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# **GARTH WYMOTT 2**

## **AIR QUALITY**

## **ASSESSMENT**

## GARTH WYMOTT 2 AIR QUALITY ASSESSMENT

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Project no. **1620010134**  
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## EXECUTIVE SUMMARY

Ramboll UK Ltd (Ramboll) has been appointed by Mace International UK Limited on behalf of the Ministry of Justice to undertake an air quality assessment for the proposed development of a new prison, boiler house and bowling green and associated parking provision on land adjacent to HMP Garth and HMP Wymott, Leyland, in Lancashire. A hybrid planning application is to be submitted to Chorley Borough Council (CBC) for the proposed development.

### **Construction Phase (Dust)**

The assessment of potential impacts to air quality during the construction phase has identified that the activities, together with the location of nearby sensitive receptors results in a medium risk of impacts in the absence of suitable mitigation. Mitigation should be provided through a series of standard measures set out in this report and included in a dust management plan to form part of a Construction Environmental Management Plan (CEMP) to be agreed with the local authority. With mitigation in place, the effects of construction dust on nearby sensitive receptors would be adequately mitigated.

### **Road Traffic Impacts (Emissions)**

The development operational impact assessment modelling has been conducted, utilising traffic flows provided for three scenarios; without the development and with the development.

Concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> have been predicted for a number of worst case locations representing existing properties adjacent to the road network. The modelling has indicated that the predicted concentrations would be well below the relevant objectives at all existing receptor locations with the proposed development and cumulative developments in place. The impact of the development traffic on air quality is considered to be negligible at all receptor locations.

Concentrations at the proposed prison buildings would be expected to meet all relevant NAQOs. Air quality at the site would therefore be suitable for the proposed development without the need for mitigation.

### **Boiler House**

The existing boiler house will need to be relocated on site as a result of the proposed development. The new boiler house is to be relocated south, to be located between the existing HMP Garth and HMP Wymott buildings, further from the site boundary. A Clean Air Act calculation has been undertaken to size the height of the required chimney. An indicative worst case flue height of 22m above ground level has been calculated although through detailed design development the required flue height may be lower. Compliance with the Clean Air Act calculation requirements will ensure no significant impacts from the boiler plant emissions.

### **Mitigation Measures**

Mitigation measures to reduce the direct impacts of the development on air quality concentrations are not required, but additional transport related mitigation measures including electric vehicle charging points and a travel plan would be employed to reduce emissions from the development in accordance with the CBC Local Plan.

### **Conclusions**

Overall, it is concluded that the proposed development would not result in a significant effect on air quality.

# 1. INTRODUCTION

## 1.1 Project Background

Ramboll UK Ltd (Ramboll) has been commissioned by Mace International UK Limited on behalf of the Ministry of Justice to prepare a detailed air quality assessment to support a hybrid planning application for the development of a new prison, boiler house and bowling green on land adjacent to HMP Garth and HMP Wymott, Leyland, in Lancashire. The current site and adjacent prisons are situated on land, which was formerly an army ammunition depot, the remnants of which are still visible in the landscape to the north.

The proposed development description is:

*Hybrid planning application seeking: Outline planning permission (with all matters reserved except for access, parking and landscaping) for a new prison (up to 74,531.71 sqm GEA) (Class C2A) within a secure perimeter fence following demolition of existing buildings and structures and together with associated engineering works; Outline planning permission for a replacement boiler house (with all matters reserved except for access); and Full planning permission for a replacement bowling green and club house (Class F2(c)).* The proposed development is within the administrative boundary of Chorley Brough Council (CBC).

## 1.2 Scope of Assessment and Objectives

This report describes existing air quality within the study area, considers the suitability of the site for commercial development, and assesses the impact of the construction and operation of the development on air quality in the surrounding area. The main air pollutants of concern related to construction are dust and fine particulate matter (PM<sub>10</sub>), and for road traffic are nitrogen dioxide (NO<sub>2</sub>), PM<sub>10</sub> and PM<sub>2.5</sub>.

At present, detailed information regarding the construction methodology for the development, specific activities and traffic movements is not available. Vehicle movements associated with access, demolition and construction will vary through the construction programme, with short periods of peak HGV movements associated with demolition and the delivery of materials during the construction phase. However, when the HGV movements are averaged over a full year period (Annual Average Daily Traffic - AADT), these will be significantly lower than peak movements. Together with the implementation of a Construction Environmental Management Plan (CEMP), the construction vehicle movements impacts on human health receptors in the area are considered to be temporary and not significant, and have therefore been scoped out of this assessment. Moreover, vehicle movements associated with construction are typically significantly lower than the number of vehicle movements associated with operation of the development, which have been taken into account in this assessment.

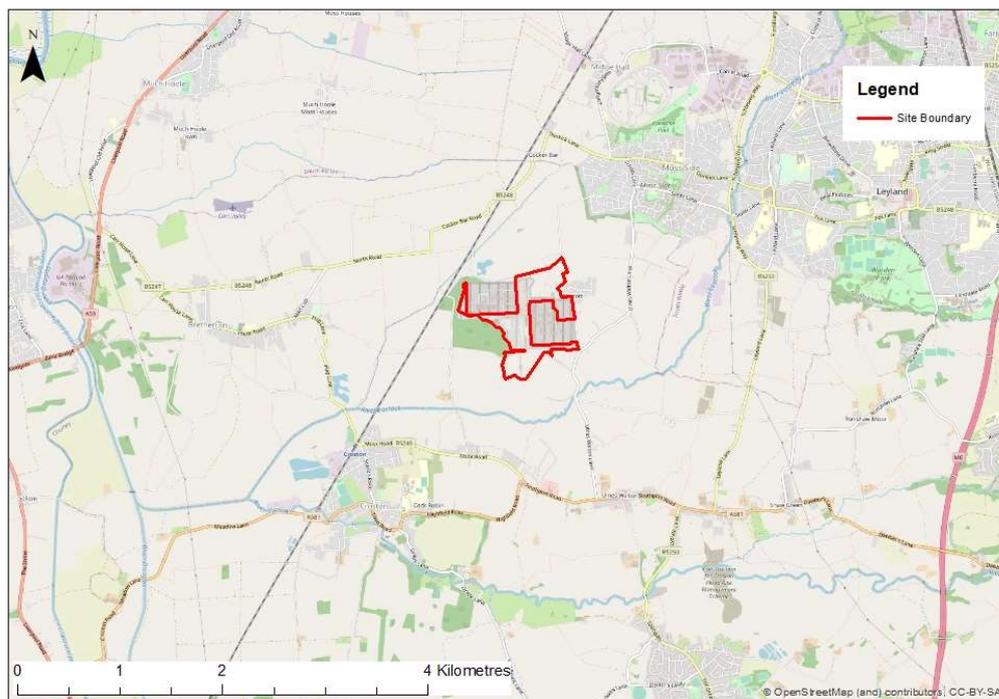
## 1.3 Consultation

Consultation has been carried out with the Environmental Health Officer (EHO) at Chorley Borough Council (CBC), Lesley Miller (via e-mail on 10th November 2020), to agree the approach to the assessment and obtain the latest air quality monitoring for the Council.

## 2. SITE DESCRIPTION

### 2.1 Site Location

The proposed site is within a predominantly rural location bounded by fields to the north, south and west. The site is an irregular shape and comprises an area of 43.53 hectares. The site currently comprises existing buildings and structures, associated hard standing and undeveloped land.



**Figure 2.1: Site Location**

The area has not been declared an Air Quality Management Area (AQMA). The closest AQMA to the proposed site, AQMA Order 5 Leyland, is approximately 2.8 km north east. The AQMA was declared in January 2018 by SRBC due to the exceedance of the annual NO<sub>2</sub> mean. There are no AQMAs declared within the Chorley area.

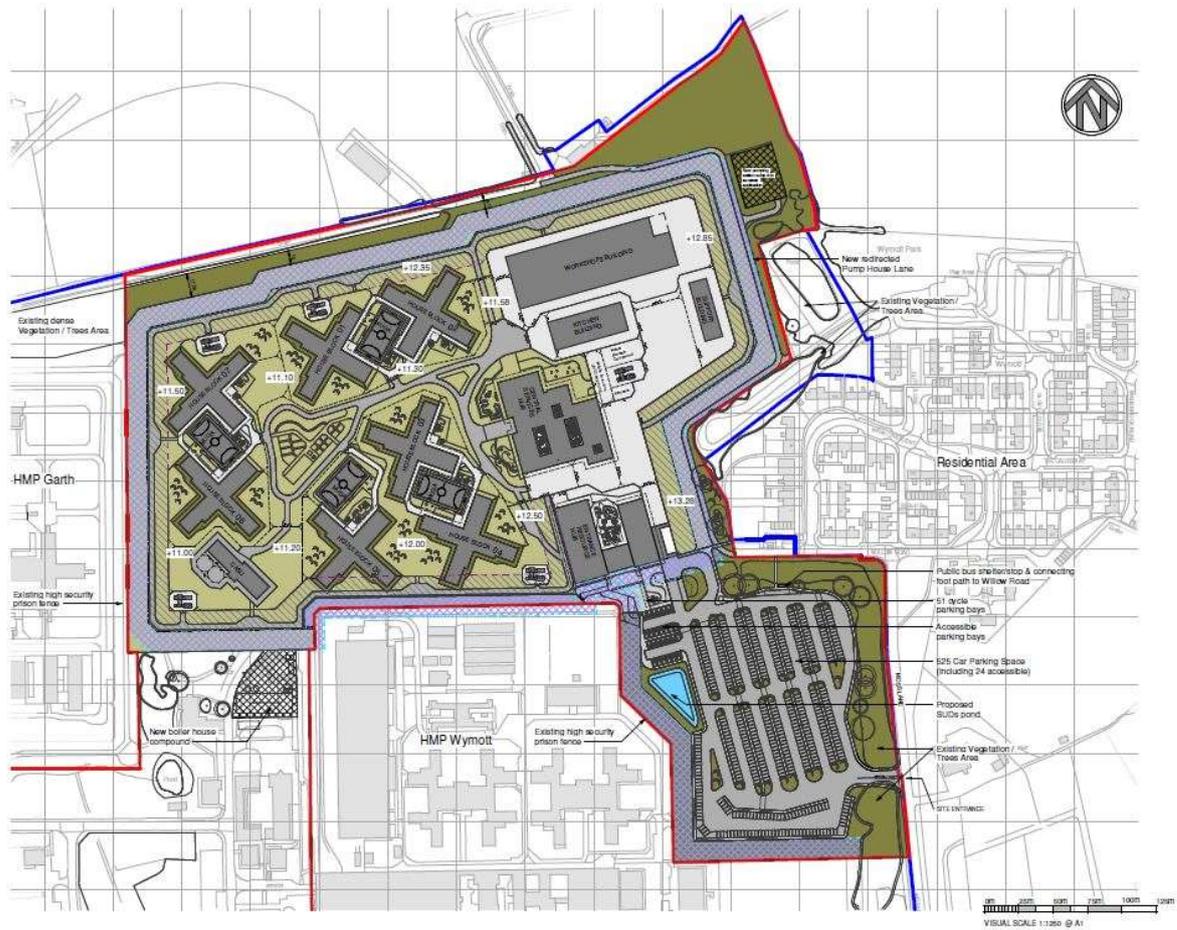
### 2.2 Proposed Development

The proposal for the application site, as shown in Figure 2.2, includes the construction of a new prison. The total site area is approximately 43.53 ha. The proposed development indicative site layout proposes a range of buildings and facilities typical of a Class C resettlement prison, including:

