assessment

11.3.2 As required under section 82 of the Environment Act 1995, NDDC has conducted an ongoing exercise to review and assess air quality within its area of jurisdiction. The assessments have indicated that concentrations of $NO_2$ and $PM_{10}$ are not above the relevant AQOs at a number of locations of relevant public exposure. NDDC has no designated Air Quality Management Areas, declared for the annual average air quality objectives for $NO_2$ and $PM_{10}$.

11.3.3 There are no AQMAs within a 20 km radius of the proposed development site.

11.3.4 Background concentrations as used within the prediction calculations were referenced from the UK National Air Quality Information Archive database based on the National Grid Co-ordinates of 1 x 1 km grid squares nearest to the development site. In June 2014 Defra issued revised 2013 based background maps for $NO_X$, $NO_2$, $PM_{10}$ and $PM_{2.5}$ which incorporate updates to the input data used for modelling. $NO_x$ and $PM_{2.5}$ are included in the AQA Technical Report for reference, however, there are no air quality objectives for $NO_x$ as $NO_x$ (Nitrous Oxides) convert to $NO_2$ and there are modelling limitations for $PM_{2.5}$. As a result, $NO_2$ and $PM_{10}$ are the pollutants considered most relevant for this assessment and therefore have been modelled in the assessment. 2016 background maps have been utilised for the model verification and baseline operational phase assessment. The updated mapped background concentrations used in the assessment, are summarised in Table 6.3 of the AQA Technical Report.

### Air Quality Monitoring

Nitrogen Dioxide Diffusion Tube Monitoring

11.3.5 Due to air quality monitoring within NDDC no longer being conducted, WYG conducted a period of diffusion tube monitoring between the 1st to 8th March 2017 to get indicative $NO_2$ levels around the site. The results of this monitoring are presented in Table 11.5.

**Table 11.5 WYG Nitrogen Dioxide Diffusion Tube Monitoring Results**

| ID | UK NRG(m) | | Site Type | $NO_2$ Annual Mean Concentration (µg/m$^3$) |
|---|---|---|---|---|
| | X | Y | | 2017 |
| D1 | 381015 | 125144 | Roadside | 17.6 |
| D2 | 382046 | 125523 | Roadside | 22.6 |
| D3 | 381057 | 125851 | Roadside | 17.4 |
| D5 | 380518 | 126473 | Roadside | 29.3 |
| B1 | 381687 | 125667 | Background | 8.5 |

11.3.6 All monitored diffusion tubes have been period and bias adjusted.

11.3.7 Table 11.5 illustrates, no monitored locations exceeded the relative AQO of 40 µg/m$^3$ during the monitoring period. All roadside locations have been used for model verification. Reference should be made to Figure 11.1 for a geographical representation of the diffusion tube locations.

### Traffic Emission Sources

11.3.8 Desktop assessment has identified that traffic movements are likely to be the most significant local source of pollutants affecting the site and its surroundings. The principal traffic derived pollutant likely to impact local receptors is nitrogen dioxide ($NO_2$).

### Meteorology

11.3.9 Meteorological conditions have significant influence over air pollutant concentrations and dispersion. Pollutant levels can vary significantly from hour to hour as well as day to day, thus any air quality predictions need to be based on detailed meteorological data. The ADMS model calculates the dispersion of pollutants on an hourly basis using a year of local meteorological data. The meteorological data used in the assessment is derived from Southampton Met Station, which is considered representative of the development site conditions and is the closest station for which there is available data, with all the complete parameters necessary for the ADMS model. Reference should be made to Figure 11.2 for an illustration of the prevalent wind conditions at the Southampton Met Station site.

