Air Quality Assessment:
Proposed Fuel Oil Storage Depot, Cherwell

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Experts in air quality management & assessment

Document Control

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Contents

1 Introduction

1.1 This report describes the potential air quality impacts associated with the proposed fuel oil storage depot on a brownfield site at Horton Grounds Quarry, near Shenington, in Cherwell. The assessment has been carried out by Air Quality Consultants Ltd on behalf of James Martindale Consultancy.

1.2 The proposed fuel oil storage depot will consist of a storage facility for fuel oils: kerosene and diesel. The proposals also include a single storey office building and associated staff and visitor car parking (19 spaces including one blue-badge holder parking space). The development will lead to changes in vehicle flows on local roads, which may impact on air quality at existing residential properties; the main air pollutants of concern related to road traffic emissions are nitrogen dioxide and fine particulate matter (PM_{10} and $PM_{2.5}$). There is also potential the release for fugitive emissions from the storage of fuel oil on-site, which have also been assessed.

1.3 This report considers the suitability of the site for its proposed use. This report has been prepared taking into account relevant local and national guidance and regulations.

2 Policy Context and Assessment Criteria

2.1 The United Kingdom formally left the European Union (EU) on 31 January 2020; until the end of 2020 there will be a transition period while the UK and EU negotiate additional arrangements. During this period EU rules and regulations will continue to apply to the UK. All European legislation referred to in this report is written into UK law and will remain in place beyond 2020, unless amended, although there is uncertainty at this point in time as to who will enforce the requirements of some of this legislation.

Road Traffic

Air Quality Strategy

2.2 The Air Quality Strategy (Defra, 2007) published by the Department for Environment, Food, and Rural Affairs (Defra) and Devolved Administrations, provides the policy framework for air quality management and assessment in the UK. It provides air quality standards and objectives for key air pollutants, which are designed to protect human health and the environment. It also sets out how the different sectors: industry, transport and local government, can contribute to achieving the air quality objectives. Local authorities are seen to play a particularly important role. The strategy describes the Local Air Quality Management (LAQM) regime that has been established, whereby every authority has to carry out regular reviews and assessments of air quality in its area to identify whether the objectives have been, or will be, achieved at relevant locations, by the applicable date. If this is not the case, the authority must declare an Air Quality Management Area (AQMA), and prepare an action plan which identifies appropriate measures that will be introduced in pursuit of the objectives.

Clean Air Strategy 2019

2.3 The Clean Air Strategy (Defra, 2019) sets out a wide range of actions by which the UK Government will seek to reduce pollutant emissions and improve air quality. Actions are targeted at four main sources of emissions: Transport, Domestic, Farming and Industry. At this stage, there is no straightforward way to take account of the expected future benefits to air quality within this assessment.

Reducing Emissions from Road Transport: Road to Zero Strategy

2.4 The Office for Low Emission Vehicles (OLEV) and Department for Transport (DfT) published a Policy Paper (DfT, 2018) in July 2018 outlining how the government will support the transition to zero tailpipe emission road transport and reduce tailpipe emissions from conventional vehicles during the transition. This paper affirms the Government's pledge to end the sale of new conventional petrol and diesel cars and vans by 2040, and states that the Government expects the majority of new cars and vans sold to be 100% zero tailpipe emission and all new cars and vans to have significant zero

tailpipe emission capability by this year, and that by 2050 almost every car and van should have zero tailpipe emissions. It states that the Government wants to see at least 50%, and as many as 70%, of new car sales, and up to 40% of new van sales, being ultra-low emission by 2030.

2.5 The paper sets out a number of measures by which Government will support this transition, but is clear that Government expects this transition to be industry and consumer led. The Government has since announced *"plans to bring forward an end to the sale of new petrol and diesel cars and vans to 2035, or earlier if a faster transition is feasible, subject to consultation, as well as including hybrids for the first time"*. If these ambitions are realised then road traffic-related NOx emissions can be expected to reduce significantly over the coming decades.

Planning Policy

National Policies

2.6 The National Planning Policy Framework (NPPF) (2019a) sets out planning policy for England. It states that the purpose of the planning system is to contribute to the achievement of sustainable development, and that the planning system has three overarching objectives, one of which is 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".

2.7 To prevent unacceptable risks from air pollution, the NPPF states that:

"Planning policies and decisions should contribute to and enhance the natural and local environment by…preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air quality".

and

"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".

2.8 More specifically on air quality, the NPPF makes clear 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".

2.9 The NPPF is supported by Planning Practice Guidance (PPG) (Ministry of Housing, Communities & Local Government, 2019b), which includes guiding principles on how planning can take account of the impacts of new development on air quality. The PPG states that:

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

2.10 Regarding plan-making, the PPG states:

"It is important to take into account air quality management areas, Clean Air Zones and other areas including sensitive habitats or designated sites of importance for biodiversity where there could be specific requirements or limitations on new development because of air quality".

2.11 The role of the local authorities through the LAQM regime is covered, with the PPG stating that a local authority Air Quality Action Plan "*identifies measures that will be introduced in pursuit of the objectives and can have implications for planning*".