- New prison 18.4 ha
- Bowling club 0.63 ha
- Boiler house 0.23 ha
- Wider site area for Biodiversity Net Gain improvements 24.27 ha

The house blocks are expected to be four storeys high with the remaining buildings expected to range from one to three storeys.

The new boiler house is proposed to be situated at land between HMP Wymott and HMP Garth. Footprint of the new boiler house and associated service yard is approximately 14 m x 41 m, 9 m in height and a combined flue height of 22 m. The new boiler house is intended to contain a like for like replacement of equipment from the existing boiler house, three 2.5MW dual fuel (gas/oil) boilers and one 1.5MW biomass boiler.



**Figure 2.2: Development Layout**

The prison is anticipated to be designed and built to be highly sustainable with the aim to exceed local and national planning policy sustainability requirements. MoJ aspires to include near net zero carbon operations, 10% biodiversity net gain and to a minimum BREEAM 'Excellent' certification with the aim to achieve BREEAM 'Outstanding'.

## 3. LEGISLATION AND POLICY

### 3.1 National Legislation and Policy

#### 3.1.1 European Union Ambient Air Quality and Clean Air for Europe, 2008

EU Directive 2008/50/EC<sup>1</sup> on ambient air quality and cleaner air for Europe (the CAFE directive) sets out the ambient air quality standards for nitrogen dioxide (NO<sub>2</sub>) and particulate matter with an aerodynamic diameter of less than 10 µm (PM<sub>10</sub>) to be achieved by 1 January 2010 and 2005 respectively. The Air Quality Standards Regulations 2010<sup>2</sup> implements the requirements of the Directive into United Kingdom (UK) legislation.

The Directive contains a series of limit values for the protection of human health and critical levels for the protection of vegetation. Compliance with the European Union (EU) Limit Values is mandatory. However, Member States can apply for a time extension for compliance, subject to approval of an action plan by the European Commission.

In December 2015, the Department for Environment Food and Rural Affairs (Defra) on behalf of the UK Government produced plans to improve air quality in the UK in order to meet the EU targets in the shortest possible time<sup>3</sup>. The adequacy of these plans to bring about the necessary improvements in air quality to meet the relevant NAQOs within the shortest time possible were successfully challenged within the High Court in 2016.

Subsequently, in 2017 a plan for the reduction in roadside NO<sub>2</sub> concentrations was released<sup>4</sup> which requires local authorities to identify local actions to accelerate the improvement in air quality in their jurisdictions. It also includes the national measures, including banning the sale of conventionally powered cars and light goods vehicles by 2040 and further investment in cleaner transport.

#### 3.1.2 Clean Air Strategy, 2019

Defra published a new Clean Air Strategy 2019<sup>5</sup> in January 2019, setting out how the UK will significantly reduce harmful air pollutant emissions by 2020 and 2030. The Clean Air Strategy contains an intention of working towards the World Health Organisation guideline value for PM<sub>2.5</sub> of 10µg/m<sup>3</sup>. The timetable for this has not been set.

#### 3.1.3 Local Air Quality Management

Part IV of the Environment Act 1995<sup>6</sup>, requires the UK Government to publish an Air Quality Strategy and local authorities to review, assess and manage air quality within their areas. This is known as Local Air Quality Management (LAQM).

The 2007 Air Quality Strategy<sup>7</sup> establishes the policy for ambient air quality in the UK. It includes the NAQOs for the protection of human health and vegetation for 11 pollutants. Those NAQOs included as part of LAQM are prescribed in the Air Quality (England) Regulations 2000<sup>8</sup> and the Air

<sup>1</sup> Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe

<sup>2</sup> Secretary of State, 2010. Statutory Instrument 2010 No. 1001, Air Quality Standards Regulations 2010. HMSO.

<sup>3</sup> Defra, December 2015. Improving air quality in the UK, Tackling nitrogen dioxide in our towns and cities, UK overview document. Defra.

<sup>4</sup> Department for Environment, Food and Rural Affairs, 2017. UK plan for tackling roadside nitrogen dioxide concentrations. Defra.

<sup>5</sup> Defra, 2019. Clean Air Strategy.

<sup>6</sup> Secretary of State, 1995. The Environment Act part IV Air Quality, HMSO.

<sup>7</sup> Department for Environment, Food and Rural Affairs, 2007. Air Quality Strategy for England, Scotland, Wales and Northern Ireland. HMSO.

<sup>8</sup> Secretary of State, 2000. Statutory Instrument 2000 No. 921, The Air Quality (England) Regulations 2000. HMSO.

Quality (Amendment) (England) Regulations 2002<sup>9</sup>. Table 3.1 presents the NAQOs for NO<sub>2</sub> and PM<sub>10</sub> the two pollutants of most concern in urban areas.

**Table 3.1: Objectives Included in Air Quality Regulations (England) 2000 for Purpose of Local Air Quality Management**

Pollutant	Air Quality Objective		
	Concentration	Measured As	Date to be Achieved By
NO <sub>2</sub>	200 micrograms per metre cubed (µg/m <sup>3</sup> ) not to be exceeded more than 18 times per year	1 hour	31 December 2005
	40 µg/m <sup>3</sup>	Annual mean	
PM <sub>10</sub>	50 µg/m <sup>3</sup> not to be exceeded more than 35 times per year	24 hour mean	31 December 2004
	40 µg/m <sup>3</sup>	Annual mean	

Analysis of long-term monitoring data suggests that if the annual mean NO<sub>2</sub> concentration is less than 60 µg/m<sup>3</sup> then the one-hour mean NO<sub>2</sub> objective is unlikely to be exceeded where road transport is the main source of pollution. Therefore, in this assessment this concentration has been used to screen whether the one-hour mean objective is likely to be achieved. Similar to NO<sub>2</sub>, a PM<sub>10</sub> annual mean below 32 µg/m<sup>3</sup> is used to screen whether the 24-hour PM<sub>10</sub> mean objective is likely to be achieved.<sup>10</sup>

The 2007 Air Quality Strategy also introduced a new policy framework for tackling PM<sub>2.5</sub> which included an exposure reduction target and a 'backstop' annual mean NAQO. The exposure reduction target is focussed on reducing average concentrations across the most polluted urban areas and is therefore not applicable to individual schemes, whilst the annual mean NAQO can be considered a concentration cap to ensure environmental compliance. The UK NAQO for PM<sub>2.5</sub> are provided in Table 3.2.

**Table 3.2: UK Objectives for PM<sub>2.5</sub>**

Averaging Period	Objective	Target Date
Annual mean	25 µg/m <sup>3</sup>	2020
3 year running annual mean	15 % reduction in concentrations measured at urban background sites	Between 2010 and 2020

The NAQOs apply to external air where there is relevant exposure to the public over the associated averaging periods within each NAQO. Guidance is provided within LAQM.TG (16)<sup>11</sup> issued by Defra for Local Authorities, on where the NAQOs apply, as detailed in

Table 3.3. The NAQOs do not apply in workplace locations, to internal air or where people are unlikely to be regularly exposed (i.e. centre of roadways).

<sup>9</sup> Secretary of State, 2002. Statutory Instrument 2002 No. 3034, The Air Quality (England) (Amendment) Regulations 2002. HMSO.

<sup>10</sup> Department for Environment, Food and Rural Affairs, 2016. Local Air Quality Management Technical Guidance LAQM.TG (16). HMSO., London.

<sup>11</sup> Department for Environment, Food and Rural Affairs, 2016. Local Air Quality Management Technical Guidance LAQM.TG (16). HMSO., London.

**Table 3.3: Locations Where National Air Quality Objectives Apply**

Averaging Period	Objectives should apply at	Objectives should generally not apply at
Annual mean	All locations where members of the public might be regularly exposed. Building façades of residential properties, schools, hospitals, care homes etc.	Building façades of offices or other places of work where members of the public do not have regular access.  Hotels, unless people live there as their permanent residence.  Gardens of residential properties.
24 Hour Mean	All locations where the annual mean objective would apply, together with hotels. Gardens of residential properties.	Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term.
1 Hour Mean	All locations where the annual mean and: 24 and 8-hour mean objectives apply. Kerbside sites (for example, pavements of busy shopping streets).  Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where members of the public might reasonably be expected to spend one hour or more.  Any outdoor locations where members of the public might reasonably expect to spend one hour or longer.	

It should be noted that the EU Limit Values are numerically the same as the NAQO values but differ in terms of compliance dates, locations where they apply and legal responsibility. The compliance date for the NO<sub>2</sub> Limit Values was 1 January 2010, which is five years later than the date for the NAQO.

The Limit Values are mandatory whereas the NAQOs are policy objectives. Local authorities are not required to achieve them, but have to demonstrate effort of working towards their achievement. In addition, the Limit Values apply in all locations except:

- where members of the public do not have access and there is no fixed habitation;
- on factory premises or at industrial installations; and
- on the carriageway/central reservation of roads except where there is normally pedestrian access.