**Figure 11.1 Air Quality Assessment Area**

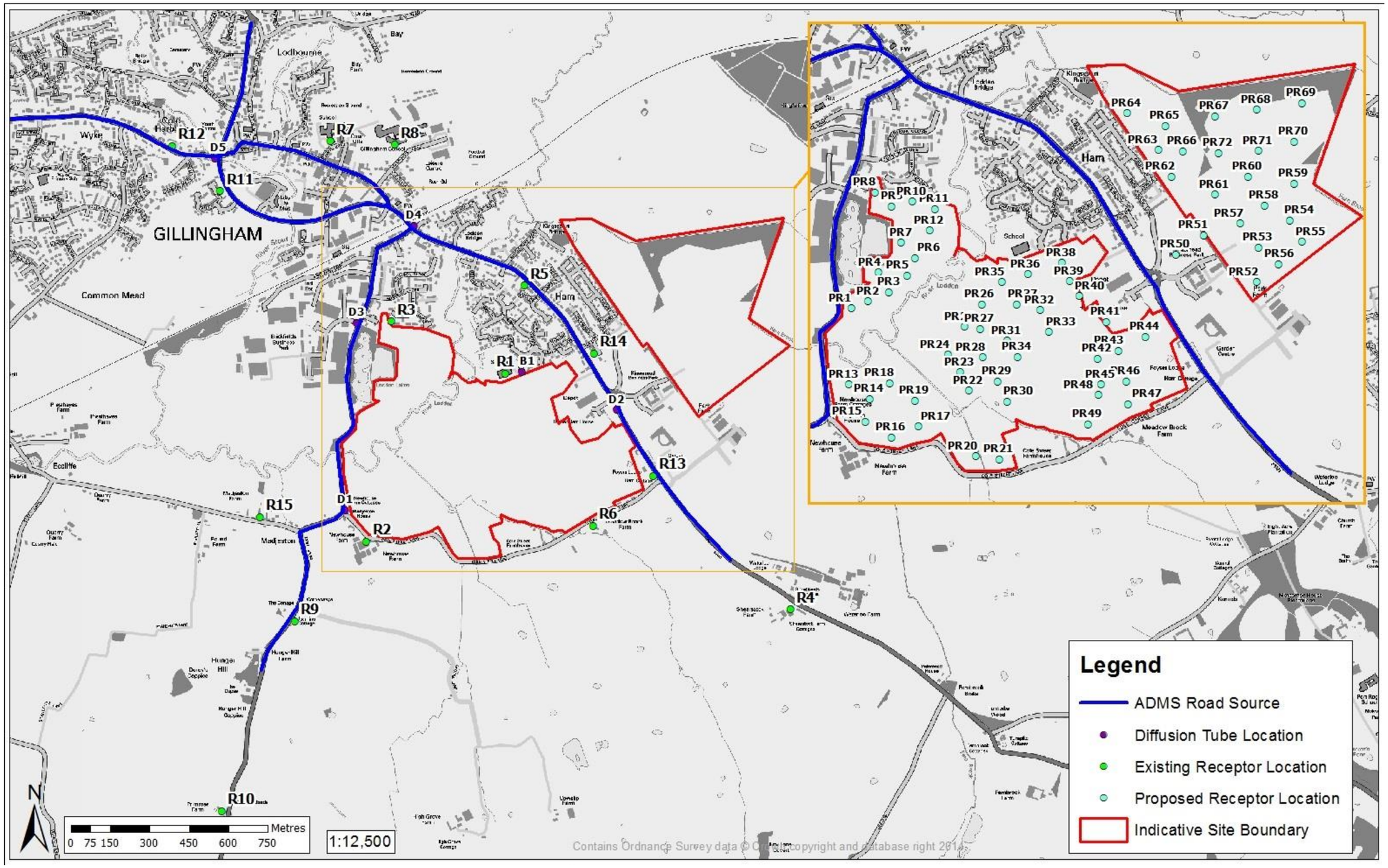
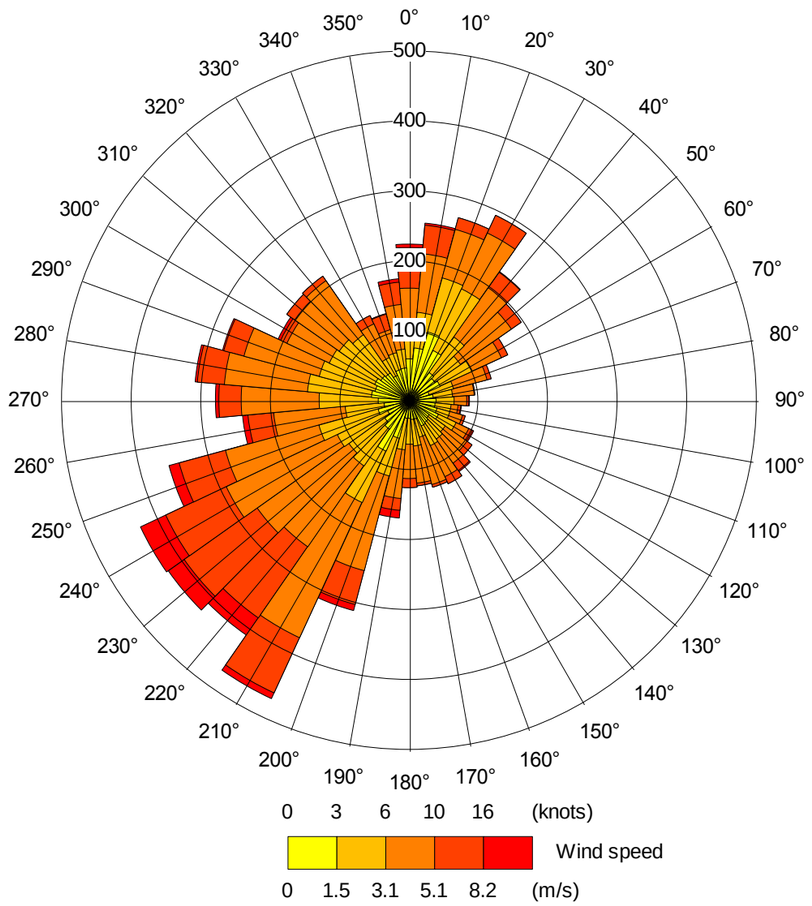