2.12 Regarding the need for an air quality assessment, the PPG states that:

"Whether air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to have an adverse effect on air quality in areas where it is already known to be poor, particularly if it could affect the implementation of air quality strategies and action plans and/or breach legal obligations (including those relating to the conservation of habitats and species). Air quality may also be a material consideration if the proposed development would be particularly sensitive to poor air quality in its vicinity".

2.13 The PPG sets out the information that may be required in an air quality assessment, making clear that:

"Assessments need to be proportionate to the nature and scale of development proposed and the potential impacts (taking into account existing air quality conditions), and because of this are likely to be locationally specific".

2.14 The PPG also provides guidance on options for mitigating air quality impacts, as well as examples of the types of measures to be considered. It makes clear that:

"Mitigation options will need to be locationally specific, will depend on the proposed development and need to be proportionate to the likely impact. It is important that local planning authorities work with applicants to consider appropriate mitigation so as to ensure new development is appropriate for its location and unacceptable risks are prevented".

Local Policies

2.15 Cherwell District Council, along with the five other Oxfordshire local authorities, have committed to producing a joint statutory spatial plan (JSSP) known as the Oxfordshire Plan 2050.The plan is anticipated to be adopted by 31st March 2021.

2.16 The Adopted Cherwell Local Plan 2011-2031 (Cherwell District Council, 2015) was adopted by Cherwell District Council in July 2015. This plan contains the following two relevant policies:

- Policy ESD 10 'Protection and Enhancement of Biodiversity and the Natural Environment' states that "*Protection and enhancement of the natural environment will be achieved by…air quality assessments will also be required for development proposals that would be likely to have a significant adverse impact on biodiversity by generating an increase in air pollution…*"; and
- Policy ESD 15 'The Character of the Built and Historic Environment' states that "*…New development proposals should:…Integrate and enhance green infrastructure and incorporate biodiversity enhancement features where possible…Well designed landscape schemes should be an integral part of the development proposals to support improvements to…air pollution…*".

Air Quality Action Plans

National Air Quality Plan

2.17 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017a); a supplement to the 2017 Plan (Defra, 2018a) was published in October 2018 and sets out the steps Government is taking in relation to a further 33 local authorities where shorter-term exceedances of the limit value were identified. Alongside a package of national measures, the 2017 Plan and the 2018 Supplement requires those identified English Local Authorities (or the GLA in the case of London Authorities) to produce local action plans and/or feasibility studies. These plans and feasibility studies must have regard to measures to achieve the statutory limit values within the shortest possible time, which may include the implementation of a CAZ. There is currently no straightforward way to take account of the effects of the 2017 Plan or 2018 Supplement in this assessment; however, consideration has been given to whether there is currently, or is likely to be

in the future, a limit value exceedance in the vicinity of the proposed development. This assessment has principally been carried out in relation to the air quality objectives, rather than the EU limit values that are the focus of the Air Quality Plan.

Local Air Quality Action Plan

2.18 Cherwell District Council has declared four AQMAs for exceedances of the annual mean and nitrogen dioxide objective (one of which is also declared for exceedances of the 1-hour mean nitrogen dioxide objective); all of these AQMAs are located some distance from the proposed development. The Council has since developed an Air Quality Action Plan (Cherwell District Council, 2017); this plan outlines actions to be undertaken by the Council to improve air quality in Cherwell between 2017 and 2020. The actions developed fall under the following five topics:

- policy, guidance and development control;
- promoting low emission transport;
- promoting travel alternatives to private vehicle use;
- transport planning and infrastructure; and
- public information.

Assessment Criteria

2.19 The Government has established a set of air quality standards and objectives to protect human health. The 'standards' are set as concentrations below which effects are unlikely even in sensitive population groups, or below which risks to public health would be exceedingly small. They are based purely upon the scientific and medical evidence of the effects of an individual pollutant. The 'objectives' set out the extent to which the Government expects the standards to be achieved by a certain date. They take account of economic efficiency, practicability, technical feasibility and timescale. The objectives for use by local authorities are prescribed within the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations (2002).

2.20 The objectives for nitrogen dioxide and PM_{10} were to have been achieved by 2005 and 2004 respectively, and continue to apply in all future years thereafter. The $PM_{2.5}$ objective is to be achieved by 2020. Measurements across the UK have shown that the 1-hour nitrogen dioxide objective is unlikely to be exceeded at roadside locations where the annual mean concentration is below 60 $\mu g/m^3$ (Defra, 2018b). Measurements have also shown that the 24-hour PM_{10} objective could be exceeded at roadside locations where the annual mean concentration is above 32 $\mu g/m^3$ (Defra, 2018b).

2.21 The objectives apply at locations where members of the public are likely to be regularly present and are likely to be exposed over the averaging period of the objective. Defra explains where these

objectives will apply in its Local Air Quality Management Technical Guidance (Defra, 2018b). The annual mean objectives for nitrogen dioxide and PM_{10} are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The 24-hour mean objective for PM_{10} is considered to apply at the same locations as the annual mean objective, as well as in gardens of residential properties and at hotels. The 1-hour mean objective for nitrogen dioxide applies wherever members of the public might regularly spend 1-hour or more, including outdoor eating locations and pavements of busy shopping streets.

