FI Facilities Management Ltd

Oak Road, Wrexham

Air Quality Assessment

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Executive Summary

Bureau Veritas UK Ltd has been commissioned by FI Real Estate Management ("the Client") to undertake an Air Quality Assessment in support of a planning application for the proposed development of an 80,000sqft warehouse and associated office space at Oak Road, Wrexham Industrial Estate, Wrexham.. The proposed development site is a green eco-heritage zone and single employment unit with integral offices (for HIAB), new vehicular access, car and HGV parking, servicing and storage, landscaping, heritage and ecology mitigation and ancillary development.

Monitoring undertaken by the Wrexham County Borough Council shows concentrations of NO_2 were below the annual mean AQS objectives between 2019 and 2023 and the site is not within an existing AQMA. Defra's background maps estimate that background concentrations of NO_2, PM_{10} and $PM_{2.5}$ remain considerably lower than the annual mean AQS objectives for all pollutants for the baseline year of 2025.

The assessment has considered existing air quality conditions and potential air quality effects during the construction phase of the development. The assessment of dust and particulate effects from the construction phase of the development was subject to a qualitative assessment undertaken in line the Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction. The assessment carried out has shown that, providing effective mitigations are implemented, such as those outlined in Section 6.1 of this report, effects from dust emissions during the construction phase would be **not significant**.

The assessment of the operational phase impacts has been undertaken in accordance with Environmental Protection UK and the Institute of Air Quality Management Guidance 'Land-Use Planning and Development Control: Planning for Air Quality'. There is not expected to be a significant change in traffic movements as a result of the development, with fewer than 500 AADT daily movements anticipated, therefore there is not predicted to be any significant effect during the operational phase with regards to Air Quality, and no further mitigation is required.

Therefore, it is considered that the proposed development is appropriate for the Site**.**

1 INTRODUCTION

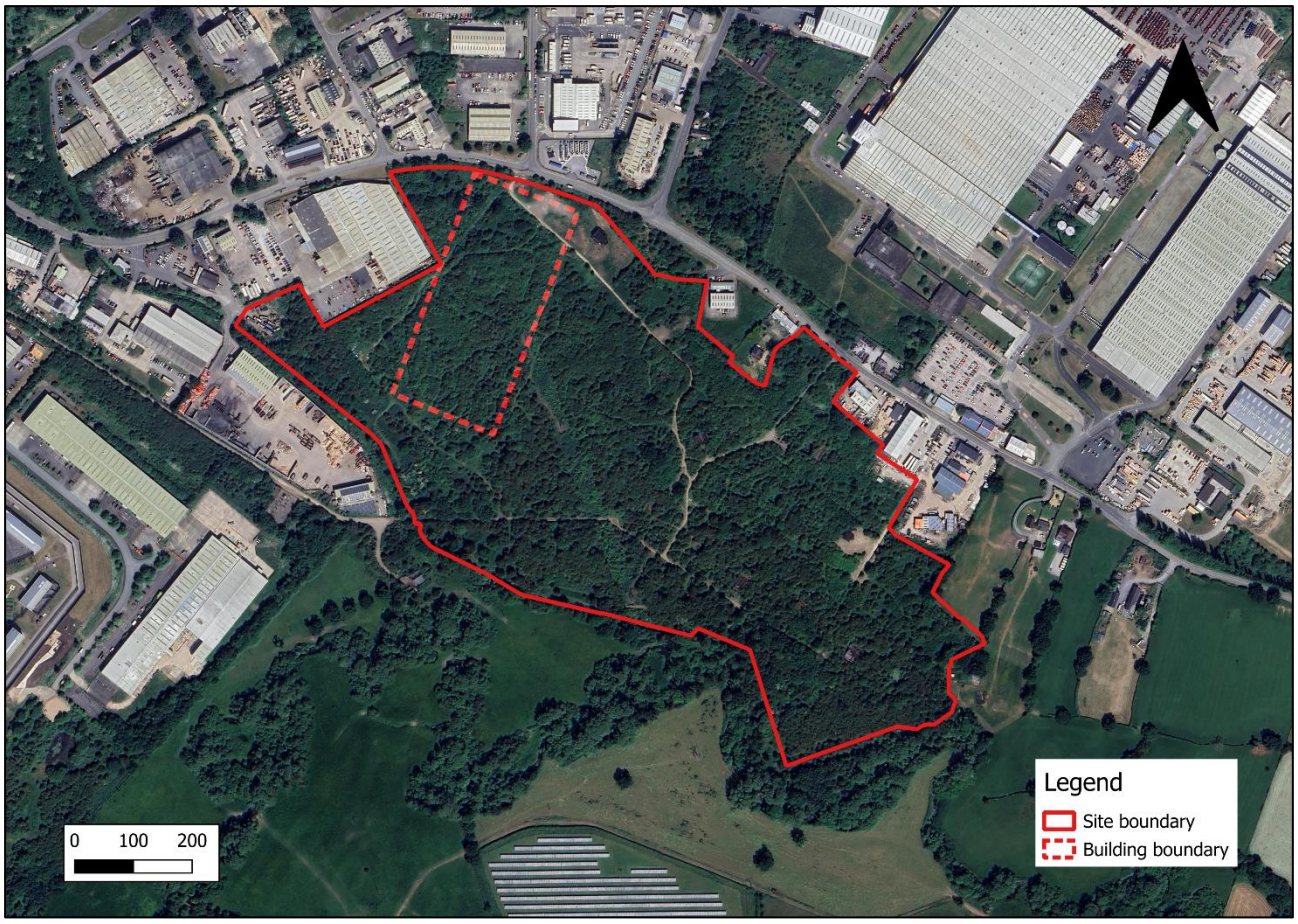
Bureau Veritas UK Ltd has been commissioned by FI Real Estate Management ("the Client") to undertake an air quality assessment in support of a planning application for the proposed development of a 80,000sqft warehouse and associated office space at Oak Road, Wrexham Industrial Estate, Wrexham, LL13 9RG.The site is situated on the southern edge of Wrexham Industrial Estate. Surrounding the site is further industrial development to the north and east, farmland to the south and industrial units and HMP Berwyn to the west.

