Logika GROUP

Report

Paint Shop Installation, Huntingdon

Air Quality Assessment for Environmental Permit

For Marshall Land System Limited

11 June 2025

Air Quality CONSULTANTS | PART OF Logika Group

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1 Introduction

1.1 This report describes the air quality assessment for the proposed paint shop installation on land adjacent to Washingley Road in Huntingdon. The assessment has been prepared to support the Environmental Permit application which is made in accordance with the Environmental Permitting (England and Wales) Regulations 2016, as amended (EPR). The assessment has been carried out by Air Quality Consultants Limited | Part of Logika Group (AQC) on behalf of Marshall Land Systems Limited ('Marshalls').

1.2 The proposals are to install a paint shop for the respraying of road vehicles in an existing warehouse building. Activities within the installation will involve the painting and respraying of vehicles as well as associated equipment and systems manufactured by the company. Emissions from the proposed installation will arise from:

- six spray booths, with extraction points located on the roof of the main building;
- two shot blast booths (one aluminium, one steel), with extraction points located on the eastern façade of the main building; and
- an underseal extraction point, located in the northern façade of the Vehicle Maintenance Shed in the north of the site.

1.3 These activities will be regulated under Schedule 1, Section 6.4, Part B(b) of the EPR, with Process Guidance Note PG 6/34 establishing the Best Available Techniques (BAT) and relevant emission limits for the activities.

1.4 The detailed modelling of relevant emissions from these processes is described in this report, alongside the model input files which have been packaged as a zip file.

1.5 To facilitate the drying of fresh paint within the booths, inlet air is heated by direct-fired gas heaters equipped with low NOx burners, ranging in size between 90 and 150 kW. These are excluded from consideration in the permit application and this assessment since none of the heaters have an individual thermal input greater than 1 MW and are thus exempt from the EPR.

1.6 The assessment focusses on emissions of the following pollutants on human health in accordance with the scope of PG 6/34 (as natural gas will be used in the heaters, emissions of sulphur dioxide are not relevant):

- particulate matter (PM_{10} and $PM_{2.5}$); and
- Volatile Organic Compounds (VOCs).

1.7 Table 1-1 summarises the site location, whilst Table 1-2 summarises the modelled scenarios and sensitivity tests that have been carried out.

Table 1-1: Site Location

Parameter	Entry
Site Name	CrossLink 252 Paint Shops
Site Address	Washingley Road, Huntingdon, PE29 6WP
Grid Reference of Site Centre (O.S. X,Y)	523220, 274153

Table 1-2: Summary of Model Scenarios and Sensitivity Tests

Parameter	Entry
Scenarios Assessed	Normal operation of the installation at maximum capacity. This scenario assumes continuous operation (8,760 hours) of all processes (see Section 6).
Year for Baseline Conditions	Most recent year of available measurements/predictions – no improvement assumed into the future (see Section 5).
Meteorological Conditions	Five years of meteorological data used each modelled separately. Receptor-specific maxima out of the five years are reported (see Section 6).
Sensitivity Tests	Sensitivity testing has been undertaken with respect to building effects, terrain effects, surface roughness value, and meteorological year. Therefore, the sensitivity of the model to input parameters used within this assessment is well understood. The assessment has also considered a range of EALs for different VOCs that may be used by the facility.

2 Site Description

Nearby Sensitive Features

2.1 The proposed facility is located within the Ermine Business Park in the northern outskirts of Huntingdon, and to the west of the northern bypass road (A141). Figure 2-1 shows the site location and the surrounding area within 5 km. Whilst not shown on the figure, outline planning permission has been granted for a mixed-use development, including 1,500 homes, on land directly to the north ('Grange Farm' application reference 19/01341/OUT) of the application site. An application for residential development to the west of the site ('Land north of Ermine Street' application reference 20/00847/OUT) was submitted in 2020 but is currently undetermined[1]. Table 2-1 summarises the proximity of nearby sensitive features.

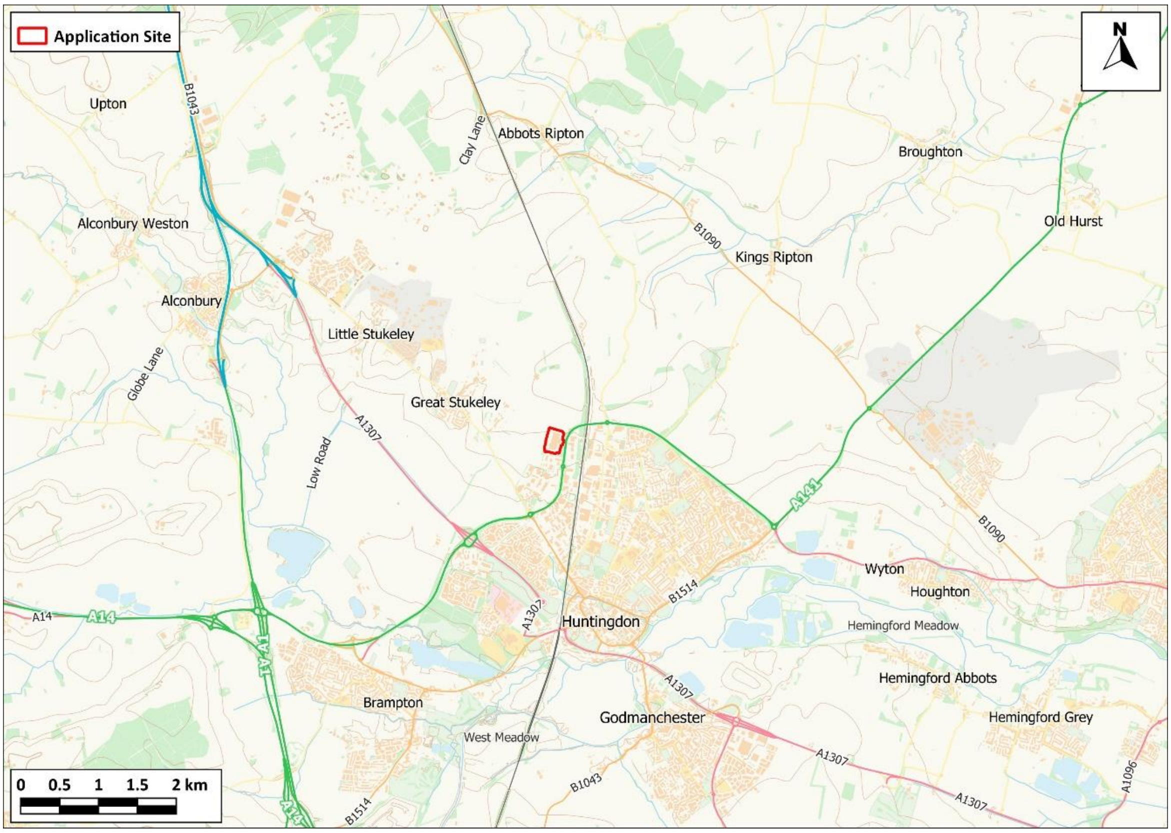

Figure 2-1: Site Location and Surrounding Area within 5 km

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

[1] Whilst the application is yet to be approved, the assessment has considered the development as a receptor to ensure worst-case locations are identified, should the development come forward.