2.22 EU Directive 2008/50/EC (The European Parliament and the Council of the European Union, 2008) sets limit values for nitrogen dioxide, PM_{10} and $PM_{2.5}$, and is implemented in UK law through the Air Quality Standards Regulations (2010). The limit values for nitrogen dioxide are the same numerical concentrations as the UK objectives, but achievement of these values is a national obligation rather than a local one. In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the limit values. Central Government does not normally recognise local authority monitoring or local modelling studies when determining the likelihood of the limit values being exceeded, unless such studies have been audited and approved by Defra and DfT's Joint Air Quality Unit (JAQU).

2.23 The relevant air quality criteria for this assessment are provided in Table 1.

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM_{10} and $PM_{2.5}$

Pollutant	Time Period	Objective
Nitrogen Dioxide	1-hour Mean	200 µg/m^3 not to be exceeded more than 18 times a year
	Annual Mean	40 µg/m^3
Fine Particles (PM_{10})	24-hour Mean	50 µg/m^3 not to be exceeded more than 35 times a year
	Annual Mean	40 µg/m^3 [a]
Fine Particles ($PM_{2.5}$) [b]	Annual Mean	25 µg/m^3

[a] A proxy value of 32 µg/m^3 as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM_{10} objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM_{10} objective are possible (Defra, 2018b).

[b] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

Screening Criteria for Road Traffic Assessments

2.24 Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM)[1] recommend a two-stage screening approach (Moorcroft and Barrowcliffe et al, 2017) to determine whether emissions from road traffic generated by a development have the potential for significant air

[1] The IAQM is the professional body for air quality practitioners in the UK.

quality impacts. The approach, as described in Appendix A1, first considers the size and parking provision of a development; if the development is residential and is for fewer than ten homes or covers less than 0.5 ha, or is non-residential and will provide less than 1,000 m^2 of floor space or cover a site area of less than 1 ha, and will provide ten or fewer parking spaces, then there is no need to progress to a detailed assessment. The second stage then compares the changes in vehicle flows on local roads that a development will lead to against specified screening criteria. Where these criteria are exceeded, a detailed assessment is required, although the guidance advises that *"the criteria provided are precautionary and should be treated as indicative"*, and *"it may be appropriate to amend them on the basis of professional judgement"*.

Fuel Oil Storage

National Planning Policy

2.25 The storage of fuel oil at the proposed development will be regulated under the Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) 2002 (Statutory Instruments 2776, 2002) and The Control of Pollution (Oil Storage) (England) Regulations 2001 (Statutory Instruments 2954, 2001), supplemented by Health and Safety Guidelines 176 (HSG176) (Health and Safety Executive, 2015).

Assessment Criteria

2.26 There is no screening criterion to determine the need for an assessment of the potential fugitive emissions to air from fuel oil storage. Using the professional judgment of the air quality consultants preparing this report (further details are provided in Appendix A2), an assessment has been carried out has been based on the design of the proposed fuel oil storage depot, consideration of the regulations and guidelines under which it will be required to operate and the proximity of the nearby sensitive receptors to emission sources.

3 Assessment Approach

Existing Conditions

3.1 Existing sources of emissions within the study area have been defined using a number of approaches. Industrial and waste management sources that may affect the area have been identified using Defra's Pollutant Release and Transfer Register (Defra, 2020a). Local sources have also been identified through examination of the Council's Air Quality Review and Assessment reports.

3.2 Information on existing air quality has been obtained by collating the results of monitoring carried out by the local authority. Background concentrations have been defined using the 2017-based national pollution maps published by Defra (2020b). These cover the whole of the UK on a 1x1 km grid.

3.3 Whether or not there are any exceedances of the annual mean EU limit value for nitrogen dioxide in the study area has been identified using the maps of roadside concentrations published by Defra (2020c) (2020d), as well as from any nearby Automatic Urban and Rural Network (AURN) monitoring sites (which operate to EU data quality standards). These maps are used by the UK Government, together with the AURN results, to report exceedances of the limit value to the EU. The national maps of roadside PM_{10} and $PM_{2.5}$ concentrations (Defra, 2020d), which are available for the years 2009 to 2018, show no exceedances of the limit values anywhere in the UK in 2018.

Road Traffic Impacts

3.4 The first step in considering the road traffic impacts of the application site has been to screen the development and its traffic generation against the criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017), as described in Paragraph 2.24 and detailed further in Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

Fugitive Emissions from Fuel Oil Storage

3.5 The assessment gives consideration to the likelihood of emissions to air at the proposed fuel oil storage depot, and the potential for air quality impacts at nearby sensitive receptors. The assessment is made based on the design of the proposed fuel oil storage depot, the regulations under which it will be required to operate (see Section 2) and the proximity of nearby sensitive receptors.

4 Site Description and Baseline Conditions

4.1 The application site is located on brownfield land on Horton Grounds Quarry, to the northwest of the town of Shenington, located in the Cherwell district. The site is bounded by existing buildings and the yard of the quarry along the western boundary, and agricultural land to the north, east and south. The site is accessed via the A422 Stratford Road.