The proposed development site is a green eco-heritage zone and single employment unit with integral offices (for HIAB), new vehicular access, car and HGV parking, servicing and storage, landscaping, heritage and ecology mitigation and ancillary development.

The purpose of this assessment is to determine any potential air quality impacts associated with the proposed development.

The Site location is illustrated in Figure 1.1 and a layout plan is provided in Appendix 2.

Figure 1.1 - Site Location



1.1 Scope of Assessment

The following are the main objectives of the assessment:

- To obtain and review the Council's latest statutory air quality reports and place them (and any relevant monitoring results) within the context of the proposed development;
- To assess any short-term impacts of the construction phase on sensitive receptors adjacent to the proposed construction activities;

- To assess any long-term impacts associated with the operational phase of the development; and,
- Determine appropriate controls during any construction works of the proposed development.

The purpose of the air quality assessment is to characterise existing air quality conditions in the area and to quantify the effect (if any) the development may have on these conditions and its impact upon existing receptor locations near to the Site.

The assessment covers the existing air quality conditions at the Site and the impact on air quality during the construction phase of the development through the emissions of dust and Particulate Matter (PM_{10}). It is understood that there is no intention to provide on-site energy generation, therefore this has not been considered as part of the assessment. Further general information in relation to these pollutants and urban pollution is provided in Appendix 1.

The assessment of potential impacts of dust and particulates during the construction phase was undertaken in line with the Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction[1]. The assessment of potential impacts on air quality during the operational phase of the development were undertaken in accordance with the IAQM/EPUK guidance[2] for planning in air quality.

[1] IAQM (2024). Guidance on the assessment of dust from demolition and construction, v2.2. Available at https://iaqm.co.uk/wp-content/uploads/2013/02/Construction-Dust-Guidance-Jan-2024.pdf

[2] IAQM (2017), Land-Use Planning & Development Control: Planning For Air Quality. Available at https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

2 RELEVANT LEGISLATION, POLICY AND GUIDANCE

2.1 Legislation and Policy

2.1.1 Legislation

The Air Quality Standards (Wales) Regulations 2010[3] set limit values for concentrations in outdoor air of major air pollutants.

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (Volume 1)[4], provides the over-arching strategic framework for air quality management in the UK and contains national air quality standards (AQS) and objectives (AQO) established by the UK Government and Devolved Administrations to protect human health.

In 2020, the Welsh Government published the Clean Air Plan for Wales[5]. This now replaces the 2007 National Air Quality Strategy for Wales in accordance with section 80 in the Environment Act 1995. The Clean Air Plan for Wales better reflects the current air quality situation and circumstances in Wales.

The AQS objectives apply at locations outside buildings or other natural or man-made structures above or below ground, where members of the public are regularly present and might reasonably be expected to be exposed to pollutant concentrations over the relevant averaging period. Typically, these include residential properties and schools/care homes for long-term (i.e., annual mean) pollutant objectives and streets or amenity areas for short-term (i.e., 1-hour) pollutant objectives. Table 2.1 taken from LAQM TG(22)[6], provides an indication of those locations that may or may not be relevant for each averaging period.

This assessment focuses on NO_2, PM_{10} and $PM_{2.5}$ as these are the pollutants of most concern within the UK. The AQS objectives for these pollutants are presented in Table 2.1.

Table 2.1 - Examples of where the AQS Objectives should 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 facades of residential properties, schools, hospitals, care homes etc.	Building facades 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. Kerbside sites (as opposed to locations at the building façade), or any other location where public exposure is expected to be short term
24-hour mean and 8-hour mean	All locations where the annual mean objectives would apply, together with hotels. Gardens or residential properties[1].	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 would apply. Kerbside sites (e.g. pavements of busy shopping streets). Those parts of car parks, bus stations and railway stations etc. which are not fully enclosed, where the public might reasonably be expected to spend one hour or more. Any outdoor locations at which the public may be expected to spend one hour or longer.	Kerbside sites where the public would not be expected to have regular access.

[3] The Air Quality Standards (Wales) Regulations (2010). Available at: https://www.gov.wales/sites/default/files/publications/2019-04/the-air-quality-standards-wales-regulations-2010.pdf
[4] Defra (2007) The air quality strategy for England, Scotland, Wales and Northern Ireland: Volume 1.
[5] The Clean Air Plan for Wales (2020) – Healthy Air, Healthy Wales.
[6] LAQM Technical Guidance LAQM TG(22) – August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.