Where a local authority's review and assessment of its air quality identifies that air quality is likely to exceed the NAQOs, it must designate these areas as AQMAs and draw up an Air Quality Action Plan (AQAP) setting out measures to reduce pollutant concentrations with the aim of meeting the NAQOs.

### 3.1.4 National Planning Policy Framework

The revised National Planning Policy Framework (NPPF)<sup>12</sup> sets out the Government's planning policies for England and how they are expected to be applied (Ministry of Housing, Communities & Local Government, 2021). In relation to achieving sustainable development, paragraph 8 states that:

*"Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):...*

*c) an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, helping to improve biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy."*

So that sustainable development is pursued in a positive way, at the heart of the Framework is a presumption in favour of sustainable development. Paragraph 11 states that plans and decisions should apply a presumption in favour of sustainable development, which for decision-taking means:

*"... d) where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date, granting permission unless: ...*

*ii. any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."*

Paragraph 55 on planning conditions and obligations states:

*"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."*

Paragraph 104 on promoting sustainable transport states:

*"Transport issues should be considered from the earliest stages of plan-making and development proposals, so that: ...*

*d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; ..."*

Paragraph 105 continues to state:

*"Significant development should be focused on locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health."*

Paragraph 174 on conserving and enhancing the natural environment states:

*"Planning policies and decisions should contribute to and enhance the natural and local environment by: ...*

<sup>12</sup> Ministry of Housing, Communities and Local Government, 2021. National Planning Policy Framework. HMSO.

*e) 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 stability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans, and..."*

Paragraph 180 within ground conditions and pollution states:

*"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."*

Paragraph 186 states that:

*"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."*

Paragraph 187 states that:

*"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed".*

## **3.2 Local Planning Policy**

### **3.2.1 Chorley Borough Council**

The Chorley Local Plan<sup>13</sup> (CLP) was adopted in July 2015 to set out development of the area up until 2026. The Chorley Borough Local Plan Review was adopted in 2003 and is replaced by this Local Plan. The plan forms part of the statutory Development Plan for Chorley.

Policy V1: Model Policy states:

*'When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the Framework. The Council will always work proactively with applicants jointly to find solutions which mean that proposals can be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.'*

Policies in relation to air quality are as follows are detailed below.

<sup>13</sup> Chorley Council, 2015, Chorley Local Plan.

Section 4 Catering for Sustainable Travel states:

*'Core Strategy Objectives*

- *SO3: To reduce the need to travel, manage car use, promote more sustainable modes of transport and improve the road network.'*

Paragraph 4.1 states that:

*'Increasing the accessibility of the borough (for homes, jobs, open space, recreation etc.) and influencing travel patterns to encourage alternatives to the car (to reduce emissions, congestion and poor air quality) are key aims of the Core Strategy. Most journeys in Chorley are taken by car, causing increased congestion and pollution. Predictions for future car use indicate that this travel preference is likely to continue.'*

Paragraph 4.6 states:

*'Bus Provision*

*4.6 A key aim of the Core Strategy is to encourage people to use their cars less and use other forms of transport. Using public transport helps to reduce congestion and exhaust emissions, which in turn leads to improved air quality. As such, Chorley Council has identified a number of relevant schemes to be included in Chorley's Infrastructure Delivery Schedule.'*

Section 9, *'Tackling Climate Change'* states Core Strategy Objectives which include:

- *SO21: To reduce energy use and carbon dioxide emissions in new development.*
- *SO22: To encourage the generation and use of energy from renewable and low carbon sources...*
- *SO24: To reduce water usage, protect and enhance Central Lancashire's water resources and minimise the pollution of water, air and soil.'*

### **3.2.2 Central Lancashire Core Strategy**

The Central Lancashire Core Strategy<sup>14</sup> contains Policy 30: Air Quality:

*Improve air quality through delivery of Green Infrastructure initiatives and through taking account of air quality when prioritising measures to reduce road traffic congestion.*

### **3.3 Additional Guidance**

#### **3.3.1 Institute of Air Quality Management: Construction Dust Guidance, 2014 v1.1**

The IAQM produced guidance<sup>15</sup> to assist in the assessment of air quality impacts from demolition and construction activities. This guidance provides a consistent methodology for assessing the risks of dust impacts from demolition and construction activities and for identifying the correct level of mitigation which should be applied to avoid significant air quality effects.

<sup>14</sup> Central Lancashire Adopted Core Strategy Local Development Framework July 2012

<sup>15</sup> Holman et al, 2014. IAQM Guidance on the assessment of dust from demolition and construction V1.1. Institute of Air Quality Management, London.

Available: <http://www.iaqm.co.uk/text/guidance/construction-dust-2014>

### **3.3.2 Environmental Protection UK/Institute of Air Quality Management Guidance, Land-Use Planning Guidance, 2017**

Environmental Protection UK (EPUK), together with the IAQM, produced updated guidance in 2017<sup>16</sup> on how air quality impacts should be assessed within the land-use planning and development control process. This guidance provides clear criteria to determine when a detailed air quality assessment is required and a methodology for assessing the significance of air quality effects.

<sup>16</sup> Institute of Air Quality Management and Environmental Protection UK, 2017. Land-Use Planning & Development Control: Planning for Air Quality. Available: <http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf>

## 4. METHODOLOGY

### 4.1 Baseline

In order to establish baseline air quality in the vicinity of the application site, relevant monitoring data was reviewed and assessed. Data was obtained from the following sources:

- diffusion tubes operated by CBC and SBRC, and CBC Annual Status Report<sup>17</sup> SRBC Annual Status Report<sup>18</sup>; and
- Department of Environment, Food and Rural Affairs (Defra) background maps.

No additional site-specific air quality monitoring was carried out.

### 4.2 Construction Impacts

Likely effects as a result of demolition and construction dust emissions, unlike other air borne pollutants, cannot be accurately predicted and quantified because they are highly dependent on local weather conditions and mitigation measures implemented at source.

This assessment has followed the guidance published by the IAQM, on the assessment of the effects of demolition and construction on air quality. The IAQM assessment methodology considers three separate dust effects and defines their significance according to the sensitivity of the study area, as follows:

- Annoyance due to dust soiling; and
- The risk of health effects due to a significant increase in exposure to PM<sub>10</sub>.

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

With appropriate mitigation in place, the residual effect of construction impacts on air quality is always assessed as not significant. The purpose of the construction dust assessment is therefore to identify the appropriate level of mitigation to employ during construction activities.

Full details of the dust risk assessment methodology which includes the assessment criteria is provided in Appendix 2.

### 4.3 Road Traffic Impacts

#### 4.3.1 Human Health Receptors

Relevant sensitive locations are places where members of the public might be expected to be regularly present over the averaging period of the objectives. For the annual mean and daily mean objectives that are the focus of this assessment, sensitive receptors will generally be residential properties, schools, nursing homes, etc. When identifying these receptors, particular attention has been paid to assessing impacts close to junctions, where traffic may become congested, and where there is a combined effect of several road links.

The area assessed also takes into account guidance developed by EPUK and the IAQM. The guidance provides indicative criteria for when an air quality assessment is required. Existing

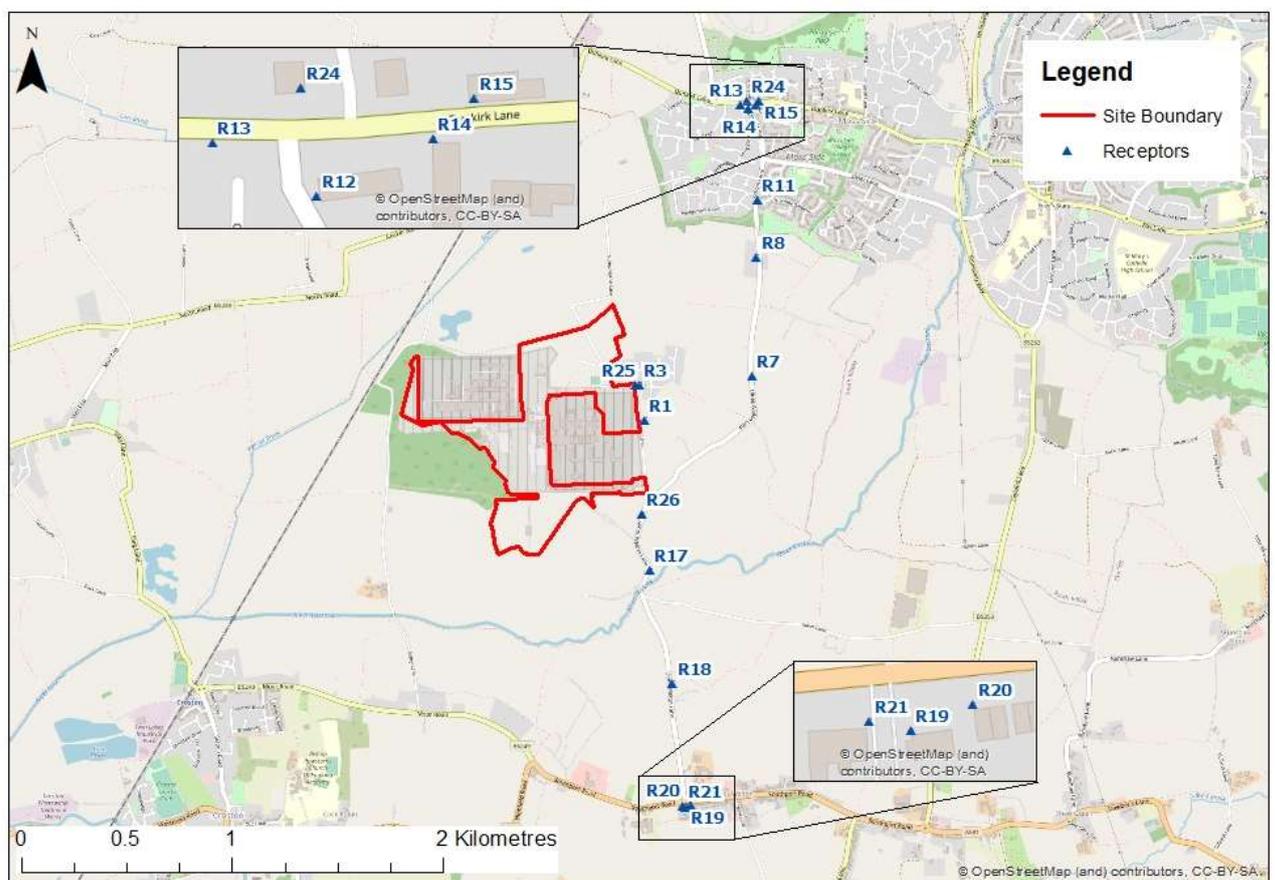
<sup>17</sup> Chorley Borough Council, 2020. Air Quality Annual Status Report. June 2020.