Industrial sources

4.2 A search of the UK Pollutant Release and Transfer Register (Defra, 2020a) has not identified any significant industrial or waste management sources that are likely to affect the study area, in terms of air quality.

Air Quality Management Areas

4.3 Cherwell District Council has investigated air quality within its area as part of its responsibilities under the LAQM regime, and has declared four AQMAs for exceeding one or more of the nitrogen dioxide objectives. The closest AQMA to the proposed development (AQMA No. 2) is located over 9.5 km to the southwest of the site, in Banbury.

Local Air Quality Monitoring

4.4 Cherwell District Council does not operate any automatic monitoring stations within its area; the Council does operate a number of nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Environmental Scientifics Group (using the 50% TEA in acetone method), however no monitoring is carried out near to the application site.

Exceedances of EU Limit Value

4.5 There are no AURN monitoring sites within the study area with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2020d), which are used to report exceedances of the limit value to the EU, do not identify any exceedances within the study area in 2017. As such, there is considered to be no risk of a limit value exceedance in the vicinity of the application site by the time that it is operational.

Background Concentrations

4.6 Estimated background concentrations at the application site have been determined for 2019 (the last full calendar year) using Defra's 2017-based background maps (Defra, 2020b). These cover the whole of the UK on a 1x1 km grid and are published for each year from 2017 to 2030. The background annual mean nitrogen dioxide maps for 2019 have been calibrated against concurrent measurements from national monitoring sites (AQC, 2020).

4.7 The background concentrations at the site are set out in Table 2 and are all well below the objectives.

Table 2: Estimated Annual Mean Background Pollutant Concentrations at the Application Site in 2019 (µg/m^3)

Year	NO_2	PM_{10}	$PM_{2.5}$
2019	7.9	13.9	8.5
Objectives	**40**	**40**	**25** [a]

[a] The $PM_{2.5}$ objective, which is to be met by 2020, is not in Regulations and there is no requirement for local authorities to meet it.

4.8 Pollutant concentrations near to roads will be greater than the predicted background levels, however, taking into account the very low background concentrations predicted at the site, the large distance of the site from any main roads (the site is located approximately 230 m to the east of the A422 Stratford Road) and the absence of an AQMA, it is not anticipated that pollutant concentrations in close proximity to the site will be above the air quality objectives.

5 Impact Assessment

Development-Generated Road Traffic Emissions Impacts

5.1 The trip generation of the proposed fuel oil storage depot on local roads (as provided by Wormald Burrows Partnership Ltd, the project team's Transport Consultant) has been compared to the screening criteria set out in the EPUK/IAQM guidance (Moorcroft and Barrowcliffe et al, 2017) (see Paragraphs A1.7 to A1.10 in Appendix A1). The site is estimated to generate a maximum of 158 tanker movements per week, which attributes to 23 Heavy Duty Vehicles (HDV) per day as an Annual Average Daily Traffic (AADT) flow. In terms of Light Duty Vehicles (LDVs), there will be a maximum of 34 staff car trips per day. These traffic volumes are well below the relevant screening thresholds provided in the EPUK/IAQM guidance, which describe that for locations outside of an AQMA, a detailed air quality assessment is not likely to be required where traffic changes by less than 500 LDV AADT and/or 100 HDV AADT. As the changes in traffic flows on local roads will all be lower than the screening criteria it can be concluded that impacts of traffic generated by the application site will not be significant, and that there is no requirement for a detailed assessment of road traffic impacts at existing receptors.

Air Quality Impacts from Fuel Oil Storage

Design of Proposed Fuel Oil Storage Depot

5.1 A site layout plan of the proposed fuel oil storage depot is provided in Figure 1. The proposals will include 6 no. above-ground bulk fuel storage tanks (one of which may be a split compartment tank making 7 no. individual tanks in total), each with a storage capability of 125,000 litres. The total site storage capacity is therefore 750,000 litres. Fuel stored on site will be diesel (Diesel Oil for Road Vehicles (DERV) and gas oil) and kerosene. All bulk storage tanks will be within a purpose-built concrete bund, lined with impermeable paint.