Table 2-1: Summary of Nearby Sensitive Features

Feature	Description	Distance from Centre of Site
Nearest roadside human receptor	Residential property on Howell Drive, south of the A141, and northeast of the facility	1,050 m
Nearest non-roadside human receptor	New residential property to the west of the facility within planning application 20/00847/OUT	155 m
Receptors within the downwash cavity length from the nearest edge/side of the building?	There are no receptors downwind of the building within the region of potential downwash effects	n/a
Sensitive receptor setting	Suburban	n/a
Sensitive receptors within an Air Quality Management Area (AQMA)?	No AQMA declared for particulate matter or VOCs in Huntingdon	n/a

Topography

2.2 Figure 2-2 shows the terrain across the modelled study area using Ordnance Survey (OS) Terrain 50 data.

2.3 The area immediately surrounding the site is broadly flat, with terrain heights across the majority of the study area ranging between zero and 60 m. As such, the facility buildings from which the processes exhaust are approximately at the same elevation as the nearest human health receptors.

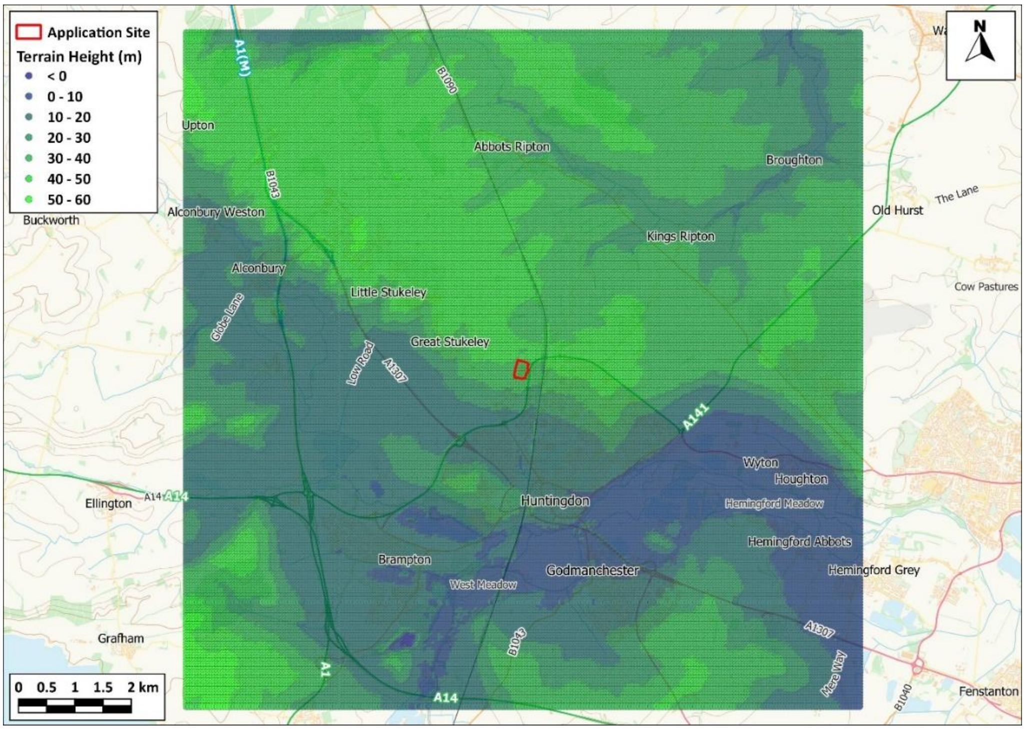

Figure 2-2: Terrain within the Modelled Area

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

3 Description of Process

Process Overview

3.1 The proposed operations will involve the painting and respraying of vehicles, equipment and systems manufactured on or off site within the company's manufacturing division. Painting and respraying processes will involve material usage and application to the refinishing of vehicles other than those produced "in house". In addition to the spraying of complete vehicles and associated equipment and systems, there will be a small amount of part spraying (interior components) prior to main assembly.

3.2 The proposed installation will comprise:

- six spray booths (the largest two of these can be further sub-divided to form four smaller spray booths);
- an aluminium shot blast booth and a steel shot blast booth;
- a mixing room, paint kitchen and recycling room;
- extraction and dust arrestment systems; and
- dedicated paint and waste storage areas.

3.3 The overall process can be separated into five distinct activities which will generate emissions to air:

- vehicle preparation – this stage includes filling, sanding and cleaning prior to entry to the spray booth. Sanding equipment is connected to individual vacuum units, whilst shot blasting is carried out within the dedicated booths using manual gun blasting equipment. Air extracted from the booths is routed through dust arrestment plant prior to discharge via the wall mounted fans;
- paint delivery and mixing – paints are pre-mixed in dedicated rooms fitted with extraction systems providing negative pressure. Air is extracted from the rooms through the roof, with an extraction rate designed to prevent solvent vapours escaping to the main workshop;
- paint application – paint is applied to vehicles in the spray booths using specialist equipment, with air extracted to roof level via dedicated air handling units in each booth connected to exhaust stacks on the roof. After spraying, inlet air is heated using the gas heaters and paints 'baked' for 40 – 60 minutes;
- wax application – chassis require underseal corrosion protection, which is applied in the Vehicle Maintenance Shed, with air extracted through a single exhaust stack; and
- spray gun cleaning – guns are cleaned in a fully enclosed unit fitted with an extract system to prevent the escape of solvent vapours.

3.4 Figure 3-1 shows the site plan and layout.

Figure 3-1: Site Layout

Data provided by Bidwells LLP, drawing reference DR-A-003, Revision 1.

Operating Conditions

3.5 Under the Regulations, the spray painting of vehicles is regulated under Schedule 1, Section 6,4, Part B(b), and as such is required to hold a Local Authority Part B permit. The facility will be required to meet the stack emission limits, abatement techniques and usage quantities in Process Guidance Note 6/34 (11) (Defra, 2013). Particulate matter emissions are controlled by dust arrestment equipment, whilst VOC emissions are controls by ensuring all paint products meet the maximum VOC content as established by the Paints Directive (Directive 2004/42/EC) and ensuring all stacks emitting VOCs discharge a minimum of 3 m above roof level and at a velocity not less than 15 m/s.

3.6 Most of the processes taking place at the installation are batch processes, meaning there will not be continuous emissions from any of the sources. The blast booths do not generate VOC emissions, and therefore only emissions of particulate matter (PM_{10} and $PM_{2.5}$) have been modelled from these sources.

4 Environmental Standards for Air

4.1 The relevant Air Quality Standards (AQS), Air Quality Objectives (AQOs) and EALs for human health impacts are set out in Table 4-1 (2025a).

4.2 Guidance provided by the Environment Agency (2025a) advises that, where the speciation of VOC emissions is unknown, the assessment should assume the total mass of VOCs is accounted for by benzene. However, a review of the Material Safety Data Sheets for VOCs within each product that may be used within the facility identified that benzene is not present in any of the listed products.