<sup>18</sup> South Ribble Borough Council, 2017. Air Quality Annual Status Report. April 2017.

receptors have been included in the assessment where they are adjacent to roads with an increase in traffic above the IAQM/EPUK<sup>19</sup> guidance criteria below:

- A change of Light Duty Vehicles (LDVs) flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere.
- A change of Heavy Duty Vehicles (HDVs) flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere<sup>20</sup>

Based on the above criteria, three existing properties have been identified as residential receptors for the assessment. The locations of existing residential receptors were chosen to represent locations where impacts from road traffic related to the proposed development are likely to be the greatest, i.e. as a result of development traffic at junctions. These locations are described in Table 4.1. Receptors were modelled at a height of 1.5 m representing ground floor exposure (shown in Figure 4.1).



**Figure 4.1: Offsite Receptor Locations**

<sup>19</sup> Institute of Air Quality Management (IAQM) and Environmental Protection UK, 2017, Land-Use Planning & Development Control: Planning for Air Quality

<sup>20</sup> Moorcroft and Barrowcliffe et al. (2017). 'Land-use Planning & Development Control: Planning for Air Quality'. V1.2. The Institute for Air Quality Management, London

**Table 4.1: Receptor Locations**

Receptor	X	Y	Height (m)
R1	350855.0433	420591.1833	1.5
R3	350829.6615	420759.5767	1.5
R7	351364.635	420801.1269	1.5
R8	351389.2947	421370.7939	1.5
R11	351389.8575	421645.1058	1.5
R12	351345.926	422079.8677	1.5
R13	351310.0054	422098.1588	1.5
R14	351385.6669	422099.4763	1.5
R15	351399.7198	422113.7354	1.5
R17	350880.0057	419869.398	1.5
R18	350989.4036	419332.6251	1.5
R19	351052.2856	418740.0475	1.5
R20	351073.6031	418749.0794	1.5
R21	351037.8521	418743.5875	1.5
R22	350933.0804	420216.9437	1.5
R24	351340.5059	422116.9898	1.5
R25	350815.4798	420759.2592	1.5
R26	350842.2223	420137.9125	1.5

### 4.3.2 Impact Predictions

Predictions have been carried out using the ADMS-Roads dispersion model (v5). The model requires the user to provide various input data, including the Annual Average Daily Traffic (AADT) flow, the proportion of Heavy Duty Vehicles (HDVs), road characteristics (including road width and street canyon height, where applicable), and the vehicle speed. It also requires meteorological data. The model has been run using 2020 meteorological data from the Rostherne meteorological station, which are considered suitable for this area (see Appendix 4 for further details on the model inputs).

AADT flows and the proportions of HDVs, for roads within 250 m of the proposed development site, existing receptors and monitoring site have been provided by the project's transport consultants. Peak hour flows used in the Transport Assessment have been used by the traffic consultants to calculate AADT flows. The AADT flows are therefore different to the figures quoted in the transport assessment. Traffic data used in this assessment are summarised in Appendix 5.

Traffic emissions were calculated using the latest version of Defra's Emission Factor Toolkit (EFT) v10.1. The traffic data were entered into the model, along with speed data to provide combined emission rates for each of the road links entered into the model.

In carrying out the assessment of operational traffic impacts the following scenarios have been assessed:

- 2025 baseline with 2025 EFT; and

- 2025 baseline with development traffic with 2025 EFT.

In order to take account of uncertainties relating to future year vehicle emissions, the assessment of future year impacts has been carried out utilising 2025 emission factors and background concentrations combined with traffic data from 2025.

The relevant objectives for human health are set out in Table 3.1 and Table 3.2. There is no official guidance in the UK on how to assess the significance of air quality impacts of a new development. The significance criteria provided in the guidance produced by IAQM and EPUK has been used to assess the significance of effects on air quality as a result of the proposed development.

The guidance has produced a matrix which is to be used to calculate the impacts at individual receptor locations as shown in Table 4.2. This takes into account both the change in concentration and the resulting overall concentration. The guidance states that the overall significance of effects should be based on professional judgement and needs to take account of such factors as:

- 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.

**Table 4.2: Impact Descriptors for Individual Receptors**

Long term average concentration at receptor with development	Percentage Change in Concentration Relative to Annual Mean Air Quality Objective (AQO)			
	<1	2 - 5	6 - 10	>10
75% or less of NAQO	Negligible	Negligible	Slight	Moderate
76 - 94% of NAQO	Negligible	Slight	Moderate	Moderate
95 - 102% of NAQO	Slight	Moderate	Moderate	Substantial
103 - 109% of NAQO	Moderate	Moderate	Substantial	Substantial
110% or more of NAQO	Moderate	Substantial	Substantial	Substantial

NAQO for NO<sub>2</sub> and PM<sub>10</sub> is 40 µg/m<sup>3</sup>  
Changes of less than 0.5% are considered to be negligible  
Changes are rounded up

Where impacts can be considered in isolation at an individual receptor, moderate or substantial impacts (i.e. per Table 4.2) may be considered to be a significant environmental effect, whereas negligible or minor impacts would not be considered significant. The overall effect however needs to be considered in the round taking into account the changes at all of the modelled receptor locations, with a judgement made as to whether the overall air quality effect of the development is significant or not.

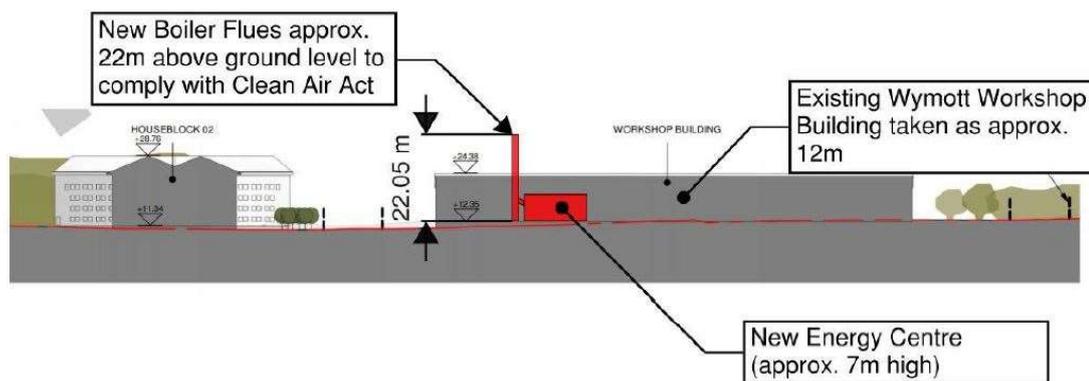
#### 4.4 Boiler House Emissions

The new boiler house is a replacement of the existing boiler house on site and is currently designed to house the same size and type of equipment as the existing boiler house. A stack height calculation has been undertaken for the project to comply with the Clean Air Act 1956 and subsequent memoranda<sup>21</sup>. The relocation of the boiler house to be more central to the site means

<sup>21</sup> MEP Stage 2 Report – Boiler House Infrastructure 608623-0000-PEV-GHX0021-XX-RP-ME-0001 Issue P01 18/06/2021 Pick Everard

that it is closer to existing Wymott Workshop building which is approximately 12m high and taller than the buildings located close to the existing boiler house.

The required flue height in order to comply with the Clean Air Act requirements is approximately 22m, which is approximately 5m taller than the existing boiler house flues. The calculation is based on three 2.5MW boilers operating on oil which is a worst case capacity assumption.



**Figure 4.2: New Boiler House**

The flue height has been calculated on the same basis as for the existing boiler house flues and will give an equivalent level of dispersion. As the new boiler house will be located to the south of the existing boiler house and more towards the centre of the site, off-site impacts are likely to be lower than for the boiler house that it will replace.

#### 4.5 Assumptions and Limitations

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

The complete development impact assessment modelling has been based on 2025 emission factors and background concentrations, whilst utilising traffic flows for 2025. The model has been verified against an agreed factor of 3. This is considered to provide a conservative assessment taking into account the uncertainties regarding future vehicle emission factors.

## 5. BASELINE ASSESSMENT

### 5.1 Local Air Quality Management

The site is in close proximity of SRBC and CBC monitoring sites; it is likely the traffic flows associated with the proposed development will travel through both of these council areas.

CBC has investigated air quality within its area as part of its responsibilities under the LAQM regime. There are currently no AQMAs within the district as there are no exceedances of the annual mean NO<sub>2</sub> objective

SRBC has investigated air quality within its area as part of its responsibilities under the LAQM regime. There are currently four AQMAs within the district as all declared for the potential exceedance of the annual average NO<sub>2</sub> objective value. The closest AQMA to the site is located approximately 3km northeast along the B5256 in Leyland. This was declared by SRBC in 2018 due to exceedances of the annual mean NO<sub>2</sub> objective.

### 5.2 Monitoring

#### 5.2.1 Nitrogen Dioxide

CBC monitor existing air quality in proximity to the site using passive diffusion tubes for the measurement of NO<sub>2</sub> concentrations. At present there is no monitoring of PM<sub>10</sub> or PM<sub>2.5</sub> concentrations in the district. SRBC monitor existing air quality in proximity to the site using passive diffusion tubes for the measurement of NO<sub>2</sub> and particulate matter (PM) concentrations. The closest and most representative monitoring locations are shown in Figure 5.1 and described in Table 5.1.