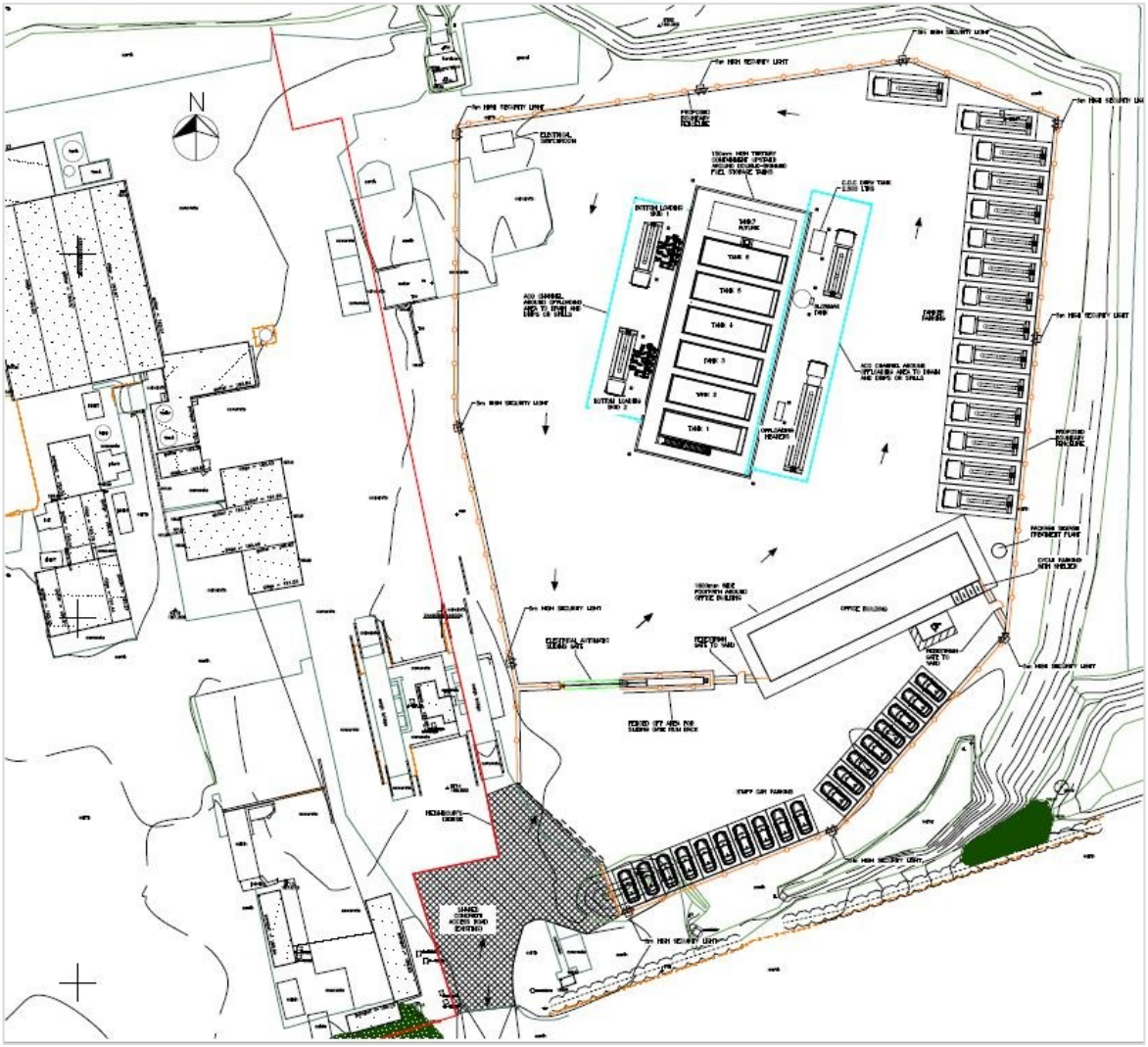

Figure 1: Proposed Layout Plan for Fuel Oil Storage Depot

(based on drawing no. 6289-801 Rev F, by Trident Engineering Consultants)

5.2 There will be 2 no. smaller, ancillary above-ground tanks; 1x 'Glowmax' (kerosene additive) tank of 6,000 litres and 1 no. Company own Consumption (CoC) tank to refuel tankers with DERV which will have a capacity of 2,500 litres. The 2 no. ancillary tanks will be sited on concrete and will be double skinned or self-bunded. These tanks will be designed in accordance with guidance to provide 110% capacity of the largest tank. The bund will be fitted with a sump system in order to collect rainwater and allow this to be pumped out.

5.3 Tanks will be filled by articulated road tankers at the 'offloading headers' (as shown in Figure 1). These will be connected to the tanks by a length of above-ground pipe. There will be a vapour recovery system at the off-loading points/loading points to prevent vapour release to atmosphere during tanker off-loading. There will be 2 no. loading bays/gantries on the other side of the storage tanks, where road tankers will fill up, again from off-set headers which are connected to the tanks by a length of above-ground pipe

5.4 In addition to the main fuel bund, containment will be provided by means of impermeable hardstanding directed into dedicated site drainage which will flow to an oil-water interceptor. Some detail on the drainage can be seen in the layout drawing (i.e. presence of strip gullies surrounding the off-loading and loading areas).

