



Air Quality Assessment: Portsmouth Hill Bio- Methane Facility, Havant

December 2019



Experts in air quality
management & assessment

Document Control

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1 Introduction

- 1.1 This report describes the potential air quality impacts associated with proposed changes to the bio-methane injection facility at Portsdown Hill in Havant. The assessment has been carried out by Air Quality Consultants Ltd on behalf of Southern Gas Network.
- 1.2 The proposed changes will allow additional third-party operators to inject bio-methane into the gas network at the facility. This will lead to changes in vehicle flows on local roads; during pre-application discussions, the Environmental Control Officer at Havant Borough Council requested that consideration be given to the potential for air quality impacts associated with the increased HGV movements. The main air pollutants of concern related to road traffic emissions are nitrogen dioxide (NO₂) and fine particulate matter (PM₁₀ and PM_{2.5}).
- 1.3 This report describes existing local air quality conditions (base year 2018), and the predicted air quality in the future assuming that the proposed development does, or does not proceed.
- 1.4 This report has been prepared taking into account all relevant local and national guidance and regulations.

2 Policy Context and Assessment Criteria

Air Quality Strategy

- 2.1 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

- 2.2 The Clean Air Strategy (Defra, 2019a) 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

- 2.3 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.
- 2.4 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. If these ambitions are realised then road traffic-related NO_x emissions can be expected to reduce significantly over the coming decades, likely beyond the scale of reductions forecast in the tools utilised in carrying out this air quality assessment.

Planning Policy

National Policies

- 2.5 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”.

- 2.6 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”.

- 2.7 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”.

- 2.8 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 EU Limit Values” and “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”. The role of the local authorities is covered by the LAQM regime, with the PPG stating that local authority Air Quality Action Plans “identify measures that will be introduced in pursuit of the objectives”.

2.9 The PPG states that:

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

2.10 The PPG sets out the information that may be required in an air quality assessment, making clear that *“Assessments should be proportionate to the nature and scale of development proposed and the level of concern about air quality”*. It 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 where necessary, will depend on the proposed development and should be proportionate to the likely impact”*.

Local Transport Plan

2.11 The Hampshire Local Transport Plan (Hampshire County Council, 2013) specifically refers to air quality and states that:

“The Transport for South Hampshire authorities will work with key partners, environmental health professionals and transport operators to mitigate the impacts of traffic on air quality. The principle causes of poor air quality will be addressed by implementing a strategic area-wide approach within each urban centre to minimize the cumulative effect of road transport emissions. This can be achieved through measures promoting modal shift towards public transport modes, walking and cycling, reducing single occupancy car journeys. Tackling congestion at hotspots can also improve air quality.”

Local Policies

2.12 The Havant Borough Council Core Strategy (Havant Borough Council, 2011) was adopted in March 2011. Development management policy 10 refers to pollution and states that:

“Development that may cause pollution of water, air or soil or pollution through noise, smell, smoke, fumes, gases, steam, dust, vibration, light, heat, electromagnetic radiation and other pollutants will only be permitted where all of the following relevant criteria can be met:

1. *The health and safety of existing and future users of the site, or nearby occupiers and residents is not put at risk.*
2. *National air quality standards or objectives would not be breached.*
3. *The water environment would not be detrimentally affected.*
4. *It would not lead to an unacceptable deterioration in the quality or potential yield of coastal, surface and ground water resources.*
5. *External lighting is of the minimum level of illumination and duration required for security and operational purposes.*
6. *External lighting would not interfere with safe navigation in either Chichester or Langstone Harbours and other coastal locations.”*

Air Quality Action Plans

National Air Quality Plan

- 2.13 Defra has produced an Air Quality Plan to tackle roadside nitrogen dioxide concentrations in the UK (Defra, 2017); 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 require 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 Clean Air Zone (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

- 2.14 Havant Borough Council has not declared any AQMAs and thus has not prepared an air quality action plan.
- 2.15 Portsmouth City Council has declared multiple AQMAs for nitrogen dioxide that encompass busy roads and junctions throughout the city. The Council has since developed an Air Quality Action Plan (Portsmouth City Council, 2010) which seeks to identify the causes of air pollution and hotspot areas, devise actions to deliver improvements and improve public awareness, amongst other aims.