Averaging Period	Objectives should apply at:	Objectives should generally not apply at:
15-minute mean	All locations where members of the public might reasonably be expected to spend a period of 15 minutes or longer.	

Notes:

[1] For gardens and playgrounds, such locations should represent parts of the garden where relevant public exposure is likely, for example where there is seating or play areas. It is unlikely that relevant public exposure would occur at the extremities of the garden boundary, or in front gardens, although local judgement should always be applied.

Table 2.2 - Relevant AQS Objectives for the Assessed Pollutants in Wales.

Pollutant	AQS Objective	Concentration Measured as:	Date for Achievement
Nitrogen Dioxide (NO_2)	200 µg/m³ not to be exceeded more than 18 times per year	1-hour mean	31 December 2005
	40 µg/m³	Annual mean	31 December 2005
Particulate Matter (PM_{10})	50 µg/m³ not to be exceeded more than 35 times per year	24-hour mean	1 January 2005
	40 µg/m³	Annual mean	1 January 2005
Particulate Matter ($PM_{2.5}$)	20 µg/m³	Annual Mean	1 January 2015

2.1.2 Local Air Quality Management (LAQM)

Part IV of the Environment Act 1995, amended in 2021[7] places a statutory duty on local authorities to periodically review and assess the current and future air quality within their area and determine whether they are likely to meet the AQS objectives set down by Government for a number of pollutants – a process known as LAQM. The AQS objectives that apply to LAQM are defined for seven pollutants: benzene, 1,3-butadiene, carbon monoxide, lead, nitrogen dioxide, sulphur dioxide and particulate matter.

Local Authorities are required to review concentrations of these pollutants annually. Where the AQS objectives are identified to be exceeded for any of these pollutants within this annual report, a local authority is required to define and declare an Air Quality Management Area (AQMA).

Where an authority has declared an AQMA, and development is proposed to take place either within or near the declared area, further deterioration to air quality resulting from a proposed development can be a potential barrier to gaining consent for the development proposal. Similarly, where a development would lead to an increase of the population within an AQMA, the protection of residents against the adverse long-term impacts of exposure to existing poor air quality can provide the barrier to consent.

2.1.3 Planning Policy Wales

The Planning Policy Wales (PPW)[8] sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. It states that the planning system should contribute towards the delivery of sustainable development and improve the social, economic, environmental and cultural well-being of Wales.

In specific relation to the air quality policy, the document states:

> *6.7.4. - 6.7.5 "The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at*

[7] Environment Act (2021), Part IV. Published by the UK Government. Available at:https://www.legislation.gov.uk/ukpga/2021/30/part/4/enacted
[8] Planning Policy Wales (2024), available at: Planning Policy Wales - Edition 12

least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes."

2.1.4 Local Plan

Wrexham County Borough Council adopted the Wrexham Local Development Plan (LDP)[9] on the 20th December 2023. The adopted LDP covers the period up to 2028 and forms part of the statutory development plan alongside Future Wales: The National Plan 2040. Policy DM1 – Development Management Considerations states that:

''Development proposals, where relevant, must:

[….]

iii. Safeguard the environment from the adverse effects of pollution of water, land,

noise, light or air, or land instability, arising from development […]''

The references made to air quality in Policy DM1 have informed this assessment.

2.2 Relevant Guidance

2.2.1 Air Quality Guidance for Construction Sites

There are a number of regulatory and legislative constraints in place to control pollution from construction and demolition activities. The Building Act 1984 and subsequent Building Regulations 2000 are in place to ensure the safety of people in and around the building during work. Part III of the Environmental Protection Act (EPA) 1990 identifies the emission of dust from construction sites as having the potential to be a statutory nuisance and requires its control under Section 80.

In December 2011, the IAQM published its 'Guidance on the assessment of dust from demolition and construction'[1] to assess the impact and the significance of any construction activities on air quality. The guidance was updated in 2024 to incorporate new evidence. The approach adopted in this assessment is based on adopting the methodology published in the 2024 version of the IAQM guidance.

2.2.2 Land-Use Planning & Development Control: Planning for Air Quality

Although no formal procedure exists for classifying the magnitude and significance of air quality effects from a new development, the EPUK and IAQM guidance document 'Land-Use Planning and Development Control: Planning for Air Quality'[10] provides a decision-making process which assists with the understanding or air quality impacts and implications as a result of development proposals.

[9] Wrexham County Borough Council Local Development Plan (2023). Available at: https://wrexham-consult.objective.co.uk/portal/adopted_wrexham_local_development_plan

[10] https://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf

3 BASELINE AIR QUALITY REVIEW

3.1 Local Air Quality Management

The Council has maintained a thorough annual review and assessment of air quality through their statutory reporting, as part of its obligations in Part IV of the Environment Act 1995 (as amended 2021)[7].

The most recent LAQM report published by Wrexham County Borough Council is the North Wales Authorities Collaborative Project 2024 Air Quality Progress Report (APR)[11] presenting monitoring data for 2023. The Council currently have no declared Air Quality Management Areas (AQMAs).

3.2 Review of Air Quality Monitoring

Annual mean NO_2 concentrations from 2019 to 2023 at monitoring locations nearest to the Site have been used to inform this assessment. Owing to the impact of the COVID-19 pandemic, the 2020 and 2021 data is not considered representative of typical conditions and long-term trends as a result of changes in vehicle use during the lockdown periods.