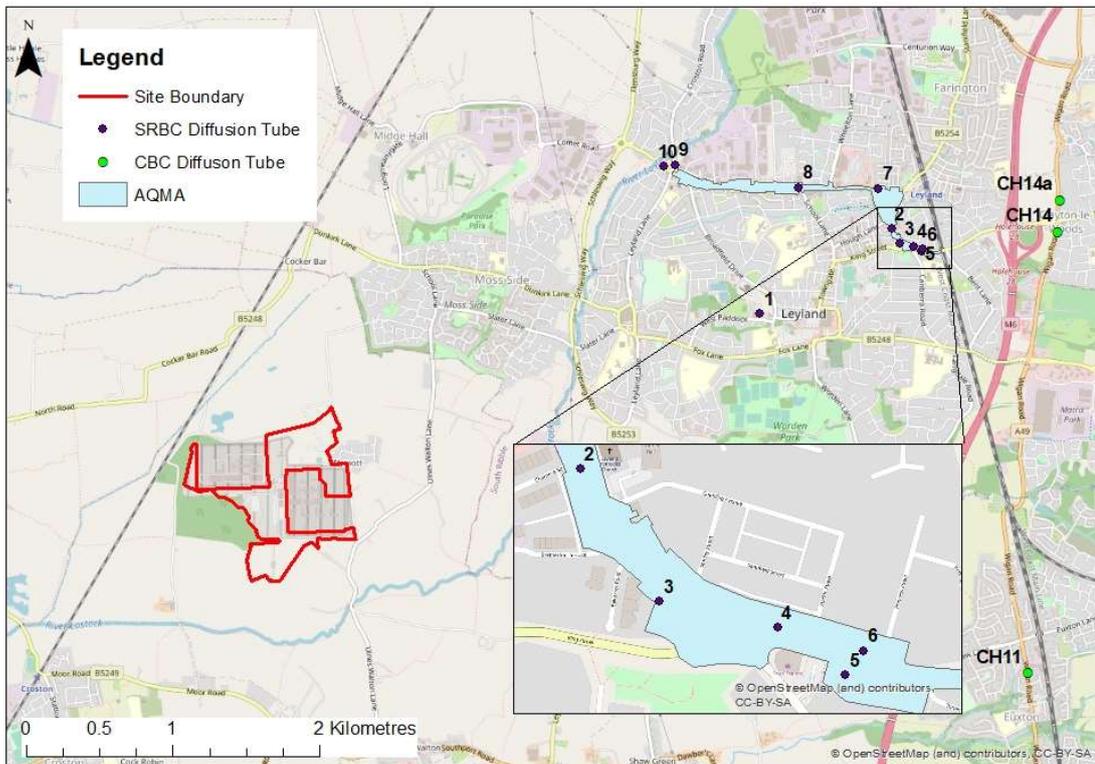


Figure 5.1: Closest Local Authority Monitoring Locations

**Table 5.1: Measured NO<sub>2</sub> Concentrations**

Site ID	Site Type	Local Authority	Within AQMA	Annual Mean (µg/m <sup>3</sup> )				
				2015	2016	2017	2018	2019
<b>Diffusion Tubes</b>								
1 - Civic Centre, Leyland	UB	SRBC	No	12	15	N/A	N/A	N/A
2 - 12 Turpin Green 3 - Lane/Charock St, Leyland	R	SRBC	No	27	32	N/A	N/A	N/A
3 - 38 Turpin Green Lane, Leyland	R	SRBC	No	29	32	N/A	N/A	N/A
4 - "Gentle Touch" 65 Turpin Green Lane, Leyland	R	SRBC	No	32	<b>41</b>	N/A	N/A	N/A
5 - 66 Turpin Green Lane, Leyland	R	SRBC	No	24	28	N/A	N/A	N/A
6 - 87 Turpin Green Lane, Leyland	R	SRBC	No	31	<b>41</b>	N/A	N/A	N/A
7 - 36 Golden Hill Lane	R	SRBC	No	30	38	N/A	N/A	N/A
8 - 130 Golden Hill Lane	R	SRBC	No	31	38	N/A	N/A	N/A
9 - 57 Leyland lane	R	SRBC	No	22	29	N/A	N/A	N/A
10 - The Mill, Longmeanygate	R	SRBC	No	20	25	N/A	N/A	N/A
CH11 - A49 Wigan Road South Euxton Lane	K	CBC	No	28.6	31.7	28.2	35.0	24.2
CH14 - A49 Wigan Road	R	CBC	No	<b>40.2</b>	<b>43.2</b>	<b>42.3</b>	29.7	37.1
CH14a - A49 Wigan Road / Lancaster Lane	R	CBC	No	27.6	31.3	29.8	32.5	26.4

Exceedances of the objective highlighted in **bold**.

R – Roadside

K – Kerbside

UB – Urban Background

N/A – Not Available. The last available ASR from SRBC at the time of this report is 2017.

### 5.3 Defra Background Maps

In addition to these measured concentrations, estimated background concentrations for the site have been obtained from the national maps provided by Defra (Defra, 2021) (shown in Table 5.2).

**Table 5.2: Estimated Annual Mean Background Concentrations**

Year	Location (X, Y)	Annual Mean ( $\mu\text{g}/\text{m}^3$ )		
		NO <sub>2</sub>	PM <sub>10</sub>	PM <sub>2.5</sub>
2019	349500, 420500	8.5	11.0	6.7
	350500, 420500	8.8	11.2	6.9
2021	349500, 420500	7.9	10.7	6.5
	350500, 420500	8.2	10.8	6.7
2025	349500, 420500	7.0	10.3	6.2
	350500, 420500	7.3	10.4	6.3
Objectives		40	40	25

### 5.4 Assessment of Monitoring Data

The results presented in Table 5.1 indicate that the majority of kerbside and roadside monitoring within the wider vicinity of the site is in compliance with the annual mean objective, with exception of monitoring site CH14. Higher concentrations were recorded at monitoring site CH14 with concentrations over the annual mean objective from 2015 to 2017. From 2018 the recorded concentrations have been in compliance with the annual mean objective.

Whilst no ambient air quality monitoring data for NO<sub>2</sub> is available in the immediate site area, the CBC monitoring locations are situated in areas significantly more built up than the site's surroundings. Furthermore, the monitoring locations are adjacent to major roads and therefore, site specific concentrations are expected to be lower than those values presented in Table 5.1, and therefore comfortably below the NAQO.

There are no PM<sub>10</sub> and PM<sub>2.5</sub> monitoring sites in proximity to the application site, but the Defra background map data for the site indicates that the NAQOs for PM<sub>10</sub> and PM<sub>2.5</sub> will be comfortably met within the site. In addition, the background PM<sub>2.5</sub> concentration is below the World Health Organisation guideline value of 10 $\mu\text{g}/\text{m}^3$ .

## 6. CONSTRUCTION IMPACT ASSESSMENT

### 6.1 Introduction

The site is located in a predominantly rural and residential area. Residential receptors are located within 500 m of the site boundary and in accordance with IAQM guidance a detailed assessment of the demolition and construction impacts is required. There are no ecological receptors or habitats that would be sensitive to dust impacts within 50 m of the application site boundary, therefore, no ecological effects are predicted to occur.

### 6.2 Assessment of Impacts

Using the evaluation criteria within the IAQM's Guidance the potential dust emission magnitude has been identified for each stage of the proposed development as shown in Table 6.1 below.

**Table 6.1: Dust Emissions Magnitude for Each Construction Activity**

Activity	Dust Emission Magnitude	Justification
Demolition	Small	Total building volume <20,000 m <sup>3</sup> , construction material with low potential for dust release (e.g. metal cladding or timber)
Earthworks	Large	Total site area requiring earthworks above 10,000 m <sup>2</sup> . Rough ground present in the eastern site area, with potentially dusty soil type (e.g. loamy / clayey, which will be prone to suspension when dry due to small particle size).
Construction	Large	Total building volume of above 100,000 m <sup>3</sup> .
Trackout	Large	It is assumed that maximum HDV movements over the course of the development will be a maximum of between 10 and 50 outward movements per day <sup>1</sup> .

<sup>1</sup> Assumed, based on likely level of construction activity

The next stage of the process is to define the sensitivity of the assessment area to dust soiling and human health impacts. This process combines the sensitivity of the receptor with distance from the source to determine the overall sensitivity as summarised in Table 6.2.

**Table 6.2: Sensitivity of Area to Dust Impacts**

Sensitivity to Dust Soiling	Sensitivity to Human Health Impacts	Sensitivity to Ecological Receptors
Medium: 10-100 residential properties within 50 m northeast of the site boundary and the trackout routes.	Low: 10- 100 residential properties within 50 m of the site boundary and the trackout routes. PM <sub>10</sub> concentrations from local monitoring significantly less than 24 µg/m <sup>3</sup> in 2017 (12.4 µg/m <sup>3</sup> ).	Not Applicable: no ecological receptors sensitive to dust within 50 m of the application site or within 50 m of the route used by construction vehicles for a distance of 500 m.

The dust emission magnitude determined in Table 6.1 has been combined with the sensitivity assessment in Table 6.2 to define the risk of impacts for each construction activity of the proposed development in the absence of mitigation, as shown in Table 6.3.

**Table 6.3: Risk of Dust Impacts in Absence of Mitigation**

Sensitivity of Surrounding Area to Impacts	Dust Emission Magnitude			
	Demolition (Small)	Earthworks (Large)	Construction (Large)	Trackout (Medium)
Dust Soiling (Medium)	Low Risk	Medium Risk	Medium Risk	Low Risk
Human Health (Low)	Medium Risk	Low Risk	Low Risk	Low Risk

### 6.3 Mitigation of Construction Impacts

The control of dust emissions from construction sites relies upon good site management and mitigation techniques to reduce emissions of dust and limit dispersion. A summary of the mitigation measures recommended in the IAQM guidance to reduce impacts from medium risk sites is provided in Table 6.4. It is recommended that these measures are included within a Construction Environmental Management Plan (CEMP) which could be secured through an appropriately worded planning condition. The proposed mitigation provided below are tried and tested and standard measures included in CEMPs on a regular basis.