**Figure 11.2 Southampton 2016 Meteorological Station Wind Rose**




**Sensitive Receptors for Traffic Air Quality Assessment**

11.3.10 Receptors that are considered as part of the air quality assessment are primarily those existing receptors that are situated along routes predicted to experience significant changes in traffic flow as a result of the Proposed Development. Proposed receptor locations on the Proposed Development site have also been considered within the assessment as well. These have been identified in the following sections.

Ecological Sensitive Receptors

11.3.11 Air quality impacts associated with the Proposed Development have the potential to impact on receptors of ecological sensitivity within the vicinity of the site. The Conservation of Habitats and Species Regulations 2010 (as amended) require competent authorities to review planning applications and consents that have the potential to impact on European designated sites (e.g. Special Protection Areas).

11.3.12 A study was undertaken to identify any statutory designated sites of ecological or nature conservation importance within the extents of the dispersion modelling assessment. This was completed using the Multi-Agency Geographic Information for the Countryside (MAGIC) web-based interactive mapping service, which draws together information on key environmental schemes and designations.

11.3.13 Following a search within a 1km radius of the site boundary, no ecologically sensitive receptors were identified.

Exhaust Emission Sensitive Receptors

11.3.14 The Design Manual for Roads and Bridges (DMRB) considers any receptor within 200m of a road source to be potentially affected by that operation. The AQOs only apply at locations where the public may be exposed to pollution for a sufficient period for there to be any measurable health impact. The averaging period and AQO involved will determine which locations are considered to be sensitive receptors. For annual mean $NO_2$ and particulate matter with mean hydraulic diameter of less than 10µm ($PM_{10}$) AQOs, LAQM.TG(16) considers typical locations for sensitive receptors to include:

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

11.3.15 Receptors sensitive to road vehicle exhaust emissions are shown in Table 11.6. Reference should be made to Figure 11.1 for a graphical representation of road vehicle exhaust sensitive receptor locations.

**Table 11.6 Modelled Existing Sensitive Receptor Locations**

| ID | Location | UK NGR (m) | |
|---|---|---|---|
| | | X | Y |
| R1 | Saint Mary the Virgin Church of England VA Primary School | 381622 | 125660 |
| R2 | Newhouse Farm | 381095 | 125024 |
| R3 | 53 The Meadows | 381188 | 125856 |
| R4 | Shearstock Farm | 382707 | 124769 |
| R5 | 3 Shaftesbury Road | 381695 | 125993 |
| R6 | Meadow Brook Farm | 381957 | 125084 |
| R7 | Gillingham Primary School | 380957 | 126538 |
| R8 | Gilingham School | 381203 | 126525 |
| R9 | Jasmine Cottage | 380822 | 124724 |
| R10 | Primrose Farm | 380544 | 124006 |
| R11 | 51 Church View | 380539 | 126349 |
| R12 | 3 Wyke Court | 380354 | 126520 |
| R13 | Ham Cottage | 382185 | 125273 |
| R14 | 25 Lockwood Terrace | 381959 | 125736 |
| R15 | Madjeston Farm | 380690 | 125118 |

### Future baseline

11.3.16 In terms of road traffic growth the 'do-minimum' scenario includes predicted traffic data should the development not occur including all committed developments. This ensures that the growth in future baseline traffic flows are taken to take into account changes in traffic in the baseline.