The NO_2 annual mean concentrations recorded at the nearest passive monitoring locations are presented in Table 3.1, and their locations are presented in Figure 3.1.

Annual mean NO_2 concentrations have shown to vary across the five-year period. Between 2019 and 2020, reductions in concentrations were observed at almost all sites which coincides with the COVID-19 lockdown period. In 2021, concentrations are shown to increase and remain relatively stable in 2022 and 2023. All diffusion tubes within 5km of the site are shown to monitor concentrations significantly below the annual average NO_2 objective.

Whilst there is no monitoring in close proximity to the site, given the low monitored conditions at local diffusion tubes and the situation of the Site away from any major junctions, it is not anticipated that any exceedances of the relevant objectives are experienced at the Site.

Table 3.1 - Annual Average NO_2 Monitoring Locations within 5km of the Site

Site ID	Coordinates		Distance from site (km)	NO_2 Annual Mean Concentration (µg/m^3)				
	X	Y		2019	2020	2021	2022	2023
60 - St Pauls School	340016	349982	1.4	7.7	6.8	7.4	5.8	6.0
59 - Cross Lanes	337541	346942	2.6	11.2	8.4	9.7	8.4	9.6
41 - Marchwiel	335407	347890	3.6	13.9	10.3	13.0	12.2	11.1
58 - St Annes School	334954	350090	4.0	12.7	10.5	10.7	9.7	11.8
42 - Llan-Y-Pwll	335359	352178	4.6	20.6	17.1	19.6	18.3	17.4
43 - Hightown	333966	349691	4.9	17.0	14.4	16.5	17.5	16.5
33 - Smithfield Road	333981	350171	4.9	15.6	19.3	21.0	17.4	17.6

[11] North Wales Authorities Collaborative Project 2023 Air Quality Progress Report. Available at: https://www.conwy.gov.uk/en/Resident/Environmental-problems/assets-Air-Quality/documents/NW-Annual-Progress-Report-2023.pdf

Figure 3.1 - Monitoring Locations Near to the Site



3.3 Background Concentrations

Defra maintain a nationwide model of existing and future background air quality concentrations at a 1 km x 1 km grid square resolution[12]. The data sets include annual average concentration estimates for NO_X, NO_2, PM_{10} and $PM_{2.5}$, using a reference year of 2021. The model used is semi-empirical in nature; it uses the national atmospheric emissions inventory (NAEI) emissions to model-predict the concentrations of pollutants at the centroid of each 1 km x 1 km grid square but then calibrates these concentrations in relation to actual monitoring data.

The estimated background concentrations for the proposed opening year (2025) are outlined in Table 3.2. Background values remain considerably lower than the annual mean AQS objectives for all pollutants during 2025.

Table 3.2 – 2025 Background Pollutant Concentrations

Year	Background Concentration (µg/m^3) *(Background concentrations taken from grid square;* 338500, 349500*)*		
	NO_2	PM_{10}	$PM_{2.5}$
2025	8.3	10.7	5.8
AQO (annual mean)	***40***	***40***	***25***

[12] UK AIR Background Mapping Tool. Available at: https://uk-air.defra.gov.uk/data/laqm-background-home

4 ASSESSMENT METHODOLOGY

The approach applied to this assessment has been based on the following:

- Assessment of the impacts from the proposed development's construction phase on air quality through emission of dust and particulates.
- Assessment of the potential impacts associated with the operational phase of the proposed development.

4.1 Construction Effects

The assessment of potential dust/PM_{10}/$PM_{2.5}$ effects in relation to the development's construction phase has been undertaken qualitatively in accordance with the IAQM guidance[1]. The guidance proposes a method to assess the significance of construction dust impacts by considering the annoyance due to dust soiling, as well as harm to ecological receptors and the risk of health effects due to significant increases to dust/PM_{10}/$PM_{2.5}$ concentrations.

Construction site activities are divided into four types to reflect their different potential impacts. These activities are:

- Demolition – an activity involved with the removal of any existing structure or structures;
- Earthworks – the processes of soil-stripping, ground-levelling, excavation, and landscaping;
- Construction – an activity involved in the provision of a new structure; and
- Trackout – the transport of dust and dirt from the site onto the public road network. This arises when lorries leave site with dusty materials or transfer dust and dirt onto the road having travelled over muddy ground on-site.

An assessment is required where a sensitive human receptor is located within 250 m from the site boundary and/or within 50 m of the routes used by vehicles on the public highway, up to 250 m from the site entrances. There are places of work and related car parking positioned within 20m of the proposed development Site boundary as well as residential dwellings within 250m. As such, a construction dust assessment is required to consider impacts associated with demolition, earthworks, construction and trackout.

An assessment is also required where ecologically sensitive receptors are located within 50 m of the site boundary and/or 50 m of the routes used by vehicles on the public highway, up to 500 m from the site entrances. In accordance with the IAQM methodology, these are defined as legislatively protected areas such as Sites of Special Scientific Interest (SSSI) and Special Areas of Conservation (SAC). According to Defra's Magic Maps natural environment mapping tool, the nearest ecologically sensitive receptor, River Dee and Bala Lake, is located more than 50m from the Site and more than 50m from the nearest Site access route. Therefore, further assessment is not required.