4.3 Whilst none of the products identify benzene, some of the products contain other VOCs with established EALs such as toluene (up to 50% w/w in some products), xylene (up to 50% w/w in some products) and ethylbenzene (up to 25% w/w in some products). In the absence of benzene in any product, and following the Environment Agency's guidance on assessing VOCs (2025a)[2], it is, therefore, considered more appropriate to assess against the EALs for toluene, since this has the most stringent EAL of the most prevalent VOCs in any of the products[3]. Consequently, toluene has been selected as the proxy VOC for the core assessment. However, a small number of products contain other VOCs, albeit in very low (<6%) quantities, which have more stringent EALs than toluene, namely styrene and naphthalene. As such, a sensitivity test has been included to assess the potential impacts of these compounds.

Table 4-1: Assessment Criteria for Human Health

Pollutant	Averaging Period	Designation	Metric (µg/m³)	Acceptable Exceedance Criteria
PM_{10}	Annual	AQS / AQO	40	Zero exceedances
	24-hour (short term)	AQS / AQO	50	Not to be exceeded more than 35 times a year
$PM_{2.5}$	Annual	AQS	20	Zero exceedances
Toluene	Weekly (long term)	EAL	260	Zero exceedances
	1-hour	EAL	8,000	Zero exceedances
Naphthalene	24-hour (long term)	EAL	3	Zero exceedances
Styrene	1-hour	EAL	800	Zero exceedances

4.4 The AQS and AQOs are defined within the Air Quality Standards (England) Regulations 2010 and the Air Quality (England) Regulations 2000, as amended, respectively. These Regulations clarify the AQS and AQO 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 assessment criteria. Defra explains where these criteria apply in its Local Air Quality Management Technical Guidance (Defra, 2022). Although EALs are not defined in these Regulations, it is common to apply the same approach to assessing relevant exposure for EALs as AQS and AQOs.

4.5 Annual mean assessment criteria are considered to apply at the façades of residential properties, schools, hospitals etc.; they do not apply at hotels. The weekly mean is considered to apply at the

[2] The guidance allows consideration of other appropriate EALs provided that justification is presented.
[3] For example, xylene has a long-term EAL of 4,410 µg/m³, and a 1-hour mean EAL of 66,200 µg/m³, whilst butane has a long-term EAL of 14,500 µg/m³ and a 1-hour mean EAL of 181,000 µg/m³.

same locations as the annual mean objective, as well as at hotels, whilst the 24-hour mean also extends to gardens of residential properties. The 1-hour mean assessment criterion applies wherever members of the public might regularly spend one-hour or more, including outdoor eating locations and pavements of busy shopping streets.

4.6 In the UK, only monitoring and modelling carried out by UK Central Government meets the specification required to assess compliance with the AQS and specific monitor and receptor siting requirements apply. None of the AQS, AQO or EAL values apply in places of work where members of the public have no free access and where relevant provisions concerning health and safety at work apply (AQC, 2016).

5 Baseline Conditions

5.1 Baseline conditions of toluene have been sourced from Defra's automatic hydrocarbon network, whilst baseline conditions for particulate matter (PM_{10} and $PM_{2.5}$) have been determined from measurements made by Huntingdonshire District Council (HDC).

5.2 Baseline conditions of particulate matter have also been sourced from Defra's published background maps (Defra, 2025a); Defra does not report background concentrations of toluene.

Local Air Quality Management

5.3 Under Part IV of the Environment Act 1995, HDC is required to periodically review and assess air quality within its area of jurisdiction. This process of Local Air Quality Management (LAQM) is an integral process for achieving the national AQOs.

5.4 Review and assessments of local air quality aim to identify areas where national policies to reduce vehicle and industrial emissions are unlikely to result in air quality meeting the Government's air quality objectives by the required dates.

5.5 Where the assessment indicates that some, or all, of the objectives may be potentially exceeded, the Local Authority has a duty to declare an AQMA. The declaration of an AQMA requires the Local Authority to implement an Air Quality Action Plan (AQAP) to reduce air pollution concentrations so that the required AQOs are met.

5.6 Whilst HDC currently has an AQMA declared for nitrogen dioxide, there is no corresponding declaration for either PM_{10} or $PM_{2.5}$. Similarly, there are no AQMAs for toluene across the whole of the UK.

Monitoring Data

Toluene

5.7 Monitoring data for toluene for 2020 to 2024, inclusive, from the nearest monitoring station, located on Marylebone Road in London, approximately 92 km south of the application site, are provided in Table 5-1. Monitoring data have been downloaded from Defra's Air Information Resource (Defra, 2025b). Measured concentrations of toluene in all five years are well below the long-term EAL.

Table 5-1: Summary of Annual Mean Toluene Monitoring Data

Site Name	Site Type	Location	2020	2021	2022	2023	2024
London Marylebone Road	Urban Traffic	Marylebone Road, London	1.9	2.0	1.8	1.6	1.5
Long-term EAL			260				

PM_{10} and $PM_{2.5}$

5.8 HDC operates an automatic monitor in Huntingdon ("Pathfinder House"), approximately 3 km southeast of the application site, which measures PM_{10} and $PM_{2.5}$ concentrations. The location of the monitor relative to the application site is shown in Figure 5-1.