Assessment of Emissions

5.5 The horizontal Best Available Technique (BAT) reference document (BREF), entitled 'Emissions from Storage', published by the European Integrated Pollution Prevention and Control (IPPC) Bureau (Integrated Pollution Prevention and Control, 2006), provides a useful summary of the potential emissions to air associated with the storage of fuel, such as diesel and kerosene:

"Important emissions to air from the storage of liquid and liquefied gases during normal operation are differentiated as follows:

- *emissions during entry and evacuation i.e. transferring substances in and out of storage (filling and emptying)*
- *emissions during tank breathing, i.e. emissions due to temperature increases resulting in vapour space expansions and subsequent emissions*
- *fugitive emissions from flange seals, fittings and pumps*
- *emissions during sampling*
- *emissions from cleaning operations."*

5.6 The site of the proposed fuel oil storage depot is located well away from any nearby sensitive receptors (such as residential dwellings), the nearest dwelling being located more than 270 m to the southeast of the application site, at Horton Grounds Farmhouse Bed and Breakfast. The application site will be located adjacent to Horton Grounds Quarry, which is not considered sensitive to the potential air quality effects associated with the proposed development, but is being mentioned for completeness; the nearest warehouse building at Horton Grounds Quarry is located approximately 50 m (to the west) of the fuel oil storage area, however as this forms part of the site, it is covered by workplace exposure regulations and is not considered to be sensitive in the context of this assessment.

5.7 The proposed fuel oil storage depot will be regulated under the DSEAR 2002 and The Control of Pollution (Oil Storage) England Regulations 2001, and will adhere to HSE176 guidelines to employ BAT at the proposed development.

5.8 In terms of the potential emissions to air the design, construction and operation of the proposed fuel oil storage depot will need to give consideration to fixed and mobile tank locations and design, pipework to and from tanks and tank connections and fittings. Best practice methods will be

employed to reduce emissions, such as the installation of a vapour recovery system to reduce emissions during fuel tanker offloading and loading.

5.9 The proposed depot itself is considered to be of a small scale (having a capacity of only 750 m^3), compared to large facilities capable of storing several million cubic meters of fuel.

5.10 On the basis of the small scale of the proposed facility, and the best practice design and operation of the site to minimise emissions to air (e.g. applying BAT following HSE176 guidelines), while there is the potential for fugitive emissions to air from the storage and transfer of fuel oil, it is considered that given the distance to sensitive receptors, there will not be any adverse air quality impacts associated with the storage of oil at the proposed facility, and the effects are therefore judged to be *not significant*.

6 Conclusions

6.1 The air quality impacts of the proposed fuel oil storage depot have been assessed.

6.2 In terms of traffic emissions arising from the additional traffic on local roads, the volumes traffic anticipated to be generated by the development fall below the relevant screening criteria set out by the EPUK/IAQM guidance and can, therefore, be judged to be not significant.

6.3 In terms of fugitive emissions to air from the storage of fuel oil (kerosene and diesel) at the proposed depot, the air quality effects are also judged to be not significant on the basis that operations will employ BAT to limit any emissions to air, and that there are no sensitive receptors located very near to the proposed development.

6.4 Overall, the air quality effects of the operation of the proposed facility are judged to be 'not significant'.

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8 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQMA	Air Quality Management Area
ASR	Annual Status Report
AURN	Automatic Urban and Rural Network
BAT	Best Available Technique
BREF	Best Available Technique Reference Document
CoC	Company own Consumption
DERV	Diesel Oil for Road Vehicles
Defra	Department for Environment, Food and Rural Affairs
DfT	Department for Transport
EPUK	Environmental Protection UK
Exceedance	A period of time when the concentration of a pollutant is greater than the appropriate air quality objective. This applies to specified locations with relevant exposure
EU	European Union
HDV	Heavy Duty Vehicles (> 3.5 tonnes)
HMSO	Her Majesty's Stationery Office
HGV	Heavy Goods Vehicle
IAQM	Institute of Air Quality Management
JAQU	Joint Air Quality Unit
JSSP	joint statutory spatial plan
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
µg/m^3	Microgrammes per cubic metre
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides (taken to be NO_2 + NO)

NPPF	National Planning Policy Framework
Objectives	A nationally defined set of health-based concentrations for nine pollutants, seven of which are incorporated in Regulations, setting out the extent to which the standards should be achieved by a defined date. There are also vegetation-based objectives for sulphur dioxide and nitrogen oxides
OLEV	Office for Low Emission Vehicles
PM_{10}	Small airborne particles, more specifically particulate matter less than 10 micrometres in aerodynamic diameter
$PM_{2.5}$	Small airborne particles less than 2.5 micrometres in aerodynamic diameter
PPG	Planning Practice Guidance
Standards	A nationally defined set of concentrations for nine pollutants below which health effects do not occur or are minimal
TEA	Triethanolamine – used to absorb nitrogen dioxide

9 Appendices

A1 EPUK & IAQM Planning for Air Quality Guidance

A1.1 The guidance issued by EPUK and IAQM (Moorcroft and Barrowcliffe et al, 2017) is comprehensive in its explanation of the place of air quality in the planning regime. Key sections of the guidance not already mentioned above are set out below.

Air Quality as a Material Consideration

"Any air quality issue that relates to land use and its development is capable of being a material planning consideration. The weight, however, given to air quality in making a planning application decision, in addition to the policies in the local plan, will depend on such factors as:

- *the severity of the impacts on air quality;*
- *the air quality in the area surrounding the proposed development;*
- *the likely use of the development, i.e. the length of time people are likely to be exposed at that location; and*
- *the positive benefits provided through other material considerations".*

Recommended Best Practice

A1.2 The guidance goes into detail on how all development proposals can and should adopt good design principles that reduce emissions and contribute to better air quality management. It states:

"The basic concept is that good practice to reduce emissions and exposure is incorporated into all developments at the outset, at a scale commensurate with the emissions".