The first step of the detailed assessment is to assess the risk of dust impacts. This is undertaken separately for each of the four activities (demolition, earthworks, construction and trackout) and takes account of:

- The scale and nature of the works, which determines the potential dust emission magnitude as small, medium, or large;and
- The sensitivity of the area to dust impacts, which is defined as low, medium, or high sensitivity.

These two factors are combined to give an estimate of the risk of dust impacts occurring with no mitigation applies. Risks are described in terms of there being a low, medium, or high risk of dust impact; the risk category assigned to the site can be different for each of the four potential activities (demolition, earthworks, construction, and trackout). Where there are low, medium, or high risks of an impact, then site specific mitigation will be required, proportionate to the level of risk.

Based on the threshold criteria and professional judgment, one or more of the groups of activities may be assigned a 'negligible' risk. Such cases could arise, for example, because the scale is very small and there are no receptors near to the activity.

Site-specific mitigation for each of the four potential activities is then determined based on the risk of dust impacts identified. Where a local authority has issued guidance on measures to be adopted at demolition/construction sites, these should also be taken into account. Professional judgment is employed to examine the residual dust effects assuming mitigation to determine whether or not they are significant.

Given the short-term nature of the construction phase and the comparatively low volume of vehicle movements that will likely arise, there is not considered to be any potential for significant air quality effects from development related road traffic NO_2 emissions during the construction phase. Such potential impacts have therefore been scoped out from requiring detailed assessment based on their negligible impact.

4.2 Operational Effects

The assessment of air quality effects in relation to the development's operational phase has been initially undertaken qualitatively in accordance with the EPUK/IAQM Guidance.

As part of the impact of the proposed development on the local area, a two staged assessment is recommended as per EPUK/IAQM guidance:

- Stage 1: Determines the need for an air quality assessment and requires any of the criteria under (A) coupled with any of the criteria under (B) in Table 4.1 to proceed to Stage 2.
- Stage 2: Where an assessment is deemed to be required, this may take the form of a simple qualitative assessment or a more detailed dispersion modelling assessment. The level of air quality assessment required is determined by the criteria in **Table 4.2**.

Table 4.1 – Stage 1 Criteria to Proceed to Stage 2

Criteria to Proceed to Stage 2
1. If any of the following apply: ▪ 10 or more residential units or a site area of more than 0.5ha ▪ More than 1,000m^2 floor space for all other uses or a site greater than 1ha
2. Coupled with any of the following: ▪ The development has more than 10 parking spaces; or ▪ The development will have a centralised energy facility or other centralised combustion process.

Table 4.2 – Indicative Criteria for Requiring an Air Quality Assessment

The Development Will	Indicative Criteria to Proceed to an Air Quality Assessment
1. Cause a significant change in Light Duty Vehicle (LDV) traffic slows on local roads with relevant receptors	A change of LDV flows of: - more than 100 Annual Average Daily Traffic (AADT) within or adjacent to an AQMA - more than 500 AADT elsewhere.
2. Cause a significant change in Heavy Duty Vehicle (HDV) flows on local roads with relevant receptors.	A change of HDV flows of: - more than 25 AADT within or adjacent to an AQMA - more than 100AADT elsewhere
3. Realign roads, i.e. changing the proximity of receptors to traffic lanes.	Where the change is 5m or more and the road is within an AQMA
4. Introduce a new junction or remove an existing junction near to relevant receptors.	Applies to junctions that cause traffic to significantly change vehicle accelerate/decelerate, e.g. traffic lights, or roundabouts.

5. Introduce or change a bus station.	Where bus flows will change by: - more than 25 AADT within or adjacent to an AQMA - more than 100 AADT elsewhere.
6. Have an underground car park with extraction system.	The ventilation extract for the car park will be within 20m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).
7. Have one or more substantial combustion processes.	Where the combustion unit is: - any centralised plant using biofuel - any combustion plant with single or combined thermal input >300kWh - a standby emergency generator associated with a centralised energy centre (if likely to be tested/used >18 hours a year).
8. Have a combustion process of any size.	Where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way or their size and/or height.

5 ASSESSMENT RESULTS

5.1 Construction Phase – Dust/PM_{10} Emissions

This assessment of dust/PM_{10}/$PM_{2.5}$ presents the effects which are likely to be relevant both prior to and following the use of the appropriate mitigation measures on-site. As per the IAQM guidance, the risk associated with the site to potentially generate dust/PM_{10}/$PM_{2.5}$ is identified. Potential unmitigated effects at receptor locations are determined, and site-specific recommendations are then made to ensure residual dust/PM_{10}/$PM_{2.5}$ effects associated with the construction phase are not significant.

The assessment of construction dust will focus on dust arising from the four relevant dust producing construction activities outlined in the IAQM guidance (demolition, earthworks, construction and trackout). Within this assessment, a site area of 27,000m^2 has been used which covers the area in which the warehouse unit will be developed as this is considered the area of concern with regards to construction.

Demolition

No building demolition is required and therefore this has not been considered further.

Earthworks

Potential sources of impacts associated with earthworks/ground preparation activities include fugitive dust/PM_{10}/$PM_{2.5}$ emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements and wind action. The total site area is approximately 27,000 m^2. The dust emission magnitude for earthworks is therefore considered to be **Medium**.