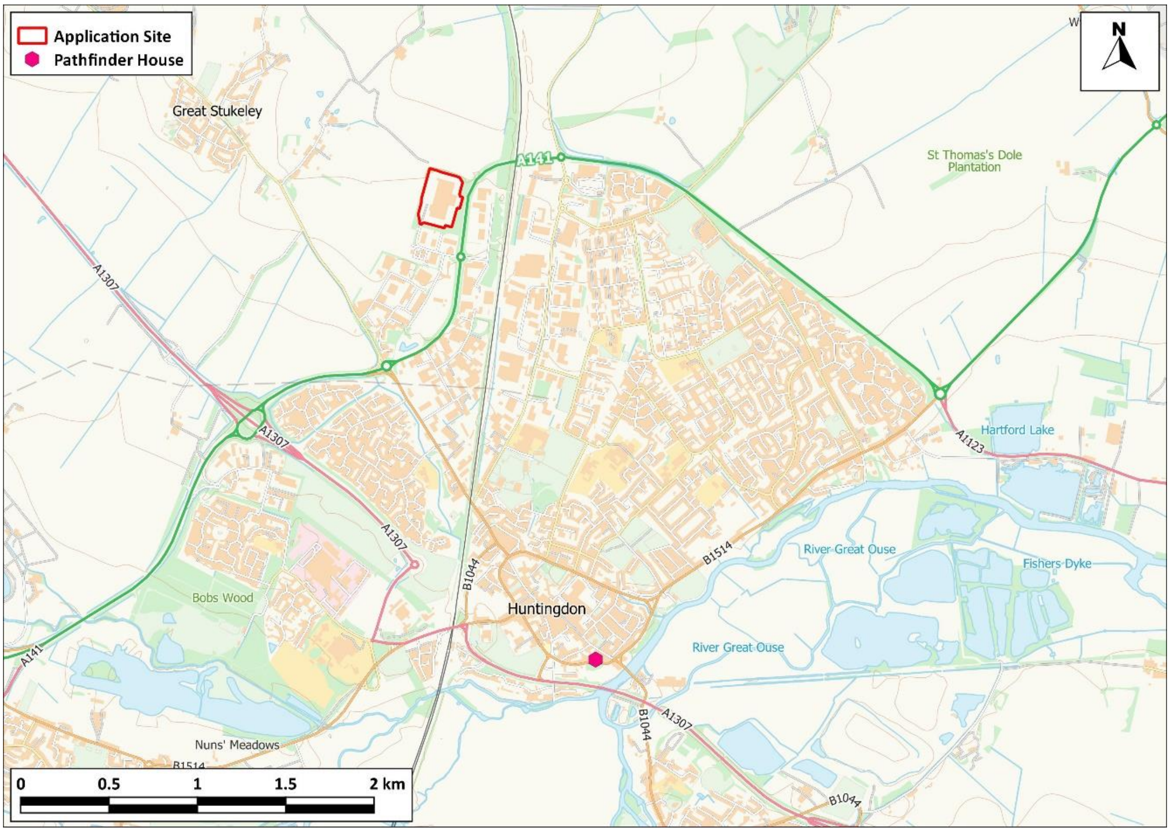

Figure 5-1: Pathfinder House Monitoring Location Relative to the Application Site

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

5.9 Data for 2020 to 2024 are provided in Table 5-2, and have been downloaded from Defra's Air Information Resource (Defra, 2025b). Measured concentrations of PM_{10} and $PM_{2.5}$ in all five years are well below the long-term AQOs.

Table 5-2: Summary of Annual Mean PM_{10} and $PM_{2.5}$ Monitoring Data

Site Name	Site Type	Pollutant	2020	2021	2022	2023	2024	Objective
Pathfinder House	Urban Traffic	PM_{10}	14.2	14.6	14.8	13.5	12.5	40
		$PM_{2.5}$	7.7	8.0	8.3	7.0	7.0	20

Background Maps

5.10 Estimated background concentrations of PM_{10} and $PM_{2.5}$ in the study area are set out in Table 5-3 and are all well below the annual mean objectives. A range of values is presented as the study area covers multiple 1x1 km grid squares.

Table 5-3: Estimated Annual Mean Background Concentrations in 2024 (µg/m³)

Pollutant	Value	Objective
PM_{10}	11.2 – 16.1	40
$PM_{2.5}$	6.0 – 9.5	20

Summary of Baseline Concentrations

5.11 Table 5-4 sets out the baseline annual mean concentrations used in this assessment.

5.12 It is not appropriate to add predicted short term or percentile concentrations from different emission sources, since peak contributions from different sources would not necessarily coincide in time or space. For the purposes of estimating short-term baseline concentrations (averaging periods of 24-hours or less that are defined as short-term), a factor of two has been applied to the annual mean baseline concentration in Table 5-4 in accordance with the Environment Agency's "*Air emissions risk assessment for your environmental permit*" guidance (2025a).

Table 5-4: Baseline Annual Mean Concentrations Used in the Assessment

Pollutant	Value (µg/m³)	Derivation
Toluene	2.0	Highest concentration measured from the Marylebone Road monitor between 2020 and 2024
PM_{10}	16.1	Highest concentration measured at Pathfinder House, Huntingdon monitor between 2020 and 2024 and Defra's background maps
$PM_{2.5}$	9.5	

6 Modelling Methodology

6.1 Modelling has been carried out using the following Environment Agency guidance:

- Air emissions risk assessment for your environmental permit (Environment Agency, 2025a); and
- Environmental permitting: air dispersion modelling reports (Environment Agency, 2025b).

Dispersion Model

6.2 There are two primary dispersion models which are used extensively throughout the UK for assessments of this nature and accepted as appropriate air quality modelling tools by the Regulators and local planning authorities alike:

- The ADMS model, developed in the UK by Cambridge Environmental Research Consultants (CERC) in collaboration with the Met Office, National Power and the University of Surrey; and
- The AERMOD model, developed in the United States by the American Meteorological Society (AMS)/United States Environmental Protection Agency (EPA) Regulatory Model Improvement Committee (AERMIC).

6.3 Both models are termed 'new generation' Gaussian plume models, parameterising stability and turbulence in the Planetary Boundary Layer (PBL) by the Monin-Obukhov length and the boundary layer depth. This approach allows the vertical structure of the PBL to be more accurately defined than by the stability classification methods of earlier dispersion models. Like these earlier models, ADMS and AERMOD adopt a symmetrical Gaussian profile of the concentration distribution in the vertical and crosswind directions in neutral and stable conditions. However, unlike earlier models, the ADMS and AERMOD vertical concentration profile in convective conditions adopts a skewed Gaussian distribution to take account of the heterogeneous nature of the vertical velocity distribution in the Convective Boundary Layer (CBL).

6.4 Numerous model inter-comparison studies have demonstrated little difference between the output of ADMS and AERMOD, except in certain scenarios, such as in areas of complex terrain (Carruthers et al., 2011). For the purposes of this study, the use of the ADMS model (version 6) is adopted. ADMS is widely used for assessments of this type and has been extensively validated. Consequently, it is considered suitable for the current assessment.

Emission Scenarios

6.5 A single model scenario has been developed to assess the impact of the site's operations. This assumes that all processes operate continuously throughout the year (8,760 hours), as described in Section 3. This will overestimate the contribution of the facility to ambient concentrations, since in reality there will be periods when the facility is not operational (such as for maintenance) and many of the processes are batch process in nature.

6.6 Additionally, the precise emissions are likely to vary depending on the specific stage of the spray-painting operations being undertaken within the installation. As precise details on timings and quantities used per hour are unavailable, this assessment assumes that the installation is constantly operating with in-stack concentrations at the maximum Emission Limit Values (ELVs) permitted within Process Guidance Note 6/34 (11) (Defra, 2013); therefore, the modelling scenario is considered conservative. PG 6/34 does not provide ELVs for VOCs (the associated controls/limits are applicable to the VOC content of the paint used) so an emission concentration of 50 mg/Nm^3 has been adopted for all emission points releasing VOCs based on manufacturer performance data.

Stack and Emission Parameters

6.7 Figure 6-1 presents the locations of all emission sources modelled. The associated stack physical parameters and emission parameters for each modelled stack are presented in Appendix A1.