11.3.17 Details of the existing baseline conditions, the 'do-minimum' (baseline conditions with committed development flows), and the 'do-something' (baseline conditions with committed development flows and proposed development flows) assessment scenarios are contained within the supporting Traffic Assessment (TA).

## 11.4 Mitigation within the Submitted Design

11.4.1 The best practice construction mitigation measures presented in Table 11.7 will be adopted.

Methodology

11.4.2 WYG have adapted Guidance from the IAQM 'Guidance on the Assessment of Dust from Demolition and Construction' Document published in February 2014. The sensitivity of receptors for the construction phase is determined using the criteria contained in Table 11.~~Table 11.~~Table 11.. In order to determine the significance of impacts, the construction phase assessment is based on number of surrounding receptors in a certain distance. The operational assessment sensitivity is based on the potential magnitude of change at receptors based on existing pollutant levels at these receptors, i.e. receptors already experiencing an exceedance of the AQO are deemed more sensitive.

11.4.3 In total four processes are considered, namely demolition, earthworks, construction and trackout. For each of these phases, the significance of the potential significant dust impacts is derived following the determination of a dust emission class and the distance of activities to the nearest sensitive receptor, therefore assessing worst case likely significant impacts. A full explanation of the methodology is contained in Appendix A of the Air Quality Technical Report.

**Table 11.7 Highly Recommended Construction Phase Mitigation Measures**

| |
|---|
| **Communications** |
| Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. |
| Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. |
| Display the head or regional office contact information. |
| **Dust Management** |
| Develop and implement a Dust Management Plan (DMP), which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk, and should include as a minimum the highly recommended measures in this document. The desirable measures should be included as appropriate for the site. In London additional measures may be required to ensure compliance with the Mayor of London's guidance. The DMP may include monitoring of dust deposition, dust flux, real time $PM_{10}$ continuous monitoring and/or visual inspections. |
| Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. |
| Make the complaints log available to the local authority when asked. |
| Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book. |
| Hold regular liaison meetings with other high risk construction sites within 500m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes. |
| 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 the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary, with cleaning to be provided if necessary. |
| Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked |
| Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. |
| Agree dust deposition, dust flux, or real-time $PM_{10}$ continuous monitoring locations with the Local Authority. Where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction. |
| Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. |
| Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. |
| Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period |
| Avoid site runoff of water or mud. |
| Keep site fencing, barriers and scaffolding clean using wet methods. |
| Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. |
| Cover, seed or fence stockpiles to prevent wind whipping. |
| Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable |
| Ensure all vehicles switch off engines when stationary - no idling vehicles. |
| Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. |
| Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced 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 approval of the nominated undertaker and with the agreement of the local authority, where appropriate) |
| Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials. |
| Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing) |
| Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems |
| Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate. |
| Use enclosed chutes and conveyors and covered skips |
| Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. |
| Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods |
| Avoid bonfires and burning of waste materials. |
| **Demolition** |
| Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). |
| Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. |
| Avoid explosive blasting, using appropriate manual or mechanical alternatives. |
| Bag and remove any biological debris or damp down such material before demolition. |
| **Earthworks** |
| No action required. |
| **Construction** |
| Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. |

| Trackout |
|---|
| Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. |
| Avoid dry sweeping of large areas. |
| Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. |
| Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable. |
| Record all inspections of haul routes and any subsequent action in a site log book. |
| Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned. |
| Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable). |
| Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. |
| Access gates to be located at least 10m from receptors where possible. |

**Table 11.8 Desirable Construction Phase Mitigation Measures**

| Communication |
|---|
| No Action Required. |
| **Dust Management** |
| No Action Required. |
| **Earthworks** |
| Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable. |
| Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. |
| Only remove the cover in small areas during work and not all at once. |
| **Construction** |
| Avoid scabbling (roughening of concrete surfaces) if possible. |
| 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. |
| For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust |
| **Trackout** |
| No Action Required |

### Operational Phase

11.4.4 The following mitigation measures aim to maximise the number of residents travelling to and from the site on foot, by cycle and/or by public transport. As such the number of trips to and from the site made by private car, and especially the single occupancy private car, will be minimised. The following measures are considered best practice but should not be regarded as an exhaustive list of design mitigation options:

- Promote local transport facilities;
- Minimise reliance upon motor vehicle use through a site specific Framework Travel Plan;
- Inclusion of integrated cycle facilities paths into surrounding environments; and,
- Inclusion of pedestrian walkways into surrounding environments.