Construction

Potential sources of impacts associated with construction activities include fugitive dust/PM_{10}/$PM_{2.5}$ emissions resulting from disturbance of dusty materials by construction plant, the construction materials used, vehicle movements and wind action. Activities at the proposed development will comprise the construction of one large unit. The total area of the proposed development site is approximately 27,000 m^2. The total volume of the proposed development is below 75,000 m^3. The dust emission magnitude for construction is therefore considered to be **Medium**.

Trackout

Dust emissions associated with trackout may occur from the transport of dust and dirt from the construction site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. The number of predicted outward HDV (i.e., >3.5 tonne) movements in any one day is likely to be between 20 and 50, the approximate unpaved on-site road length is expected to be 50-100m. The dust emission magnitude for trackout is therefore considered to be **Medium**.

Summary

A summary of the dust emission magnitude for the relevant activities is detailed in Table 5.1.

Table 5.1 - Construction Dust Emission Magnitude

Source	Dust Emission Magnitude
Earthworks	Medium
Construction	Medium
Trackout	Medium

Sensitivity of the Area

As the proposed development is located within an existing industrial estate, there are around 40 medium sensitivity receptors located within 200 m of the development, to the north, east and west of the Site. The sensitivity of the area with respect to dust soiling effects on people and property resulting from earthworks, construction and trackout is therefore **Low.**

The existing maximum background PM_{10} concentration is 10.6 µg/m^3 which is below the AQS annual mean objective of 40 µg/m^3. Given the above information regarding the number of receptors within 200 m of the site boundary, the sensitivity of the area with respect to human health impacts in relation to earthworks, construction and trackout is therefore **Low**.

A summary of the sensitivity of the surrounding area is detailed in Table 5.2 below. According to Defra's Magic Maps natural environment mapping tool[13], the nearest ecologically sensitive receptor (River Dee and Bala Lake) is located more than 50 m from the development site and more than 50 m from the nearest road used for trackout. Therefore, the assessment of ecological receptors is not required.

Table 5.2 - Sensitivity of the Surrounding Area

Potential Impact	Sensitivity of the Surrounding Area		
	Earthworks	Construction	Trackout
Dust Soiling	Low	Low	Low
Human Health	Low	Low	Low

Risk of Dust Impacts

The risk of dust impacts is defined using Tables 6, 7, 8 and 9 in the IAQM guidance, for earthworks, construction and trackout respectively. The dust emission magnitude classes in Table 5.1 combined with the sensitivity of the surrounding area classes in Table 5.2, result in the site risk categories as shown in Table 5.3.

Table 5.3 - Summary of Dust Risk

Potential Impact	Risk		
	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	Low Risk	Low Risk
Human Health	Low Risk	Low Risk	Low Risk

Following the construction dust assessment, without mitigation measures in place, the development Site is found to be **Low Risk** in relation to earthworks, construction and trackout, as summarised in Table 5.3 for Dust Soiling and Human Health.

Providing mitigation measures outlined in Section 6 are implemented, construction dust impacts are considered to be **Not Significant**.

5.2 Operational Phase

There is the potential for an increase in vehicle movements on the local road network as a result of the proposed development. As such, anticipated daily vehicle movements were provided by the Transport Consultants for the development, Prime Transport Planning (Table 5.4). An evaluation of the proposed development against the EPUK/IAQM criteria is outlined within Table 5.5 below.

Table 5.4 - Proposed Operational Phase Vehicle Movements in AADT

LDVs	HDVs	Total Vehicles
372	45	414

[13] DEFRA Magic Maps Tool. Available at: https://magic.defra.gov.uk/

Table 5.5 - Evaluation of the Proposed Operational Impacts in Relation to EPUK/IAQM Criteria

Indicative Criteria to Proceed to an Air Quality Assessment	Evaluation of the Potential Operational Impacts of the Proposed Development
A change of LDV* flows of: ▪ more than 100 AADT within or adjacent to an AQMA ▪ more than 500 AADT elsewhere	It is predicted that there will be less than 500 LDV trips per day and less than 100 HDV trips per day (see Table 5.4). Therefore, it is not anticipated there will be a significant change in vehicle emissions as a result of the development.
A change of HDV** flows of: ▪ more than 25 AADT within or adjacent to an AQMA ▪ more than 100 AADT elsewhere	
Road realignment, where the change is 5 m or more and the road is within an AQMA	No change of road realignment expected.
Introduction of a new junction or the removal of an existing junction near to relevant receptors. This applies to junctions that cause traffic to significantly change vehicle accelerate/ decelerate, e.g. traffic lights or roundabouts	No junction is expected to be introduced.
Introduction or change of a bus station, where bus flows will change by: ▪ more than 25 AADT within or adjacent to an AQMA ▪ more than 100 AADT elsewhere	The introduction or changes to a bus station are not proposed.
Have an underground carpark with extraction system, where the ventilation extract for the car park will be within 20 m of a relevant receptor. Coupled with the car park having more than 100 movements per day (total in and out).	No underground carpark proposed.
Having one or more substantial combustion process, where the combustion unit it: ▪ any centralised plan using biofuel ▪ any combustion plant with single or combined thermal input > 300kWh ▪ a standby emergency generator associated with a centralised energy centre (is likely to be tested/used > 18 hours a year).	No such plant proposed.
Have a combustion process of any size, where the pollutants are exhausted from a vent or stack in a location and at a height that may give rise to impacts at receptors through insufficient dispersion. This criterion is intended to address those situations where a new development may be close to other buildings that could be residential and/or which could adversely affect the plume's dispersion by way of their size and/or height.	No such plant proposed.
**LDV – Light Duty Vehicle* ***HDV – Heavy Duty Vehicle*	

As outlined within Table 5.5, none of the indicative criteria to proceed to a detailed air quality assessment are met.