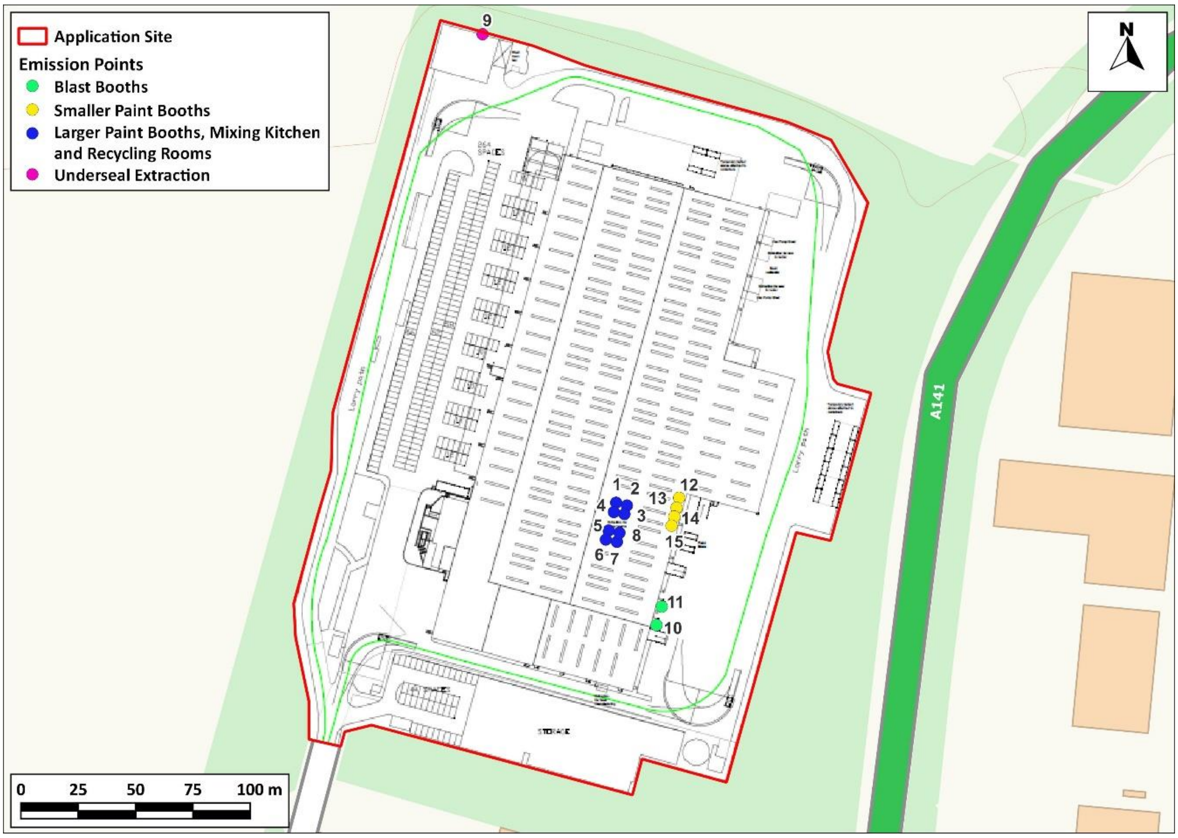

Figure 6-1: Location of Emission Points

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0. Includes data provided by Bidwells LLP, drawing reference DR-A-003, Revision 1.

6.8 Stack physical parameters and exhaust parameters (such as exhaust gas velocity) have been provided by Bidwells LLP. The corresponding volumetric flows are applied to the relevant emission limit values to obtain the pollutant emission rates.

6.9 It is assumed the facility is operating at the full load conditions continuously throughout the year. This will overestimate long-term impacts as processes are batch in nature.

Receptors and Study Area

6.10 Human health impacts have been predicted over a 10 km x 10 km model domain, with the site at the centre.

6.11 Concentrations have been predicted over this area using nested Cartesian grids (see Figure 6-2). These grids have a spacing of:

- 5 m x 5 m within 200 m of the centre of the site;
- 25 m x 25 m within 400 m of the centre of the site;

- 50 m x 50 m within 1,000 m of the centre of the site;
- 250 m x 250 m within 2,000 m of the centre of the site; and
- 500 m x 500 m within 5,000 m of the centre of the site.

6.12 This grid is considered to provide a sufficiently high resolution to enable the identification of worst-case impacts throughout the study area. The receptor grid has been modelled at a height of 1.5 m above ground level.

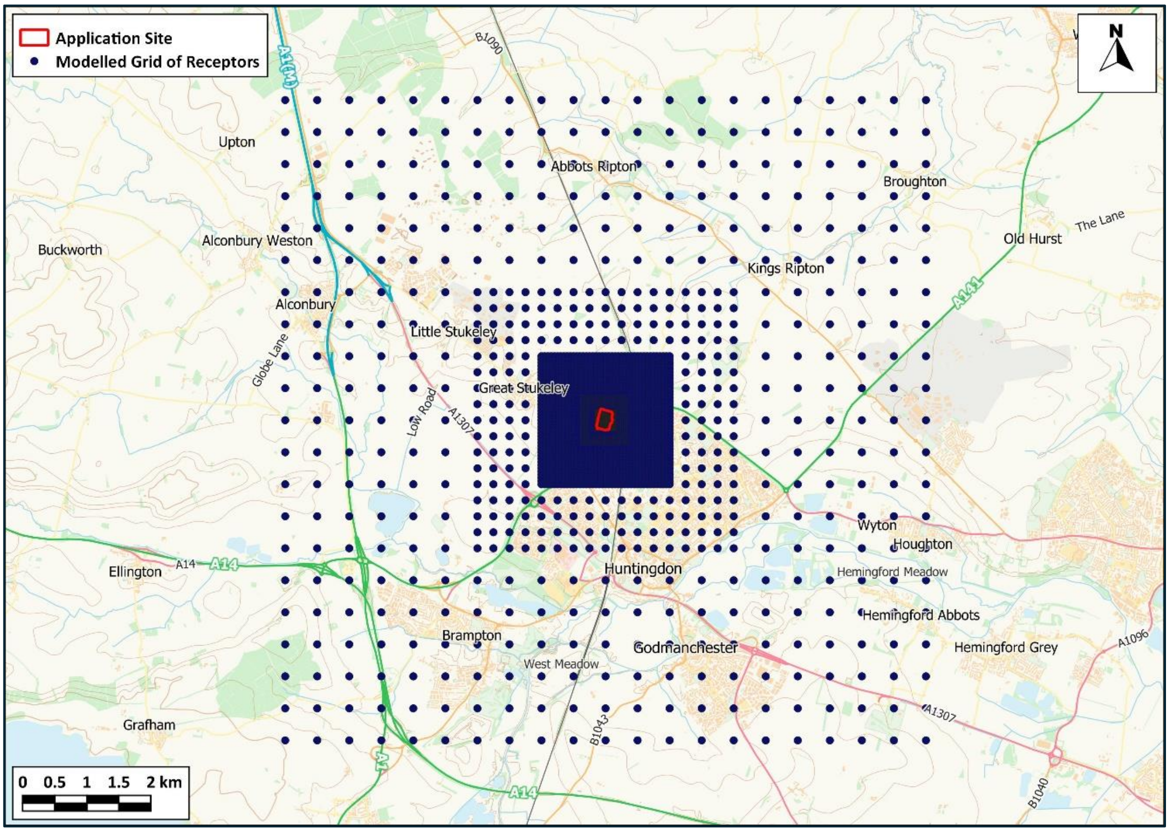

Figure 6-2: Nested Grid of Modelled Receptors

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6.13 Specific receptors have also been selected to determine impacts at locations where the assessment criteria apply. The specific receptors identified are detailed in Table 6-1 and shown in Figure 6-3. All receptors have been modelled at a height of 1.5 m above ground level.