11.4.5 Further details of the mitigation measures are included in the supporting Traffic Assessment and Framework Travel Plan.

## 11.5 Likely Significant Environmental Effects of the Scheme

### Construction Phase Effects

Pollutant Sources

11.5.1 Other than negligible emissions from construction vehicles and equipment the main emissions during construction are likely to be dust and particulate matter generated during earth moving (particularly during dry months), or from construction materials. In respect of fires on site it should be noted that suitable management strategies will be in place to prevent burning of any material during the construction phase. The main potential impacts of particulates/dust are:

- Visual – dust plume, reduced visibility, coating and soiling of surfaces leading to annoyance, loss of amenity, the need to clean surfaces;
- Physical and/or chemical contamination and corrosion of artefacts;
- Coating of vegetation and soil contamination; and,
- Health impacts due to inhalation e.g. asthma or irritation of the eyes.

11.5.2 A number of other factors such as the amount of precipitation and other meteorological conditions will also greatly influence the amount of particulate matter generated.

11.5.3 Construction activities can give rise to short term elevated dust/$PM_{10}$ concentrations in neighbouring areas. This may arise from vehicle movements, soiling of the public highway, demolition or windblown stockpiles.

Particulate Matter ($PM_{10}$)

11.5.4 The UK Air Quality Standards seek to control the health implications of respirable particulate matter $PM_{10}$ (less than 10 micrometers in diameter). However, the majority of particles released from construction will be greater than this in size.

11.5.5 Construction works on site have the potential to elevate localised $PM_{10}$ concentrations in the area. On this basis, mitigation measures should still be taken to minimise these emissions as part of good site practice.

Dust

11.5.6 Particles greater than 10µm are likely to settle out relatively quickly and may cause annoyance due to their soiling capability. There are no formal standards or criteria for nuisance caused by deposited particles, however, a deposition rate of 200mg/$m^2$/day is often presented as a threshold for serious nuisance though this is usually only applied to long term exposure as people are generally more tolerant of dust for a short or defined period. Significant nuisance is likely when the dust coverage of surfaces is visible in contrast with adjacent clean areas, especially when it happens regularly. Severe dust nuisance occurs when the dust is perceptible without a clean reference surface.

11.5.7 Construction activities have the potential to suspend dust, which could result in annoyance of residents surrounding the site. Measures should be taken to minimise the emissions of dust as part of good site practice. Recommended mitigation measures proportionate to the risk associated with the development and based on best practice guidance are discussed in earlier in this chapter.

11.5.8 Assessment Results

11.5.9 Based on the methodology detailed in the Air Quality Assessment Technical Report and after the CEMP is implemented, the potential impact significance of dust emissions associated with the construction phase of the Proposed Development is predicted to be **negligible.**

11.5.10 Construction phase effects are predicted with regard to the potential for dust nuisance complaints and surface soiling events due to deposition, as opposed to the risk of exceeding any AQOs. All dust impacts are considered to be **direct, temporary, short-term** and **reversible** in nature. The impacts are determined to be **direct** as they occur as a result of activities associated with the development, **temporary** as they will only potentially occur during the construction phase, **short-term** because these will only arise at particular times when certain activities and meteorological conditions for creating the level of magnitude predicted combine, and **reversible** as conditions will return to baseline upon cessation of construction phase activities. The impacts arising from the construction phase are **not significant**.

## Operational Phase Effects

Road Vehicle Exhaust Emissions

11.5.11 Additional vehicle movements associated with the Proposed Development will generate additional exhaust emissions, such as $NO_2$ and $PM_{10}$, on the local and regional road networks. In order to quantify potential impacts of these emissions in the vicinity of the site, a detailed dispersion modelling assessment has been undertaken using the ADMS-Roads software package. This model is routinely used in the UK for environmental assessment work.

11.5.12 Traffic data for this assessment was provided by i-Transport and is detailed within the Air Quality Assessment Technical Report.