A1.3 The guidance sets out a number of good practice principles that should be applied to all developments that:

- include 10 or more dwellings;
- where the number of dwellings is not known, residential development is carried out on a site of more than 0.5 ha;
- provide more than 1,000 m^2 of commercial floorspace;
- are carried out on land of 1 ha or more.

A1.4 The good practice principles are that:

- New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- Wherever possible, new developments should not create a new "street canyon", as this inhibits pollution dispersion;

- Delivering sustainable development should be the key theme of any application;
- New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads;
- The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000 m^2 of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made available;
- Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- All gas-fired boilers to meet a minimum standard of <40 mgNOx/kWh;
- Where emissions are likely to impact on an AQMA, all gas-fired CHP plant to meet a minimum emissions standard of:
    - Spark ignition engine: 250 mgNOx/Nm^3;
    - Compression ignition engine: 400 mgNOx/Nm^3;
    - Gas turbine: 50 mgNOx/Nm^3.
- A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of 275 mgNOx/Nm^3 and 25 mgPM/Nm^3.

A1.5 The guidance also outlines that offsetting emissions might be used as a mitigation measure for a proposed development. However, it states that:

"It is important that obligations to include offsetting are proportional to the nature and scale of development proposed and the level of concern about air quality; such offsetting can be based on a quantification of the emissions associated with the development. These emissions can be assigned a value, based on the "damage cost approach" used by Defra, and then applied as an indicator of the level of offsetting required, or as a financial obligation on the developer. Unless some form of benchmarking is applied, it is impractical to include building emissions in this approach, but if the boiler and CHP emissions are consistent with the standards as described above then this is not essential".

A1.6 The guidance offers a widely used approach for quantifying costs associated with pollutant emissions from transport. It also outlines the following typical measures that may be considered to offset emissions, stating that measures to offset emissions may also be applied as post assessment mitigation:

- Support and promotion of car clubs;
- Contributions to low emission vehicle refuelling infrastructure;
- Provision of incentives for the uptake of low emission vehicles;
- Financial support to low emission public transport options; and
- Improvements to cycling and walking infrastructures.

Screening

Impacts of the Local Area on the Development

"There may be a requirement to carry out an air quality assessment for the impacts of the local area's emissions on the proposed development itself, to assess the exposure that residents or users might experience. This will need to be a matter of judgement and should take into account:

- *the background and future baseline air quality and whether this will be likely to approach or exceed the values set by air quality objectives;*
- *the presence and location of Air Quality Management Areas as an indicator of local hotspots where the air quality objectives may be exceeded;*
- *the presence of a heavily trafficked road, with emissions that could give rise to sufficiently high concentrations of pollutants (in particular nitrogen dioxide), that would cause unacceptably high exposure for users of the new development; and*
- *the presence of a source of odour and/or dust that may affect amenity for future occupants of the development".*

Impacts of the Development on the Local Area

A1.7 The guidance sets out two stages of screening criteria that can be used to identify whether a detailed air quality assessment is required, in terms of the impact of the development on the local area. The first stage is that you should proceed to the second stage if any of the following apply:

- 10 or more residential units or a site area of more than 0.5 ha residential use; and/or
- more than 1,000 m^2 of floor space for all other uses or a site area greater than 1 ha.

A1.8 Coupled with any of the following:

- the development has more than 10 parking spaces; and/or
- the development will have a centralised energy facility or other centralised combustion process.

A1.9 If the above do not apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area. If they do apply then you proceed to stage 2, which sets out indicative criteria for requiring an air quality assessment. The stage 2 criteria relating to vehicle emissions are set out below:

- the development will lead to a change in LDV flows of more than 100 AADT within or adjacent to an AQMA or more than 500 AADT elsewhere;
- the development will lead to a change in HDV flows of more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere;
- the development will lead to a realigning of 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;
- the development will introduce a new junction or remove an existing junction near to relevant receptors, and the junction will cause traffic to significantly change vehicle acceleration/deceleration, e.g. traffic lights or roundabouts;
- the development will introduce or change a bus station where bus flows will change by more than 25 AADT within or adjacent to an AQMA or more than 100 AADT elsewhere; and
- the development will have an underground car park with more than 100 movements per day (total in and out) with an extraction system that exhausts within 20 m of a relevant receptor.

A1.10 The criteria are more stringent where the traffic impacts may arise on roads where concentrations are close to the objective. The presence of an AQMA is taken to indicate the possibility of being close to the objective, but where whole authority AQMAs are present and it is known that the affected roads have concentrations below 90% of the objective, the less stringent criteria are likely to be more appropriate.

A1.11 On combustion processes (including standby emergency generators and shipping) where there is a risk of impacts at relevant receptors, the guidance states that:

"Typically, any combustion plant where the single or combined NOx emission rate is less than 5 mg/sec is unlikely to give rise to impacts, provided that the emissions are released from a vent or stack in a location and at a height that provides adequate dispersion. As a guide, the 5 mg/s criterion equates to a 450 kW ultra-low NOx gas boiler or a 30kW CHP unit operating at <95mg/Nm^3.