Table 6-1: Specific Human Health Receptor Coordinates

Receptor ID	Description	X Coordinate	Y Coordinate	Approximate Distance to Site Boundary (m)
A	Vindis Volkswagen Car Garage	523152	273979	30
B	Vindis Huntingdon Audi Car Garage	523204	273964	30

Receptor ID	Description	X Coordinate	Y Coordinate	Approximate Distance to Site Boundary (m)
C	Vantage Park Day Nursery	523126	273851	160
D	Residential property in proposed development to west	523048	273961	70
E	Residential property in proposed development to west	523079	274168	35
F	Tennis courts in proposed development to west	523090	274222	40
G	Residential property in consented development to north (Grange Farm)	523269	274399	105

Figure 6-3: Specific Human Health Receptor Locations

Imagery ©2025 Airbus, Maxar Technologies. Includes data from JTP Studios (Grange Farm Application) and Savills (Western Application).

Meteorological Data

6.14 To allow for uncertainties in local and future-year conditions, the dispersion model has been run five times, with each run using a different full year of hour-by-hour meteorological data from the nearest appropriate meteorological site.

6.15 Hourly sequential meteorological data from Monks Wood have been used for the years 2019-2023 inclusive. The Monks Wood meteorological monitoring station is located approximately 6 km to the northwest of the site. It is considered to be the nearest monitoring station representative of meteorological conditions at the site. The Monks Wood meteorological station is operated by the UK Meteorological Office. Raw data were provided by the Met Office, and processed by AQC for use in ADMS.

6.16 The meteorological parameters entered into the model are shown in Table 6-2. Wind roses for each year are presented in Appendix A2.

Table 6-2: Meteorological Parameters Entered into the ADMS Model

Parameter	Modelled Receptors	Meteorological Site
Surface Roughness	Variable Surface Roughness File	0.3 m
Minimum MO Length	10 m	1 m
Surface Albedo	0.23 [a]	0.23 [a]
Priestly-Taylor Parameter	1 [a]	1 [a]

[a] Model default value. An analysis of the effects of surface characteristics on ground level concentrations by the UK Atmospheric Dispersion Modelling Liaison Committee (Auld et al., 2003) concluded surface energy budget parameters such as albedo and the Priestly-Taylor parameter have "*relatively little impact on model uncertainty*". Consequently, it is considered appropriate to retain the model default values which are applicable for moist ground that is not snow covered (representative of typical UK conditions).

Surface Roughness

6.17 The roughness length represents the aerodynamic effects of surface friction and is defined as the height at which the extrapolated surface layer wind profile tends to zero. This value is an important parameter used by meteorological pre-processors to interpret the vertical profile of wind speed and estimate friction velocities which are, in turn, used to define heat and momentum fluxes and, consequently, the degree of turbulent mixing in the boundary layer.

6.18 The surface roughness length is related to the height of surface elements; typically, the surface roughness length is approximately 10% of the height of the main surface features. Consequently, it follows that surface roughness is greater in urban, congested areas than in rural, open areas.

6.19 CERC (2023) and Oke (1987) suggest typical roughness lengths for various land use categories as summarised in Table 6-3.

Table 6-3: Typical Surface Roughness Lengths of Different Land Use Types

Type of Surface	Surface Roughness Length (m)
Ice	0.00001
Smooth snow	0.00005
Calm sea / water	0.0001 - 0.0002
Lawn grass	0.01
Pasture	0.2
Isolated settlement (farms, trees, hedges)	0.4
Parkland, woodlands, villages, open suburbia	0.5 - 1.0

Type of Surface	Surface Roughness Length (m)
Forests/cities/industrialised areas	1.0 - 1.5
Heavily industrialised areas	1.5 - 2.0

6.20 The study area encompasses a range of land types. Consequently, a variable surface roughness file has been used to represent the spatial variation of the surface roughness over each land type as shown in Figure 6-4. The following parameters have been used to define the surface roughness length and land type:

- forest – 1 m;
- built-up area – 0.5 m;
- grassland – 0.2 m; and
- water – 0.0001 m.

6.21 The variable surface roughness file was generated for a 50 m resolution gridded area covering the model domain by assigning appropriate representative surface roughness values based on the underlying land use categories. The land use categories were derived by combining those defined in the Meridian 2 and VectorMap District datasets available from OS. The surface roughness file was amended to reflect the presence of new residential properties directly adjacent to the site which are currently assigned as grassland in OS datasets.

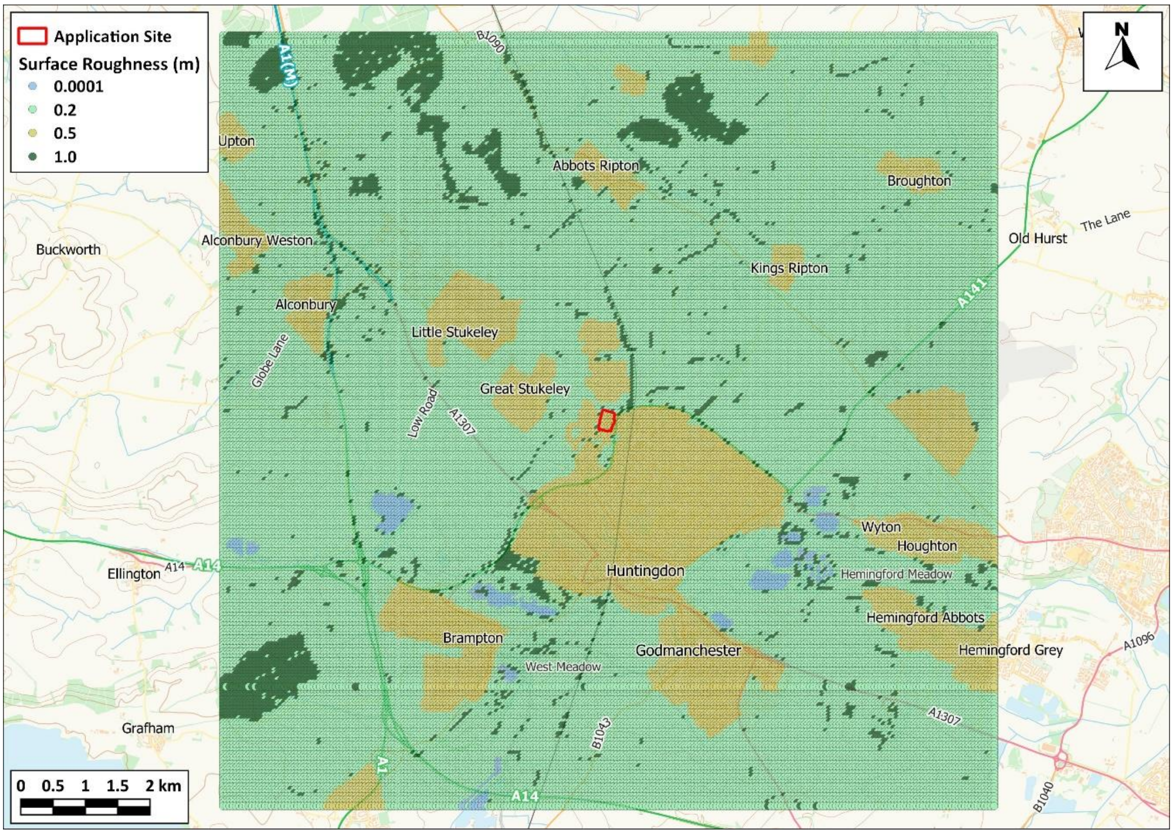

Figure 6-4: Surface Roughness across Modelled Area

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6.22 A sensitivity test was also included to determine the sensitivity of the model to the surface roughness length assigned to built-up areas, which is the land use class immediately surrounding the facility. The sensitivity test was run using a length of 0.5 m.