11.5.13 The likely significant impacts of road vehicle exhaust emissions has been undertaken for the following assessment years:

- 2016 Baseline = Existing Site Conditions
- 2021 'Do Minimum' = Baseline + committed developments
- 2021 'Do Something' = Baseline + committed development + proposed development (no traffic mitigation)
- 2031 'Do Minimum' = Baseline + committed developments
- 2031 'Do Something' = Baseline + committed developments + proposed development

11.5.14 A baseline assessment year of 2016 has been selected as this is the most recent year for which corresponding traffic data and monitoring data is available in accordance with LAQM TG(16).

11.5.15 The development opening years were considered with appropriate 'do-minimum' and 'do-something' scenarios. The 'do-minimum' scenario included predicted traffic data should the development not occur, including committed development traffic surrounding the Proposed Development. The 'do-something' scenario included predicted traffic data should the development be completed. Reference should be made to the Transport & Access Chapter for full details of the traffic flows and committed development considered within each scenario.

11.5.16 Reference should be made to the Air Quality Assessment Technical Report for the:

- Detailed Modelling of Operational Phase Road Vehicle Exhaust Emissions – Method Statement;
- Detailed Modelling of Operational Phase Road Vehicle Exhaust Emissions – Detailed Results Tables.
- Theoretical assessment assuming no improvement in emissions from baseline year to future year.

Nitrogen Dioxide

11.5.17 Predicted annual mean ground level $NO_2$ concentrations were assessed against the AQO of 40µg/$m^3$. Reference should be made to the Air Quality Assessment Technical Report for detailed results tables of predicted annual mean ground level $NO_2$ concentrations.

11.5.18 All effects are considered to be **direct**, **permanent**, **long-term** and **irreversible** in nature. The impacts are determined to be **direct** as they occur as a result of vehicles travelling to and from the Proposed Development, **permanent** as they will occur throughout the operational phase, **long-term** because these occur during the entire operational phase, and **irreversible** as conditions will not return to baseline conditions until cessation of the development.

11.5.19 Confidence in these predictions is **high** given that a detailed dispersion modelling assessment has been undertaken using traffic data provided by WYG and modelling results have been verified, which is considered to be a robust approach.

11.5.20 For both the 2021 modelling scenarios, the assessment has found that, in accordance with IAQM methodology and the methodology outlined in Section 11.2, the development will not affect the local levels of $NO_2$ and the impact at surrounding receptors during the operational phase will be **negligible to slight** which is **not considered to be significant**.

11.5.21 For both the 2031 modelling scenarios, the assessment has found that, in accordance with IAQM methodology and the methodology outlined in Section 11.2, the development will not affect the local levels of $NO_2$ and the impact at surrounding receptors during the operational phase will be **negligible** which is **not considered to be significant**.

Particulate Matter

11.5.22 Predicted annual mean ground level $PM_{10}$ concentrations were assessed against the AQO of 40 µ g/$m^3$. Reference should be made to the Air Quality Assessment Technical Report for detailed results tables of predicted annual mean ground level $PM_{10}$ concentrations.

11.5.23 For both the 2021 and 2031 modelling scenarios, all effects are considered to be **direct**, **permanent**, **long-term** and **irreversible** in nature. The impacts are determined to be **direct** as they occur as a result of vehicles travelling to and from the Proposed Development, **permanent** as they will occur throughout the operational phase, **long-term** because these occur during the entire operational phase, and **irreversible** as conditions will not return to baseline conditions until cessation of the development.

11.5.24 Confidence in these predictions is **high** given that a detailed dispersion modelling assessment has been undertaken using traffic data provided by WYG and modelling results have been verified, which is considered to be a robust approach.

11.5.25 For both the 2021 and 2031 modelling scenarios, the assessment has found that, in accordance with IAQM methodology and the methodology outlined in Section 11.2, the development will not affect local levels of $PM_{10}$ and the impact at surrounding receptors during the operational phase will be **negligible** which is **not considered to be significant**.

## 11.6 Additional Mitigation, Compensation and Enhancement Measures

11.6.1 No additional mitigation is required for Air Quality.

## 11.7 Assessment Summary and Likely Significant Residual Environmental Effects

11.7.1 Taking into account the design mitigation during the construction phase of the Proposed Development the residual effects are likely to be **negligible**.