Assessment Criteria

- 2.16 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).
- 2.17 The UK-wide objectives for nitrogen dioxide and PM₁₀ 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 µg/m³ (Defra, 2018b). Therefore, 1-hour nitrogen dioxide concentrations will only be considered if the annual mean concentration is above this level. Measurements have also shown that the 24-hour mean PM₁₀ objective could be exceeded at roadside locations where the annual mean concentration is above 32 µg/m³ (Defra, 2018b). The predicted annual mean PM₁₀ concentrations are thus used as a proxy to determine the likelihood of an exceedance of the 24-hour mean PM₁₀ objective. Where predicted annual mean concentrations are below 32 µg/m³ it is unlikely that the 24-hour mean objective will be exceeded.
- 2.18 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 PM₁₀ 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 PM₁₀ 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.
- 2.19 The European Union has also set limit values for nitrogen dioxide, PM₁₀ and PM_{2.5} (The European Parliament and the Council of the European Union, 2008). 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).

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

Table 1: Air Quality Criteria for Nitrogen Dioxide, PM₁₀ 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/m³ as an annual mean is used in this assessment to assess the likelihood of the 24-hour mean PM₁₀ objective being exceeded. Measurements have shown that, above this concentration, exceedances of the 24-hour mean PM₁₀ 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

2.21 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 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 m² 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”*.

Descriptors for Air Quality Impacts and Assessment of Significance

2.22 There is no official guidance in the UK in relation to development control on how to describe air quality impacts, nor how to assess their significance. The approach developed jointly by EPUK and the IAQM (Moorcroft and Barrowcliffe et al, 2017) has therefore been used. The overall significance of the air quality impacts is determined using professional judgement. Full details of the EPUK/IAQM approach are provided in Appendix A1. The approach includes elements of professional judgement, and the experience of the consultants preparing the report is set out in Appendix A2.

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

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, 2019b). 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 (2019c). These cover the whole of the UK on a 1x1 km grid.
- 3.3 Exceedances of the annual mean EU limit value for nitrogen dioxide in the study area have been identified using the maps of roadside concentrations published by Defra (2019f), 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 PM₁₀ and PM_{2.5} concentrations (Defra, 2019d), which are available for the years 2009 to 2017, show no exceedances of the limit values anywhere in the UK in 2017.
- 3.4 Portsmouth City Council is currently in the process of developing a detailed plan for the implementation of a Clean Air Zone (CAZ), although no details are available at this stage. The approach taken in this assessment is considered to be worst-case, as it does not account for any future improvements in air quality brought about by the introduction of the CAZ.

Road Traffic Impacts

Screening

- 3.5 The first step in considering the road traffic impacts of the proposed development 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 2.21 and detailed further in Appendix A1. Where impacts can be screened out there is no need to progress to a more detailed assessment.

4 Site Description and Baseline Conditions

- 4.1 The application site is located approximately 3 km to the west of Havant town centre. It is bounded to the east and south by an existing waste management site and the existing gas works respectively, and to the north and west by Portsmouth Golf Course. There are existing residential properties adjacent to the B2177 Farlington, approximately 250 m to the south east, as well as to the other side of the golf course, approximately 350 m to the north.

Industrial sources

- 4.2 A search of the UK Pollutant Release and Transfer Register (Defra, 2019b) has not identified any industrial or waste management sources that are likely to affect the proposed development, in terms of air quality.

Air Quality Management Areas

- 4.3 Havant Borough Council has investigated air quality within its area as part of its responsibilities under the LAQM regime. No exceedances of the air quality objectives have been identified and no AQMAs have been declared. Portsmouth City Council declared multiple AQMAs in April 2005 for exceedances of the annual mean nitrogen dioxide objective; however, the closest AQMA is 5.4 km south west of the application site and will be unaffected by the proposed changes.
- 4.4 In terms of PM₁₀, both Councils concluded that there are no exceedances of the objectives. It is, therefore, reasonable to assume that PM₁₀ levels will not exceed the objectives within the study area.