The impacts of additional vehicle movements associated with the proposed development on air quality are considered to be **not significant**.

Given the existing baseline review completed around the assessment site which showed that levels were below relevant air quality objectives, it is not anticipated that new receptors will be introduced into an area of poor air quality.

6 RECOMMENDED MITIGATION MEASURES

As discussed in Section 5, without mitigation measures, construction impacts associated with the proposed development would result in the generation of dust and PM_{10}. The implementation of best practice mitigation measures during the construction phase would ensure that dust impacts remain negligible.

The IAQM guidance outlines a number of site-specific mitigation measures based on the assessed site risk. The measures are grouped into those which are highly recommended and those which are desirable.

6.1 Short-term Impacts during Construction – Dust/PM_{10} Emissions

As discussed in Section 5, without mitigation measures, construction impacts associated with the proposed development would result in the generation of dust and PM_{10}. The implementation of best practice mitigation measures during the construction phase would ensure that dust impacts remain negligible.

The IAQM guidance outlines a number of site-specific mitigation measures based on the assessed site risk. The measures are grouped into those which are highly recommended and those which are desirable.

As the site is classed as **Low Risk** the following general mitigation measures are highly recommended:

With respect to communications:

- 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.

With respect to site management:

- 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.

With respect to monitoring:

- 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.

With respect to preparing and maintaining the site:

- 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.
- Avoid site runoff of water or mud.

With respect to operating vehicle/machinery and sustainable travel:

- 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.

With respect to operations:

- 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.

With respect to waste management:

- Avoid bonfires and burning of waste materials.

Additionally as the site is classed as **low risk** the following mitigation measures are desirable:

With respect to communications:

- 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.

With respect to monitoring:

- 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 windowsills within 100m of site boundary, with cleaning to be provided if necessary.

With respect to preparing and maintaining the 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.
- 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.

With respect to operating vehicle/machinery and sustainable travel:

- Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).

With respect to operations:

- 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.

As the site is classed as **low risk** for construction the following mitigation measures are desirable:

- Avoid scabbling (roughening of concrete surfaces) if possible.
- 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.

As the site is classed as **low risk** for trackout the following mitigation measures are desirable:

- 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.
- Record all inspections of haul routes and any subsequent action in a site log book.
- Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).

With the inclusion of the above mitigation measures the impact of construction dust will be **not significant**.

7 CONCLUSIONS

Bureau Veritas UK Ltd has been commissioned by FI Real Estate Management ("the Client") to undertake an Air Quality Assessment in support of a planning application for the proposed development of an 80,000sqft warehouse and associated office space at Oak Road, Wrexham Industrial Estate, Wrexham.. The proposed development site is a green eco-heritage zone and single employment unit with integral offices (for HIAB), new vehicular access, car and HGV parking, servicing and storage, landscaping, heritage and ecology mitigation and ancillary development.

Monitoring undertaken by the Wrexham County Borough Council shows concentrations of NO_2 were below the annual mean AQS objectives between 2019 and 2023 and the site is not within an existing AQMA. Defra's background maps estimate that background concentrations of NO_2, PM_{10} and $PM_{2.5}$ remain considerably lower than the annual mean AQS objectives for all pollutants for the baseline year of 2025.

The assessment has considered existing air quality conditions and potential air quality effects during the construction phase of the development. The assessment of dust and particulate effects from the construction phase of the development was subject to a qualitative assessment undertaken in line the Institute of Air Quality Management (IAQM) Guidance on the assessment of dust from demolition and construction. The assessment carried out has shown that, providing effective mitigations are implemented, such as those outlined in Section 6.1 of this report, effects from dust emissions during the construction phase would be **not significant**.

The assessment of the operational phase impacts has been undertaken in accordance with Environmental Protection UK and the Institute of Air Quality Management Guidance 'Land-Use Planning and Development Control: Planning for Air Quality' . There is not expected to be a significant change in traffic movements as a result of the development, with fewer than 500 AADT daily movements anticipated, therefore there is not predicted to be any significant effect during the operational phase with regards to Air Quality, and no further mitigation is required.

Therefore, it is considered that the proposed development is appropriate for the Site**.**

Appendices

Appendix 1 – Background to Air Quality

Emissions from road traffic contribute significantly to ambient pollutant concentrations in urban areas. The main constituents of vehicle exhaust emissions produced by fuel combustion are carbon dioxide (CO_2) and water vapour (H_2O). However, combustion engines are not 100% efficient and partial combustion of fuel results in emissions of a number of other pollutants, including carbon monoxide (CO), particulate matter (PM), Volatile Organic Compounds (VOCs) and hydrocarbons (HC). For HC, the pollutants of most concern are 1,3 - butadiene (C_4H_6) and benzene (C_6H_6). In addition, some of the nitrogen (N) in the air is oxidised under the high temperature and pressure during combustion; resulting in emissions of oxides of nitrogen (NO_X). NO_X emissions from vehicles predominately consist of nitrogen oxide (NO), but also contain nitrogen dioxide (NO_2). Once emitted, NO can be oxidised in the atmosphere to produce further NO_2.