11.7.2 The residual effects of the operational phase will be **negligible.**

11.7.3 Table 11.9 provides the summary of the assessment of Air Quality.

## 11.8 Cumulative impacts

### Operation

11.8.1 Cumulative impacts during the operational phase of the Proposed Development have been considered within the detailed assessment of vehicle exhaust emissions. The 'do-minimum' scenario included predicted traffic should the development not occur including all committed developments and the 'do-something' scenarios included predicted traffic should the development be complete. The magnitude of change allows the impact of the Proposed Development to be assessed. As the absolute concentration is compared against the AQO the cumulative likely significant impact of the development is also considered within the assessment. Therefore, the cumulative significance remains '**negligible'** to '**slight'** at all surrounding sensitive receptors for the 2021 scenario and '**negligible'** for the 2031 scenario.

**Table 11.9 Assessment Summary and Residual Environmental Effects (Air Quality)**

| Summary description of the identified impact | Sensitivity of Receptor | Impact Magnitude | Significance and Nature of Effect | Additional Mitigation | Residual Impact Magnitude | Residual Significance and Nature of Effect | Confidence Level |
|---|---|---|---|---|---|---|---|
| **Construction** | | | | | | | |
| Construction | Medium | Small | Negligible | None Required | Small | Negligible | Low |
| Earthworks | Medium | Small | Negligible | None Required | Small | Negligible | Low |
| Trackout | Medium | Small | Negligible | None Required | Small | Negligible | Low |
| **Operation - 2021** | | | | | | | |
| Impact of $NO_2$ emission generated by road vehicles during operational phase | Negligible | Negligible to Medium | Negligible to Slight | None Required | Negligible to Medium | Negligible to Slight | High |
| Impact of $PM_{10}$ emission generated by road vehicle movements during operational phase | Negligible | Negligible to Medium | Negligible to Slight | None Required | Negligible to Medium | Negligible to Slight | High |
| **Operation - 2031** | | | | | | | |
| Impact of $NO_2$ emission generated by road vehicles during operational phase | Negligible | Negligible | Negligible | None Required | Negligible | Negligible | High |
| Impact of $PM_{10}$ emission generated by road vehicle movements during operational phase | Negligible | Negligible | Negligible | None Required | Negligible | Negligible | High |

## 11.10 References


- National Planning Policy Framework, Department for Communities and Local Government, March 2012;
- Planning Practice Guidance: Air Quality, March 2014;
- The Air Quality Standards Regulations (Amendments 2016)
- The Air Quality Strategy for England, Scotland, Wales and Northern Ireland, 2007
- The Environment Act, 1995
- Local Air Quality Management Technical Guidance LAQM.TG(16), DEFRA, 2016
- Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1, HA 207/07 - Air Quality, Highways Agency, 2007
- Development Control: Planning for Air Quality, National Society for Clean Air and Environmental Protection, 2010
- The Control of Dust and Emissions from Construction and Demolition – Best Practice Guide, Greater London Authority and London Councils, 2006
- Guidance on the Assessment of Dust from Demolition and Construction (Institute of Air Quality Management, 2014)
- Guidance on the Assessment of Mineral Dust Impacts for Planning (Institute of Air Quality Management, 2016)
- Defra Local Air Quality Management Note on Projecting $NO_2$ concentrations (April 2012)
- North Dorset District Council Air Quality Updating and Screening Assessment, 2015
- North Dorset Local Plan, Adopted January 2016.


### Websites Consulted


- Google maps (maps.google.co.uk)
- The UK National Air Quality Archive (www.airquality.co.uk)
- Department for Transport Matrix (www.dft.go.uk/matrix)
- emapsite.com
- MAGIC (http://magic.defra.gov.uk/)
- Planning Practice Guidance (http://planningguidance.planningportal.gov.uk/)
- North Dorset Council (http://www.dorsetforyou.gov.uk/index.htm)


## 11.11 Glossary

| Term | Definition |
|---|---|
| AQA | Air Quality Assessment |
| AQMA | Air Quality Management Area |
| DEFRA | Department for Environment, Food and Rural Affairs |
| EA | Environment Agency |
| LA | Local Authority |
| LAQM | Local Air Quality Management |
| NDDC | North Dorset District Council |
| $\mu g/m^3$ | Concentration (in micrograms per cubic metre) |
| UK NGR | UK National Grid Reference |
| $NO_2$ | Nitrogen dioxide |
| $NO_X$ | Total oxides of nitrogen |
| $PM_{10}$ | Particulate matter with a mean hydraulic diameter less then 10µm |
| CEMP | Construction Environmental Management Plan |