Local Air Quality Monitoring

- 4.5 Havant Borough Council does not operate any automatic monitoring stations within its area. Portsmouth City Council operates five automatic monitoring stations, although none of these are in close proximity to the application site.
- 4.6 Havant Borough and Portsmouth City Councils operate numerous nitrogen dioxide monitoring sites using diffusion tubes prepared and analysed by Gradko, using the 20% TEA in water method and 50% TEA in acetone method respectively. These include one deployed at the roadside of junction 5 of the A3(M) and several roadside and background locations in Drayton, Widley and Purbrook. Results for the years 2014 to 2018 are summarised in Table 2 and the monitoring locations are shown in Figure 1.

Table 2: Summary of Nitrogen Dioxide (NO₂) Monitoring (2014-2018) ^a

Site No.	Site Type	Location	2014	2015	2016	2017	2018
Diffusion Tubes - Annual Mean (µg/m³)							
8	Roadside	London Road, Purbrook	26.5	23.5	26.8	26.3	23.5
25(B)	Roadside	Stakes Road	26.0	22.4	24.4	24.1	26.8
26	Roadside	Ladybridge Road	24.9	21.6	24.9	25.1	-
S9	Urban Background	St Peter's Primary Prayer Garden	-	-	-	-	19.3
S10	Suburban	St Peters Primary Car Park	-	-	-	-	21.8
T3	Suburban	Bedhampton Hill	-	-	-	-	22.9
8	Urban Background	492 Hawthorn Crescent	28.4	28.4	29.9	26.8	26.0
10	Urban Background	20 Stroudley Avenue	16.7	16.5	19.5	17.6	17.2
100	Roadside	340 Havant Road	-	-	-	-	22.1
101	Roadside	Havant Road	-	-	-	-	28.2
Objective			40				

^a Data taken from the Havant Borough Council 2019 Air Quality Annual Status Report (Havant Borough Council, 2019) and the Portsmouth City Council 2019 Air Quality Annual Status Report (Portsmouth City Council, 2019).

- 4.7 Annual mean nitrogen dioxide concentrations have remained well below the objective at all diffusion tube sites since 2014. At several of the monitoring sites, there has been a downward trend in concentrations in recent years, likely due to the progressive introduction of new vehicles operating to more stringent standards, as well as other policies to improve local air quality implemented by the local authorities.