The quantities of each pollutant emitted depend upon a number of parameters; including the type and quantity of fuel used, the engine size, the vehicle speed, and the type of emissions abatement equipment fitted. Once emitted, these pollutants disperse in the air. Where there is no additional source of emission, pollutant concentrations generally decrease with distance from roads, until concentrations reach those of the background.

This air quality assessment focuses on NO_2 and PM_{10} (PM of aerodynamic diameter less than 10µm) as these pollutants are least likely to meet their respective Air Quality Strategy (AQS) objectives near roads. This has been confirmed over recent years by the outcome of the Local Air Quality Management (LAQM) regime. The most recent statistics[14] regarding Air Quality Management Areas (AQMAs) show that approximately 650 AQMAs are declared in the UK. The majority of existing AQMAs have been declared in relation to road traffic emissions.

In line with these results, the reports produced by the Council under the LAQM regime have confirmed that road traffic within their administrative area is the main issue in relation to air quality.

An overview of these two pollutants, briefly describing the sources and processes influencing the ambient concentrations, is presented below.

Particulate Matter (PM_{10})

Particulate matter is a mixture of solid and liquid particles suspended in the air. There are a number of ways in which airborne PM may be categorised. The most widely used categorisation is based on the size of particles such as $PM_{2.5}$, particles of aerodynamic diameter less than 2.5µm (micrometre = 10^{-6} metre), and PM_{10}, particles of aerodynamic diameter less than 10µm. Generically, particulate residing in low altitude air is referred to as Total Suspended Particulate (TSP) and comprises coarse and fine material including dust.

Particulate matter comprises a wide range of materials arising from a variety of sources. Examples of anthropogenic sources are carbon (C) particles from incomplete combustion, bonfire ash, recondensed metallic vapours, and secondary particles (or aerosols) formed by chemical reactions in the atmosphere. As well as being emitted directly from combustion sources, man-made particles can arise from mining, quarrying, demolition, and construction operations, from brake and tyre wear in motor vehicles and from road dust resuspension from moving traffic or strong winds. Natural sources of PM include wind-blown sand and dust, forest fires, sea salt and biological particles such as pollen and fungal spores.

The health impacts from PM depend upon size and chemical composition of the particles. For the purposes of the AQS objectives, PM_{10} or $PM_{2.5}$ is solely defined on size rather than chemical composition. This enables a uniform method of measurement and comparison. The short and long-term exposure to PM has been associated with increased risk of lung and heart diseases.PM may also carry surface-absorbed carcinogenic compounds. Smaller PM have a greater likelihood of

[14] Statistics from the UK AIR website available at https://uk-air.defra.gov.uk/aqma/summary – Figures as of November 2019

penetrating the respiratory tract and reaching the lung to blood interface and causing the above adverse health effects.

In the UK, emissions of PM_{10} have declined significantly since 1980, and were estimated to be 114kt (kilotonne) in 2010[15]. Residential / public electricity and heat production and road transport are the largest sources of PM_{10} emissions. The road transport sector contributed 22% (25kt) of PM_{10} emissions in 2010. The main source within road transport is brake and tyre wear.

It is important to note that these estimates only refer to primary emissions, that is, the emissions directly resulting from sources and processes and do not include secondary particles. These secondary particles, which result from the interaction of various gaseous components in the air such as ammonia (NH_3), sulphur dioxide (SO_2) and NO_X, can come from further afield and impact on the air quality in the UK and vice versa.

Similarly to PM_{10}, emissions of $PM_{2.5}$ have declined since 1970, and were estimated to be 67kt in 2010, which makes over 58% of PM_{10} emissions. In 2010, the road transport sector emitted 28% (18kt) of the total $PM_{2.5}$ emissions in the UK.

Nitrogen Oxides (NO_X)

NO and NO_2, collectively known as NO_X, are produced during the high temperature combustion processes involving the oxidation of N. Initially, NO_X is mainly emitted as NO, which then undergoes further oxidation in the atmosphere, particularly with ozone (O_3), to produce secondary NO_2. Production of secondary NO_2 could also be favoured due to a class of compounds, VOCs, typically present in urban environments, and under certain meteorological conditions, such as hot sunny days and stagnant anti-cyclonic winter conditions.

Of NO_X, it is NO_2 that is associated with health impacts. Exposure to NO_2 can bring about reversible effects on lung function and airway responsiveness. It may also increase reactivity to natural allergens, and exposure to NO_2 puts children at increased risk of respiratory infection and may lead to poorer lung function in later life.

In the UK, emissions of NO_X have decreased by 62% between 1990 and 2010. For 2010, NO_X (as NO_2) emissions were estimated to be 1,106kt. The transport sector remained the largest source of NO_X emissions with road transport contribution 34% to NO_X emissions in 2010.

[15] National Atmospheric Emissions Inventory (NAEI) Summary Emission Estimate Datasets 2010. March 2012

Appendix 2 – Site Layout Plan