**Table 6.4: Recommended Dust Mitigation for Medium Risk Sites**

Phase	Mitigation Measure
Communications	<ul style="list-style-type: none"> <li>Implement a stakeholder communication plan.</li> <li>Display name and contact details of responsible person for dust issues on Site boundary in addition to head/regional office contact information.</li> </ul>
Dust Management Plan	<ul style="list-style-type: none"> <li>Develop and implement a Dust Management Plan (DMP) which would be included as part of the CEMP, to be approved by the Local Authority.</li> </ul>
Site Management	<ul style="list-style-type: none"> <li>Record all complaints and incidents in a site log.</li> <li>Take appropriate measures to reduce emissions in a timely manner, and record the measures taken within the log.</li> <li>Make the complaints log available to the Local Authority if requested.</li> <li>Record any exceptional dust incidents on or off site.</li> </ul>
Monitoring	<ul style="list-style-type: none"> <li>Undertake daily on and off-site visual inspections where there are nearby receptors.</li> <li>Carry out regular inspections to ensure compliance with the DMP and record results in the site log book.</li> <li>Increase the frequency of inspections during activities with a high potential to create dust or in prolonged dry weather.</li> <li>Agree dust monitoring with the local authority where required.</li> </ul>
Preparing and Maintaining the Site	<ul style="list-style-type: none"> <li>Plan site layout to locate dust generating activities as far as possible from receptors.</li> <li>Use solid screens around dusty activities and around stockpiles.</li> <li>Avoid site runoff of water and mud.</li> <li>Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period.</li> <li>Keep site fencing barriers and scaffolding clean using wet methods.</li> </ul>

Phase	Mitigation Measure
Operating Vehicle/Machinery and Sustainable Travel	<p>Remove dusty materials from site as soon as possible. Minimise emissions from stockpiles by covering, seeding, fencing or damping down.</p> <p>Enforce an on-site speed limit of 15 mph on surfaced roads and 10 mph on unsurfaced areas.</p> <p>Ensure vehicles switch of engines when stationary.</p> <p>Avoid use of generators where possible.</p> <p>Produce a Construction Logistics Plan to manage the sustainable delivery of materials.</p> <p>Implement a sustainable travel plan for site workers.</p>
Operations	<p>Only use cutting, grinding or sawing equipment with suitable dust suppression equipment or techniques.</p> <p>Ensure adequate water supply for effective dust and particulate matter suppression.</p> <p>Use enclosed chutes, conveyors and covered skips.</p> <p>Minimise drop heights of materials.</p> <p>Ensure suitable cleaning material is available at all times to clean up spills.</p>
Waste Management Measures Specific to Demolition	<p>Avoid bonfires.</p> <p>Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).</p> <p>Ensure effective water suppression is used during demolition operations.</p> <p>Avoid explosive blasting, using appropriate manual or mechanical alternatives.</p> <p>Bag and remove any biological debris or damp down such material before demolition.</p>
Measures Specific to Earthworks	<p>Re-vegetate earthworks and exposed areas/soil stockpiles as soon as practicable.</p> <p>Use hessian, mulch or trackifiers where it is not possible to re-vegetate or cover with topsoil.</p> <p>Only expose small areas of ground or stockpile when working.</p>
Measures Specific to Construction	<p>Ensure aggregates are stored in bunded areas and are not allowed to dry out.</p> <p>Avoid concrete scabbling where possible.</p> <p>Ensure bulk cement and other fine powder is delivered in tankers and stored in silos with suitable emission control.</p> <p>Smaller supplies of fine powder material to be in sealed containers and stored appropriately.</p>
Measures Specific to Trackout	<p>Use water-assisted dust sweepers to clean access and local roads.</p> <p>Avoid dry sweeping of large areas.</p> <p>Ensure vehicles entering and leaving the site are appropriately covered.</p> <p>Inspect on-site haul roads for integrity and repair as necessary.</p> <p>Inspections of haul roads to be recorded in site log, including any remedial action taken.</p> <p>Implement a wheel washing system.</p>

#### **6.4 Residual Effects**

Using the IAQM guidance, and on the assumption that appropriate dust mitigation measures are applied commensurate with the risk of potential dust impacts, the effect of construction dust on nearby sensitive receptors would not be significant.

## 7. ROAD TRAFFIC IMPACTS

### 7.1 Existing Human Health Receptors

Predicted concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> at existing receptors with the proposed development in place are presented in Table 7.1, Table 7.2 and Table 7.3.

**Table 7.1: Predicted NO<sub>2</sub> Concentrations (µg/m<sup>3</sup>)**

Receptor	2025 Without Development	2025 With Development	Change (%)	Impact Descriptor
R1	7.8	8.3	1.3	Negligible
R3	8.1	8.1	0.1	Negligible
R7	10.8	11.3	1.4	Negligible
R8	9.1	9.5	0.8	Negligible
R11	10.4	10.9	1.2	Negligible
R12	15.7	16.6	2.2	Negligible
R13	13.1	13.3	0.7	Negligible
R14	12.5	12.9	0.9	Negligible
R15	14.3	14.7	1.0	Negligible
R17	9.0	9.5	1.2	Negligible
R18	9.7	10.1	1.2	Negligible
R19	9.9	10.0	0.4	Negligible
R20	11.3	11.6	0.6	Negligible
R21	10.3	10.4	0.4	Negligible
R22	8.7	9.0	0.7	Negligible
R24	13.4	13.8	1.1	Negligible
R25	8.1	8.2	0.1	Negligible
R26	9.9	10.4	1.1	Negligible
<b>Objectives</b>		<b>40</b>	-	-

**Table 7.2: Predicted PM<sub>10</sub> Concentrations (µg/m<sup>3</sup>)**

Receptor	2025 Without Development	2025 With Development	Change (%)	Impact Descriptor
R1	10.5	10.6	0.3	Negligible
R3	10.5	10.5	0.0	Negligible
R7	10.7	10.8	0.4	Negligible
R8	10.1	10.1	0.2	Negligible
R11	10.3	10.4	0.3	Negligible
R12	11.6	11.8	0.5	Negligible
R13	11.2	11.3	0.2	Negligible
R14	11.1	11.2	0.2	Negligible
R15	11.6	11.7	0.3	Negligible
R17	10.5	10.6	0.3	Negligible
R18	10.7	10.8	0.3	Negligible
R19	10.3	10.4	0.1	Negligible
R20	10.7	10.8	0.2	Negligible
R21	10.5	10.5	0.1	Negligible
R22	10.7	10.8	0.2	Negligible
R24	11.2	11.3	0.2	Negligible
R25	10.5	10.5	0.0	Negligible
R26	11.0	11.1	0.3	Negligible
<b>Objectives</b>		<b>40</b>	-	-

**Table 7.3: Predicted PM<sub>2.5</sub> Concentrations (µg/m<sup>3</sup>)**

Receptor	2025 Without Development	2025 With Development	Change (%)	Impact Descriptor
R1	6.4	6.4	0.3	Negligible
R3	6.4	6.4	0.0	Negligible
R7	6.7	6.8	0.3	Negligible
R8	6.5	6.5	0.2	Negligible
R11	6.7	6.7	0.2	Negligible
R12	7.3	7.4	0.5	Negligible
R13	7.0	7.1	0.1	Negligible
R14	7.0	7.0	0.2	Negligible

Receptor	2025 Without Development	2025 With Development	Change (%)	Impact Descriptor
R15	7.3	7.3	0.2	Negligible
R17	6.5	6.5	0.3	Negligible
R18	6.6	6.6	0.3	Negligible
R19	6.5	6.5	0.1	Negligible
R20	6.7	6.7	0.1	Negligible
R21	6.5	6.6	0.1	Negligible
R22	6.5	6.5	0.2	Negligible
R24	7.1	7.1	0.2	Negligible
R25	6.4	6.4	0.0	Negligible
R26	6.7	6.7	0.3	Negligible
<b>Objectives</b>		<b>25</b>	-	-

The predicted NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations for the year 2025 with and without the proposed development in place are below the relevant objectives at all existing receptor locations. None of the predicted annual mean NO<sub>2</sub> concentrations exceed 60 µg/m<sup>3</sup> and therefore exceedance of the 1-hour mean NO<sub>2</sub> objective is unlikely. None of the predicted annual mean PM<sub>10</sub> concentrations exceed 32 µg/m<sup>3</sup> and therefore the 24-hour mean PM<sub>10</sub> objective is not predicted to be exceeded.

The largest increase in NO<sub>2</sub> concentrations is predicted to be 0.9 µg/m<sup>3</sup> at R12. The changes in annual mean NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are all <0.5%. Using the criteria set out in Table 4.2, the impact on annual mean NO<sub>2</sub> concentrations is described as negligible at all receptor locations. The impact on PM<sub>10</sub> concentrations is described as negligible, and the annual mean of 32µg/m<sup>3</sup> equating to 35 days above 50µg/m<sup>3</sup> for PM<sub>10</sub> is described as negligible at all receptor locations.

## 7.2 Mitigation of Operational Effects

The predicted increases in pollutant concentrations from the development are negligible and therefore there are no requirements to mitigate the direct impacts of the development. In accordance with the Chorley Local Plan mitigation in the form of reduction of energy use and carbon dioxide emissions in new developments, use and generation of energy from renewable and low carbon sources, and to minimise pollution of air would be incorporated into the development.

## 8. CONCLUSION

The air quality impacts associated with the proposed development of the site at land adjacent to HMP Garth and HMP Wymott, Ulnes Walton, Leyland, Lancashire have been assessed.

To date CBC has declared no AQMAs. To date SRBC has declared four AQMAs due to exceedances of the annual mean NO<sub>2</sub> objective. The closest AQMA is located approximately 3 km north east of the proposed development site. None of the AQMAs would be impacted by the proposed development.

The assessment of potential impacts to air quality during the construction stage has identified that the activities, together with the location of nearby sensitive receptors, results in a high risk of impacts in the absence of suitable mitigation. Suitable mitigation would be provided through a series of measures set out in a dust management plan to form part of a CEMP to be agreed with the local authority. With mitigation in place, the effects of construction dust on nearby sensitive receptors would not be significant.

The relocation of the boiler house will involve 'like for like' replacement of equipment. The flue height has been calculated on the same basis as for the existing boiler house flues and will give an equivalent level of dispersion. As the new boiler house will be located to the south of the existing boiler house and more towards the centre of the site, off-site impacts are likely to be lower than for the boiler house that it will replace.