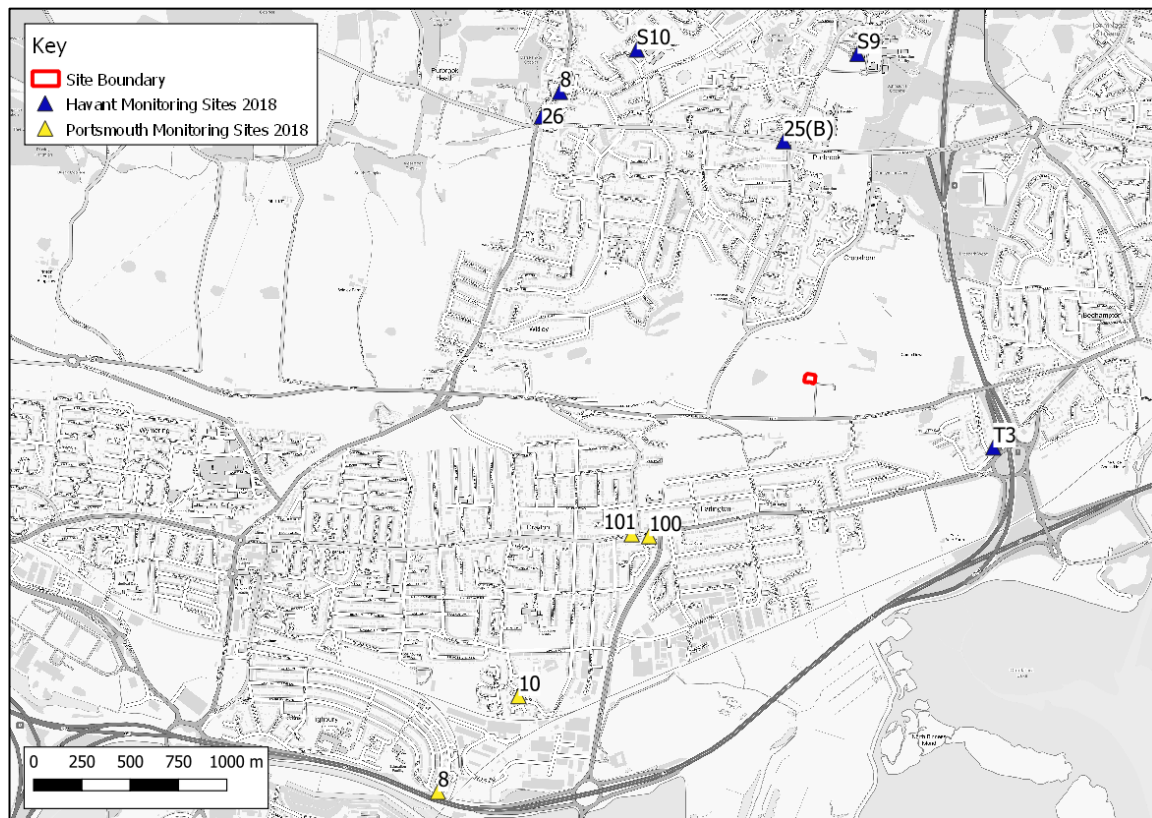


Figure 1: Monitoring Locations

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- 4.8 No monitoring of PM₁₀ or PM_{2.5} concentrations is undertaken by Havant Borough Council. Portsmouth City Council does undertake monitoring of PM₁₀ and PM_{2.5} at several automatic monitoring sites, although none are in close proximity to the application site.

Exceedances of EU Limit Value

- 4.9 There are no AURN monitoring sites within 1 km of the application site with which to identify exceedances of the annual mean nitrogen dioxide limit value. Defra's roadside annual mean nitrogen dioxide concentrations (Defra, 2019f), which are used to report exceedances of the limit value to the EU, identify exceedances of the limit value in 2017 at the junction of the A3(M) and A27. All other roads in the vicinity of the application site show no exceedances. As the exceedances are located more than 1 km from the application site and are on roads not considered representative of the study area, there is considered to be no risk of a limit value exceedance by the time the proposed changes become operational.
- 4.10 As discussed in Paragraph 2.13, Defra has produced an Air Quality Plan (Defra, 2017) to tackle roadside nitrogen dioxide concentrations in the UK. Within this Plan, Havant Borough Council is

identified as having limit value exceedances in or beyond 2017, but not beyond 2020, thus the Plan does not require the authority to undertake any further action. However, a recent High Court judgement (Royal Courts of Justice, 2018) declared the Plan unlawful with regard to its application to the 45 local authority areas in which exceedances are projected beyond 2017, but not beyond 2020. The judgement requires the 33 local authorities where exceedances are projected beyond 2018 to “develop and implement a plan designed to deliver compliance in the shortest time possible”; Havant Borough Council is not one of these authorities, having no projected exceedances beyond 2018, thus it is not required to produce a plan.

Background Concentrations

- 4.11 Estimated background concentrations in the vicinity of the application site have been determined for 2018 using Defra’s 2017-based background maps (Defra, 2019c). The background concentrations are all well below the objectives.

Table 3: Estimated Annual Mean Background Pollutant Concentrations in 2018 ($\mu\text{g}/\text{m}^3$)

Year	NO ₂	PM ₁₀	PM _{2.5}
2018	16.6	14.6	10.3
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.