In situations where the emissions are released close to buildings with relevant receptors, or where the dispersion of the plume may be adversely affected by the size and/or height of adjacent buildings (including situations where the stack height is lower than the receptor) then consideration will need to be given to potential impacts at much lower emission rates.

Conversely, where existing nitrogen dioxide concentrations are low, and where the dispersion conditions are favourable, a much higher emission rate may be acceptable".

A1.12 Should none of the above apply then the development can be screened out as not requiring a detailed air quality assessment of the impact of the development on the local area, provided that professional judgement is applied; the guidance importantly states the following:

"The criteria provided are precautionary and should be treated as indicative. They are intended to function as a sensitive 'trigger' for initiating an assessment in cases where there is a possibility of significant effects arising on local air quality. This possibility will, self-evidently, not be realised in many cases. The criteria should not be applied rigidly; in some instances, it may be appropriate to amend them on the basis of professional judgement, bearing in mind that the objective is to identify situations where there is a possibility of a significant effect on local air quality".

A1.13 Even if a development cannot be screened out, the guidance is clear that a detailed assessment is not necessarily required:

"The use of a Simple Assessment may be appropriate, where it will clearly suffice for the purposes of reaching a conclusion on the significance of effects on local air quality. The principle underlying this guidance is that any assessment should provide enough evidence that will lead to a sound conclusion on the presence, or otherwise, of a significant effect on local air quality. A Simple Assessment will be appropriate, if it can provide this evidence. Similarly, it may be possible to conduct a quantitative assessment that does not require the use of a dispersion model run on a computer".

A1.14 The guidance also outlines what the content of the air quality assessment should include, and this has been adhered to in the production of this report.

Assessment of Significance

A1.15 There is no official guidance in the UK in relation to development control on how to assess the significance of air quality impacts. The approach within the EPUK/IAQM guidance has, therefore, been used in this assessment. The guidance is that the assessment of significance should be based on professional judgement, with the overall air quality impact of the development described as either 'significant' or 'not significant'. In drawing this conclusion, the following factors should be taken into account:

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

- the potential for cumulative impacts. In such circumstances, several impacts that are described as '*slight*' individually could, taken together, be regarded as having a significant effect for the purposes of air quality management in an area, especially where it is proving difficult to reduce concentrations of a pollutant. Conversely, a '*moderate*' or '*substantial*' impact may not have a significant effect if it is confined to a very small area and where it is not obviously the cause of harm to human health; and
- the judgement on significance relates to the consequences of the impacts; will they have an effect on human health that could be considered as significant? In the majority of cases, the impacts from an individual development will be insufficiently large to result in measurable changes in health outcomes that could be regarded as significant by health care professionals.

A1.16 The guidance is clear that other factors may be relevant in individual cases. It also states that the effect on the residents of any new development where the air quality is such that an air quality objective is not met will be judged as significant.

A1.17 A judgement of the significance should be made by a competent professional who is suitably qualified. A summary of the professional experience of the staff contributing to this assessment is provided in Appendix A2.

A2 Professional Experience

Laurence Caird, MEarthSci CSci MIEnvSc MIAQM

Mr Caird is an Associate Director with AQC, with 15 years' experience in the field of air quality including the detailed assessment of emissions from road traffic, airports, heating and energy plant, and a wide range of industrial sources including the thermal treatment of waste. He has experience in ambient air quality monitoring for numerous pollutants using a wide range of techniques and is also competent in the monitoring and assessment of nuisance odours and dust. Mr Caird has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers and process operators. He is a Member of the Institute of Air Quality Management and is a Chartered Scientist.

Suzanne Hodgson, BSc (Hons) MSc CSci MIEnvSc MIAQM

Ms Hodgson is a Principal Consultant with AQC, with over 10 years' experience in the field of air quality management and assessment. She has been responsible for a wide range of air quality projects covering impact assessments for new residential, commercial and industrial developments, local air quality management, ambient air quality monitoring of various pollutants and the assessment of nuisance odours and construction dust. She has extensive modelling experience, including the modelling of road traffic, energy centres (including energy from waste) and odour sources, and is familiar with preparing stand-alone air quality reports as well as chapters for inclusion within an Environment Statement. Suzanne has worked with a variety of clients to provide expert air quality services and advice, including local authorities, planners, developers and process operators. She is a Member of the Institute of Air Quality Management and is a Chartered Scientist.

Samantha Barber, MChem (Hons)

Miss Barber is a Consultant with AQC, having joined the company in November 2017. She has carried out assessments of air quality impacts for a range of projects, including EIA schemes, residential, commercial and mixed-use schemes, energy centres and power generation schemes. Miss Barber has also prepared construction dust risk assessments, Air Quality Neutral assessments, local authority Annual Status Reports (ASRs) and odour assessments. She has carried out numerous passive nitrogen dioxide monitoring surveys, and construction dust monitoring, at sites across Greater London.

Full CVs are available at www.aqconsultants.co.uk.