Buildings

6.23 Atmospheric flow is disrupted by aerodynamic forces in the immediate vicinity of structures. These disruptions generate an area of stagnation behind the structure known as the cavity region. The flow within this region is highly turbulent and can be visualised as circulating eddies of air. The area beyond the cavity region is known as the building wake, where turbulence generated by the structure gradually decays to background levels. The entire area covered by the cavity region and turbulent wake is known as the 'building envelope'.

6.24 The above phenomena can cause a plume to be drawn downwards towards the ground in the building envelope, resulting in elevated ground level concentrations; this effect is known as building induced downwash. The building envelope is generally regarded as extending to a height of three times the height of the structure in the vertical plane, and a distance of 5L (where L is the lesser of the building width or height) from the foot of the building in the horizontal plane. Consequently, stacks within these extents should be identified and the corresponding building included in the dispersion model. The location of the modelled buildings relative to the stacks are shown in Figure 6-5 with their dimensions provided in Table 6-4. Building heights have provided by Bidwells LLP.

6.25 Sensitivity analysis to understand the effects of assumptions related to the treatment of buildings within the model is provided in Table 6-5.

Figure 6-5: Buildings Included in the Model (Inset Shows 3D Image: Modelled Buildings – Green-topped Objects and Modelled Flues - Red-topped Cylinders)

Additional data sourced from third parties, including public sector information licensed under the Open Government Licence v3.0.

Table 6-4: Modelled Building Dimensions

Building	X (m)	Y (m)	Width (m)	Rotation (°)	Height (m)	Length (m)	Main Building?
Main Hangar	523228	274147	221.5	285.0	13.2	92.4	Yes
Hangar Ridge	523241	274159	34.5	195.0	17.6	188.0	No
Hangar Extension	523291	274141	60.8	104.7	9.3	32.1	No
Maintenance Shed	523170	274308	25.5	195.0	8.2	25.5	No

Terrain Effects

6.26 Figure 2-2 shows the terrain across the modelled study area using OS Terrain 50 data. The ADMS User Guide recommends terrain data should be included in the model set up where terrain gradients exceed 1 in 10. Terrain gradients do not exceed this criterion and, consequently, terrain data have not been included in the core model set up.

6.27 However, sensitivity analysis with respect to the treatment of terrain is provided in Table 6-5.

Model Post-Processing

6.28 For each individual receptor point on the nested Cartesian grids, the maximum predicted concentration across any of the five meteorological datasets has been determined. It is these maxima which are presented.

Annual Mean Process Contributions (PCs)

6.29 The model has been run assuming constant operation.

6.30 Annual mean Process Contributions (PCs) have been obtained from the raw model output using this assumption. Similarly, no adjustment has been made to the weekly mean PCs, since it is possible that the facility could operate for a complete week (168 hours).

Short-term PCs

6.31 Short-term PCs have been predicted assuming continuous operation with the model configured to output the relevant averaging period and percentile based on the acceptable number of exceedances as defined by the AQS / AQO / EAL. This provides a worst-case assessment.

6.32 Since it is not appropriate to add percentiles, the short-term PCs presented in the assessment are based on all processes within the site operating concurrently.

Special Model Treatments

6.33 Due to the proximity of the four stacks within the spray booths, the ADMS 6 combined stack module has been used (the stacks are within a distance of five diameters of each other). This module combines the source parameters for each stack and models them as a single source. In this case, stacks 1 to 4, stacks 5 to 8 and stacks 12 to 15 have been combined into three single sources (see Appendix A1).

6.34 Since the extraction from the blast booths is via wall-mounted fans, the Environment Agency's recommended approach for modelling non-buoyant horizontal sources has been followed. This recommends modelling the velocity at 0.1 m/s and using the ADMS module that turns off stack tip downwash effects.

6.35 Special model treatments for e.g., short-term (puff) releases, coastal effects, fluctuations or photochemistry have not been used in this assessment.

Model Uncertainty

6.36 The point source dispersion model used in the assessment is dependent upon emission rates, flow rates, exhaust temperatures and other parameters for each source, all of which are both variable and uncertain. There are then additional uncertainties, as models are required to simplify real-world conditions into a series of algorithms. These uncertainties cannot be easily quantified, and it is not possible to verify the point-source model outputs. Where these parameters have been estimated the approach has been to use reasonable worst-case assumptions.

6.37 On balance, when taking into account the approach taken to meteorological conditions, the assumption that all sources will operate at 100% load continuously throughout the year at emission limits, and the sensitivity testing for building downwash, terrain and surface roughness, the assessment can be expected to robustly predict the impacts of the facility. The approach has been designed to provide a robust and conservative assessment.

6.38 The use of dispersion models has been widely used in the UK for both regulatory and compliance purposes for many years and is an accepted approach for this type of assessment. The model used has also undergone extensive validation.

Sensitivity Analysis

6.39 As discussed in Paragraph 6.36, the point source dispersion model used in this assessment is required to simplify real-world conditions into a series of algorithms. Consequently, sensitivity analysis is an important component of any model assessment, since it helps to identify the potential magnitude of uncertainty in model predictions and the associated impacts on the conclusions of the assessment. Various sensitivity analyses have been undertaken in relation to the following inputs:

- meteorological data;
- buildings;
- terrain; and
- surface roughness.

6.40 The aim of the sensitivity analysis is not necessarily to find a model setup that obtains the maximum possible prediction from the model, but to provide greater understanding of how assumptions on key input variables may affect the assessment, so that these factors can be considered when evaluating the significance of potential effects and determining the conclusions of the assessment.

6.41 Sensitivity tests have been undertaken by establishing a 'core' model that is considered to best represent the actual site characteristics and emission scenarios. This is the model from which the results in Section 8 are obtained. This model is then run in different configurations to quantify the impact certain model options or assumptions may have on predicted concentrations. For buildings and terrain, this is simply a case of running one version of the model with these aspects included, and a second version with them excluded. In the case of the surface roughness sensitivity, the model has been run with a variable surface roughness file and a fixed surface roughness value (0.5 m) across the model domain.