Concentrations of NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> have been predicted for a number of worst case locations representing existing properties adjacent to the road network. Predicted concentrations are well below the relevant objectives at all of the existing receptor locations with the proposed development in place and the impact of the development is negligible and therefore not significant.

Mitigation measures to reduce the direct impacts of the development on air quality concentrations are not required, but additional transport related mitigation measures will be employed to reduce emissions from the development in accordance with the Chorley Local Plan.

Overall, it is concluded that there are no air quality constraints to the proposed development.

## **APPENDIX 1 GLOSSARY**

Abbreviations	Meaning
AADT	Annual Average Daily Traffic
ADMS	Air Dispersion Modelling System
APIS	Air Pollution Information System
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CBC	Chorley Borough Council
CHP	Combined Heat and Power
CEMP	Construction Environmental Management Plan
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
Diffusion Tube	A passive sampler used for collecting NO <sub>2</sub> in the air
EA	Environmental Agency
EFT	Emission Factor Toolkit
EHO	Environmental Health Officer
EPUK	Environmental Protection UK
HDV	Heavy Duty Vehicle; a vehicle with a gross vehicle weight greater than 3.5 tonnes. Includes Heavy Goods Vehicles and buses
IAQM	Institute of Air Quality Management
LAQM	Local Air Quality Management
NAQO	National Air Quality Objective as set out in the Air Quality Strategy and the Air Quality Regulations
NO <sub>2</sub>	Nitrogen Dioxide
NO <sub>x</sub>	Nitrogen oxides, generally considered to be nitric oxide and NO <sub>2</sub>
NPPF	National Planning Policy Framework
PM <sub>10</sub> /PM <sub>2.5</sub>	Small airborne particles less than 10/2.5 microns in aerodynamic diameter
PPG	Planning Practice Guidance
Receptor	A location where the effects of pollution may occur
SRBC	South Ribble Borough Council
SSSI	Site of Special Scientific Interest
SPG	Supplementary Planning Guidance

## **APPENDIX 2 DUST RISK ASSESSMENT METHODOLOGY**

**Determining Dust Emission Magnitude**

Large	Medium	Small
<p><b>Demolition</b></p> <ul style="list-style-type: none"> <li>total building volume &gt;50,000 m<sup>3</sup></li> <li>potentially dusty construction material (e.g. concrete)</li> <li>on-site crushing and screening</li> <li>demolition activities &gt;20 m above ground level</li> </ul>	<ul style="list-style-type: none"> <li>total building volume 20,000m<sup>3</sup> – 50,000m<sup>3</sup></li> <li>potentially dusty construction</li> <li>demolition activities 10-20m above ground level</li> </ul>	<ul style="list-style-type: none"> <li>total building volume &lt;20,000m<sup>3</sup></li> <li>construction material with low potential for dust release (e.g. metal cladding or timber)</li> <li>demolition activities &lt;10m above ground</li> <li>during wetter months</li> </ul>
<p><b>Earthworks</b></p> <ul style="list-style-type: none"> <li>total site area &gt;10,000m<sup>2</sup></li> <li>potentially dusty soil type (e.g. clay, which will be prone to suspension when dry due to small particle size)</li> <li>&gt;10 heavy earth moving vehicles active at any one time</li> <li>formation of bunds &gt;8m in height</li> <li>total material moved &gt;100,000 tonnes</li> </ul>	<ul style="list-style-type: none"> <li>total site area 2,500m<sup>2</sup> - 10,000m<sup>2</sup></li> <li>moderately dusty soil type (e.g. silt)</li> <li>5-10 heavy earth moving vehicles active at any one time</li> <li>formation of bunds 4m - 8m in height</li> <li>total material moved 20,000 - 100,000 tonnes</li> </ul>	<ul style="list-style-type: none"> <li>total site area &lt;2,500m<sup>2</sup></li> <li>soil type with large grain size (e.g. sand)</li> <li>&lt;5 heavy earth moving vehicles active at any one time</li> <li>formation of bunds &lt;4m in height</li> <li>total material moved &lt;20,000 tonnes</li> <li>earthworks during wetter months</li> </ul>
<p><b>Construction</b></p> <ul style="list-style-type: none"> <li>total building volume &gt;100,000m<sup>3</sup></li> <li>piling</li> <li>on-site concrete batching</li> <li>sandblasting</li> </ul>	<ul style="list-style-type: none"> <li>total building volume 25,000m<sup>3</sup> - 100,000m<sup>3</sup></li> <li>potentially dusty construction material (e.g. concrete)</li> <li>piling</li> <li>on-site concrete batching</li> </ul>	<ul style="list-style-type: none"> <li>total building volume &lt;25,000 m<sup>3</sup></li> <li>construction material with low potential for dust release (e.g. metal cladding or timber)</li> </ul>
<p><b>Trackout</b></p> <ul style="list-style-type: none"> <li>&gt;50 HDV (&gt;3.5t) movements in any one day</li> <li>potentially dusty surface material (e.g. high clay content)</li> <li>unpaved road length &gt;100m</li> </ul>	<ul style="list-style-type: none"> <li>10-50 HDV (&gt;3.5t) movements in any one day</li> <li>moderately dusty surface material (e.g. high clay content)</li> <li>unpaved road length 50m – 100m</li> </ul>	<ul style="list-style-type: none"> <li>&lt;10 HDV (&gt;3.5t) movements in any one day</li> <li>surface material with low potential for dust release</li> <li>unpaved road length &lt;50m</li> </ul>

**Determining Receptor Sensitivity**

High	Medium	Low
<b>Sensitivities of People to Dust Soiling Effects</b>		
<ul style="list-style-type: none"> <li>• users can reasonably expect a enjoyment of a high level of amenity; or</li> <li>• The appearance, aesthetics or value of their property would be diminished by soiling; and the people or property would reasonably be expected a to be present continuously, or at least regularly for extended periods, as part of the normal pattern of use of the land.</li> <li>• indicative examples include dwellings, museums and other culturally important collections, medium and long term car parks and car showrooms.</li> </ul>	<ul style="list-style-type: none"> <li>• users would expect to enjoy a reasonable level of amenity, but would not reasonably expect to enjoy the same level of amenity as in their home; or</li> <li>• the appearance, aesthetics or value of their property could be diminished by soiling; or</li> <li>• The people or property wouldn't reasonably be expected to be present here continuously or regularly for extended periods as part of the normal pattern of use of the land.</li> <li>• Indicative examples include parks and places of work.</li> </ul>	<ul style="list-style-type: none"> <li>• the enjoyment of amenity would not reasonably be expected; or</li> <li>• property would not reasonably be expected to be diminished in appearance, aesthetics or value by soiling; or</li> <li>• there is transient exposure, where the people or property would reasonably be expected to be present only for limited periods of time as part of the normal pattern of use of the land.</li> <li>• indicative examples include playing fields, farmland (Unless commercially-sensitive horticultural), footpaths, short term car parks and roads.</li> </ul>
<b>Sensitivities of People to the Health Effects of PM<sub>10</sub></b>		
<ul style="list-style-type: none"> <li>• locations where members of the public are exposed over a time period relevant to the air quality objective for PM<sub>10</sub> (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).</li> <li>• Indicative examples include residential properties, Hospitals, schools and residential care homes should also be considered as having equal sensitivity to residential areas for the purposes of this assessment.</li> </ul>	<ul style="list-style-type: none"> <li>• locations where the people exposed are workers, and exposure is over a time period relevant to the air quality objective for PM<sub>10</sub> (in the case of the 24-hour objectives, a relevant location would be one where individuals may be exposed for eight hours or more in a day).</li> <li>• Indicative examples include office and shop workers, but will generally not include workers occupationally exposed to PM<sub>10</sub>, as protection is covered by Health and Safety at Work legislation.</li> </ul>	<ul style="list-style-type: none"> <li>• Locations where human exposure is transient.</li> <li>• Indicative examples include public footpaths, playing fields, parks and shopping streets.</li> </ul>
<b>Sensitivities of Receptors to Ecological Effects</b>		
<ul style="list-style-type: none"> <li>• locations with an international or national designation <i>and</i> the designated features may be affected by dust soiling; or</li> <li>• locations where there is a community of a particularly dust sensitive species such as vascular species included in the Red Data List For Great Britain.</li> <li>• Indicative examples include a Special Area of Conservation (SAC) designated for acid heathlands or a local site designated for lichens adjacent to the demolition of a large site containing concrete (alkali) buildings.</li> </ul>	<ul style="list-style-type: none"> <li>• locations where there is a particularly important plant species, where its dust sensitivity is uncertain or unknown; or</li> <li>• Locations with a national designation where the features may be affected by dust deposition.</li> <li>• Indicative example is a Site of Special Scientific Interest (SSSI) with dust sensitive features.</li> </ul>	<ul style="list-style-type: none"> <li>• Locations with a local designation where the features may be affected by dust deposition.</li> <li>• Indicative example is a local Nature Reserve with dust sensitive features.</li> </ul>

**Determining Sensitivity of the Area**

**Dust Soiling Effects on People and Property**

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

**Human Health Impacts**

	Annual Mean PM <sub>10</sub> concentration	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m <sup>3</sup>	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	>28-32 µg/m <sup>3</sup>	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	>24-28 µg/m <sup>3</sup>	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
<24 µg/m <sup>3</sup>	>100	Medium	Low	Low	Low	Low	
	10-100	Low	Low	Low	Low	Low	
	1-10	Low	Low	Low	Low	Low	
Medium		>1	High	Medium	Low	Low	Low
Low		>1	Medium	Low	Low	Low	Low

**Ecological Impacts**

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

## **Determining Risk of Dust Impacts**

### **Demolition**

<b>Sensitivity of Area</b>	<b>Dust Emission Magnitude</b>		
	<b>Large</b>	<b>Medium</b>	<b>Small</b>
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

### **Earthworks**

<b>Sensitivity of Area</b>	<b>Dust Emission Magnitude</b>		
	<b>Large</b>	<b>Medium</b>	<b>Small</b>
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

### **Construction**

<b>Sensitivity of Area</b>	<b>Dust Emission Magnitude</b>		
	<b>Large</b>	<b>Medium</b>	<b>Small</b>
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