5 Impact Assessment

Impacts at Existing Receptors

Initial Screening Assessment of Development-Generated Road Traffic Emissions

- 5.1 The trip generation associated with the proposed changes on local roads (as provided by Glanville Consultants Ltd) has initially 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 proposed changes are expected to increase Annual Average Daily Traffic (AADT) flows by a maximum of 30 HGVs on any local road, which is below the screening threshold of 100 HDVs for outside of an AQMA. As such, thus there is no requirement for a detailed assessment and it can be concluded that the proposed changes will not have a significant effect on local air quality.
- 5.2 There are a number of existing sensitive residential receptors in close proximity to the busy junction 3 of the A3(M) and the main carriageway. The T3 monitoring site, operated by Havant Borough Council, is also located at this junction and is in a location representative of the likely exposure at these properties. In 2018, this monitoring site recorded an annual mean nitrogen dioxide concentration well below the objective. Consequently, the small number of additional vehicles associated with the proposed changes is not expected to result in significant air quality effects at this location.

Significance of Operational Air Quality Effects

- 5.3 The operational air quality effects without mitigation are judged to be 'not significant'. This professional judgement is made in accordance with the methodology set out in Appendix A1.
- 5.4 The additional HGV traffic generated by the proposed changes fall well below recognised screening criteria, and pollutant concentrations at all of the selected worst-case existing receptors along the local road network will be well below the air quality objectives.

6 Conclusions

- 6.1 The potential air quality impacts associated with the proposed changes to the bio-methane injection facility at Portsdown Hill in Havant have been assessed. The proposed changes will permit additional third-party operators to inject bio-methane into the gas network at the facility.
- 6.2 The proposed changes will result in an increase in HGV movements below published screening criteria, and there will be no adverse effects on air quality conditions. Therefore, the overall operational air quality effects of the proposed development are judged to be 'not significant'.

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8 Glossary

AADT	Annual Average Daily Traffic
AQC	Air Quality Consultants
AQAL	Air Quality Assessment Level
AQMA	Air Quality Management Area
AURN	Automatic Urban and Rural Network
CAZ	Clean Air Zone
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
kph	Kilometres Per hour
LAQM	Local Air Quality Management
LDV	Light Duty Vehicles (<3.5 tonnes)
LGV	Light Goods Vehicle
µg/m³	Microgrammes per cubic metre
NO	Nitric oxide
NO₂	Nitrogen dioxide
NO_x	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
PM₁₀	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
RDE	Real Driving Emissions
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

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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 m² 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 m² 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 mgNO_x/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 mgNO_x/Nm³;
 - Compression ignition engine: 400 mgNO_x/Nm³;
 - Gas turbine: 50 mgNO_x/Nm³.
- 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 mgNO_x/Nm³ and 25 mgPM/Nm³.

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 m² 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 NO_x 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 NO_x gas boiler or a 30kW CHP unit operating at <95mg/Nm³.

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.

A2 Professional Experience

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Mr Moorcroft is a Director of Air Quality Consultants, and has worked for the company since 2004. He has over 35 years' postgraduate experience in environmental sciences. Prior to joining Air Quality Consultants, he was the Managing Director of Casella Stanger, with responsibility for a business employing over 100 staff and a turnover of £12 million. He also acted as the Business Director for Air Quality services, with direct responsibility for a number of major Government projects. He has considerable project management experience associated with Environmental Assessments in relation to a variety of development projects, including power stations, incinerators, road developments and airports, with particular experience related to air quality assessment, monitoring and analysis. He has contributed to the development of air quality management in the UK, and has been closely involved with the LAQM process since its inception. He has given expert evidence to numerous public inquiries, and is frequently invited to present to conferences and seminars. He is a Member of the Institute of Air Quality Management.

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Mr Buckley is a Consultant with AQC with 2 years' experience in the field of air quality. Prior to joining AQC in June 2019, he worked as a Consultant at Capita, where he gained experience in the assessment of air quality impacts for a range of projects, including road and rail infrastructure schemes, residential developments and industrial facilities sites. He has experience in producing air quality assessments for EIA schemes, using qualitative and quantitative methods, including ADMS-Roads and air quality neutral calculations, and has undertaken diffusion tube monitoring studies. Prior to joining Capita, Jack completed a BSc (Hons) in Chemistry and an MSc in Environmental Science and Management, with both dissertations investigating the performance of low-cost air quality sensors. He is an Associate Member of both the Institute of Air Quality Management and the Institution of Environmental Sciences.