### **Trackout**

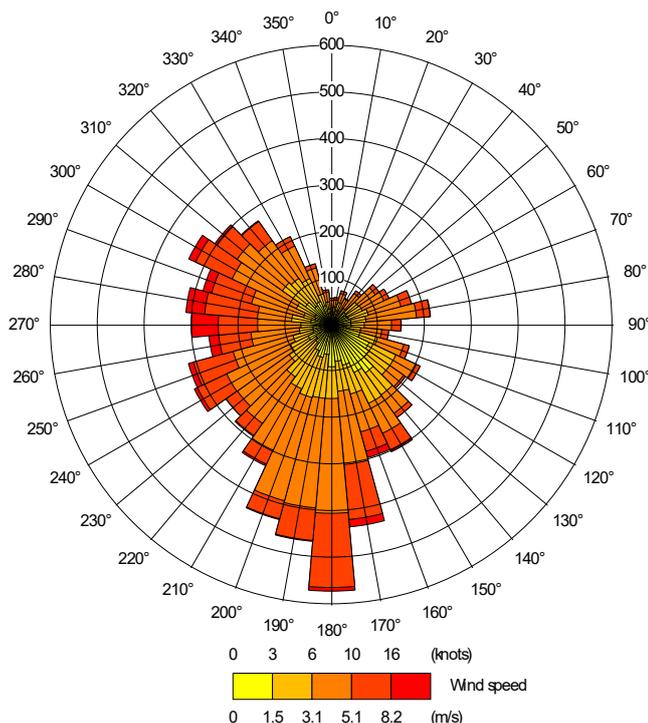
<b>Sensitivity of Area</b>	<b>Dust Emission Magnitude</b>		
	<b>Large</b>	<b>Medium</b>	<b>Small</b>
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible



## **APPENDIX 3 MODEL INPUTS AND RESULTS PROCESSING TOOLS**

Meteorological Data	2020 Hourly meteorological data from Rostherne Meteorological Station has been used in the model. The wind rose is shown overleaf.
ADMS	Version 5.0.0.1.
Time Varying Emission Factors	Based on Department for Transport statistics. Table TRA0307. Motor vehicle traffic distribution by time of day and day of the week on all roads, Great Britain: 2025.
Latitude	53.4°
Surface Roughness	A value of 0.5 for Parkland and Open Suburbia to represent the modelled area. A value of 0.3 for agricultural areas was used to represent the meteorological station site.
Minimum Monin-Obukhov length	A value of 10 for Small towns <50,000 was used to represent the represent the modelled area and meteorological station site.
Street Canyon	No canyons were included in the model.
Emission Factor Toolkit (EFT)	V10.1, August 2020.
NO <sub>x</sub> to NO <sub>2</sub> Conversion	NO <sub>x</sub> to NO <sub>2</sub> calculator version 8.1, May 2019. Traffic Mix All UK Traffic.
Background Maps	2018 reference year background maps

2020 Rostherne Meteorological Station Wind rose



## **APPENDIX 4 TRAFFIC DATA AND ROAD NETWORK**

Location	Speed (kph)	2025 Baseline		2025 With Development	
		AADT	%HDV	AADT	%HDV
Dunkirk Lane, east of Dunkirk Lane / School Lane Junction	48	7818	4	8232	4
Dunkirk Lane, west of Dunkirk Lane / School Lane Junction	48	7532	3	7705	3
Ulnes Walton Lane, south of Dunkirk Lane / School Lane Junction	32	5333	3	5920	3
Ulnes Walton Lane, north of Ulnes Walton Lane / Moss Lane Junction	64	4290	2	4877	2
Ulnes Walton Lane, south of Ulnes Walton Lane / Moss Lane Junction	64	4175	2	4920	2
Ulnes Walton Lane, north of A581 Southport Road / Ulnes Walton Lane Junction	64	4800	2	5545	2
A581 Southport Road , east of A581 Southport Road / Ulnes Walton Lane Junction	48	12540	4	13039	4
A581 Southport Road , west of A581 Southport Road / Ulnes Walton Lane Junction	48	9586	4	9831	4
Moss Lane, north of Ulnes Walton Lane / Moss Lane Junction	48	2340	3	3671	4
Moss Lane between existing HMP Garth Wymott Site Access and Proposed Prison Site Access	48	826	1	2077	4
Proposed Prison Site Access	25	0	0	1331	5
Moss Lane between Proposed Prison Site Access and Willow Road	32	826	1	746	1

\*estimated based on transport consultants, Atkins, data

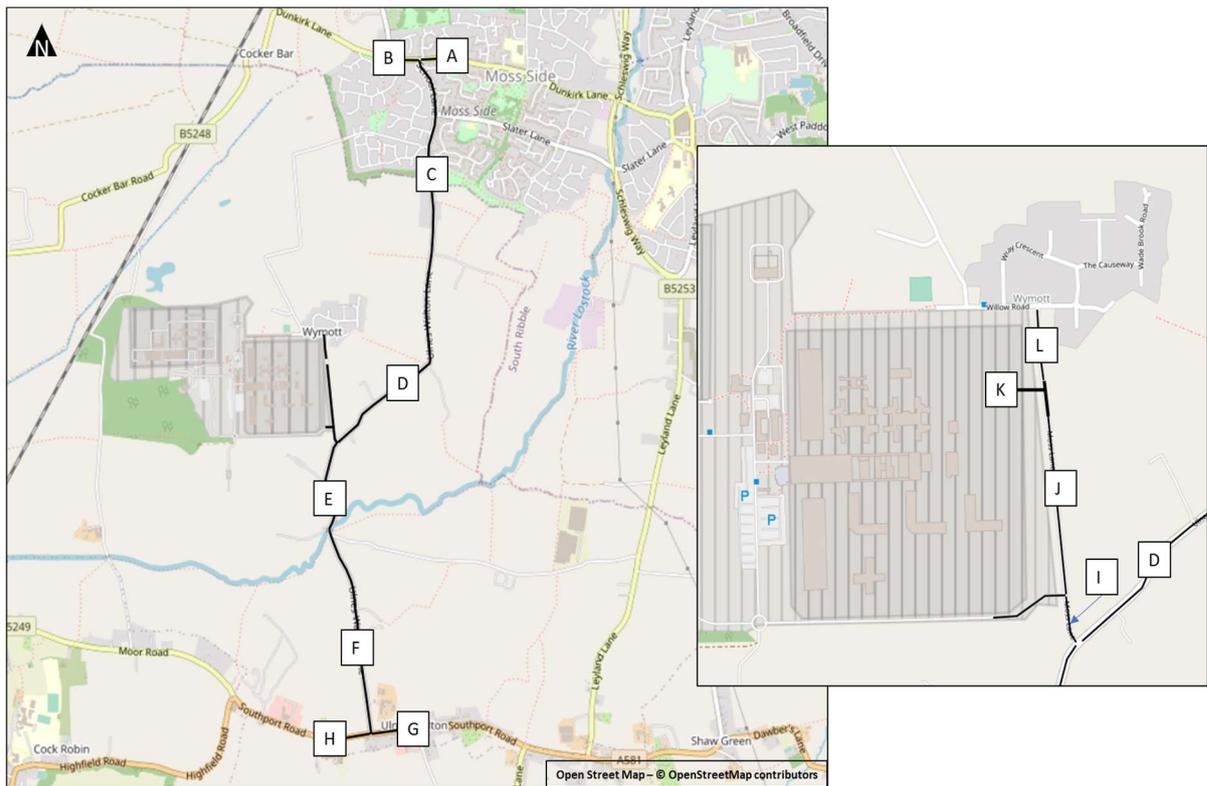


Figure A4.1: Modelled Road Network

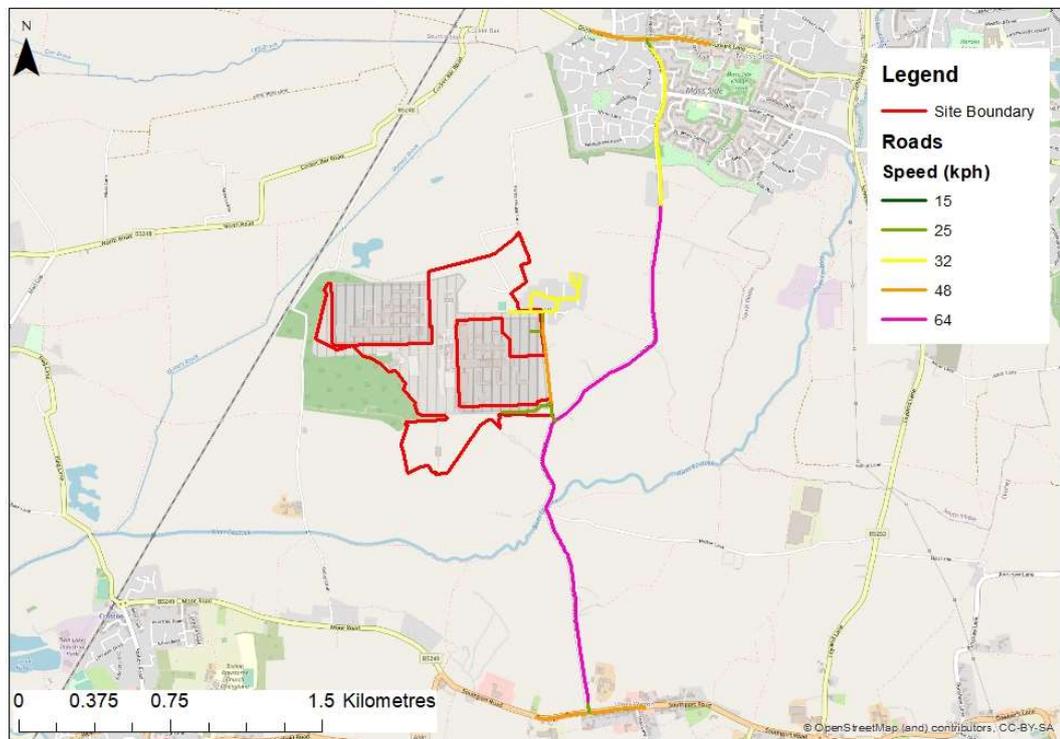


Figure A4.2: Modelled Road Network Speeds