6.42 The results of the sensitivity test at the worst-case specific receptor location have been compared and presented as a ratio to the 'core' model. For example, a value of 0.8 indicates the maximum result from the sensitivity test is 20% smaller than the 'core' model, whilst a value of 1.2 indicates the maximum result from the sensitivity test is 20% greater than the 'core' model.

6.43 Table 6-5 presents the sensitivity tests for the annual mean (PM), weekly mean (toluene), 24-hour means (PM_{10}) and 100th percentile of 1-hour means (toluene) at the specific receptor of maximum concentration for each run.

Table 6-5: Model Sensitivity Results

Model Sensitivity Test	Toluene		PM	PM_{10}
	Weekly Mean	1-hour Mean	Annual Mean	24-hour Mean
Core model (buildings included, no terrain, variable surface roughness file)	1.00	1.00	1.00	1.00
With terrain (as per Core model but with terrain file included)	1.05	0.96	0.74	0.74
No buildings (as per Core model but buildings excluded from model set up)	0.69	0.74	0.55	0.55
Uniform surface roughness length of 0.5 m (as per Core model but with a uniform roughness length rather than a variable roughness file)	1.18	0.98	1.05	1.08

6.44 The sensitivity analysis indicates that different averaging periods have different sensitivities to the model input parameters. For example, the weekly mean predictions (toluene) are relatively insensitive to the treatment of terrain, whilst the 24-hour annual mean predictions are affected by the inclusion of terrain, despite the relatively uniform nature of terrain across the model domain. Greater sensitivity is observed across all averaging periods in the treatment of buildings, which reflects the presence of the large production building and its associated downwash effects. The assumption that the area is represented by a uniform surface roughness mostly leads to higher predictions than the core scenario, which is likely to be due to the presence of large areas of grassland in the direction of the prevailing wind which would likely result in a model domain-averaged surface roughness length less than 0.5 m. Where building effects are included in the model, increasing surface roughness generally increases the maximum ground level concentration due to enhanced building downwash.
.

6.45 Table 6-6 presents normalised results (ratio of the maximum impact at any specific receptor for a given year to the maximum impact at any specific receptor from any year) from the meteorological year sensitivity test and displays the typical range in outcomes that could be expected for any given year. The analysis demonstrates that there is a large variation (typically around 20%, but up to as much as 43%) in pollutant concentrations for all averaging periods.

Table 6-6: Meteorological Year Sensitivity Results (Core Model Scenario)

Year	Toluene		PM	PM_{10}
	Weekly Mean	1-hour Mean	Annual Mean	24-hour Mean
2019	0.79	0.87	0.72	0.61
2020	0.82	0.85	0.80	0.75
2021	0.75	1.00	1.00	1.00
2022	1.00	0.90	0.62	0.57
2023	0.83	0.91	0.78	0.77

Data Gaps and Assumptions

6.46 Table 6-7 details the data gaps identified during the course of the assessment and the corresponding assumption made in order to allow an assessment to proceed.

Table 6-7: Data Gaps and Assumptions

Data Gap	Assumption
Speciation of VOCs	VOCs have been modelled as a group with the model predictions for the group as a whole assessed against the toluene EAL, since in the absence of benzene in any product, this is the most prevalent VOC in the products used. This approach is in accordance with Environment Agency guidance. Additional sensitivity tests have also been made assuming the VOCs are accounted for by naphthalene and styrene due to the lower EALs of these compounds compared to toluene.
Particle size distribution	It has been assumed that the total particulate matter in the airstream consists either entirely of particulate matter <10 µm in aerodynamic diameter or of particulate matter <2.5 µm in aerodynamic diameter. In reality, there will be a range of size fractions present in the airstream, such that assuming exclusively PM_{10} or $PM_{2.5}$ is conservative.
Actual emission levels	Emissions have been modelled assuming they occur at the relevant emission limit value or manufacturer performance levels continuously throughout the year.

7 Assessment Approach

7.1 The Environment Agency's "*Air emissions risk assessment for your environmental permit*" guidance (2025a) (previously Horizontal Guidance Note H1) provides methods for quantifying the environmental impacts of emissions to air. This compares predicted PCs and predicted environmental concentrations (PEC, i.e., PC in addition to baseline) to both long- and short-term environmental standards. These standards include guideline EALs and statutory AQS / AQO.

7.2 Air emission risk assessments for environmental permits require a three-tiered approach to assessing the significance of emissions to atmosphere. The first stage is to 'screen out' insignificant emissions to air using the H1 screening tool; these are emissions which are emitted in such small quantities that they are unlikely to cause a significant impact on ground level concentrations. The Environment Agency's guidance suggests that emissions are insignificant where PCs are less than:

- 1% of a long-term environmental standard; or
- 10% of a short-term environmental standard.

7.3 For those emissions that cannot be screened out as insignificant using the H1 software tool, the guidance indicates that further modelling of emissions may be appropriate for long term effects where the PEC is greater than 70% of the long-term environmental benchmark. For short-term effects, further modelling of emissions is required where the PC is more than 20% of the difference between twice the (long term) background concentration and the relevant short term environmental benchmark (i.e., more than 20% of the model 'headroom').

7.4 In any resultant modelling assessment, the EA guidance explains no further action is required where the assessment shows that both of the following apply:

- Emissions comply with Best Available Technique Associated Emission Levels (BAT-AELs) or the equivalent requirements where there is no BAT-AEL; and
- The resulting PECs will not exceed environmental standards.

7.5 Consequently, in this modelling study, the assessment of impacts is primarily made with respect to the PEC. Where the PEC is exceeded and BAT-AELs are being met, an assessment of the significance of the installation's impact towards the exceedance is made using the H1 software tool first tier insignificance criteria and/or professional judgment taking into account other mitigating factors, e.g., the probability of exceedance. Although the insignificance criteria technically apply to PCs predicted using the H1 software tool, they are considered suitable proxies for determining the significance of an installation's modelled contribution to a PEC.

7.6 This assessment models all relevant pollutants emitted from the various emission sources, including those that may have been screened out as insignificant using the H1 software tool, to provide a more robust prediction of the installation's impact on local air quality.

8 Results

VOCs

Emissions as 100% Toluene

8.1 Table 8-1 presents the maximum PCs and PECs at any assessed receptor, as well as the specific receptors identified in Figure 6-3 and Table 6-1, assuming that emissions from the facility are entirely comprised toluene.

Table 8-1: Maximum Toluene PCs and PECs at Relevant Human Health Receptors

Location	X Coordinate	Y Coordinate	PC (µg/m³)	PC (% of assessment level) [a]	PEC (µg/m³) [b]	PEC (% of assessment level) [a]
Weekly Mean Toluene EAL (260 µg/m³)						
Max on Grid [c]	523270	274113	24.4	9.4	26.4	10.2
A [c]	523152	273979	5.0	1.9	7.0	2.7
B [c]	523204	273964	3.8	1.4	5.8	2.2
C	523126	273851	3.4	1.3	5.4	2.1
D	523048	273961	2.6	1.0	4.6	1.8
E	523079	274168	1.6	0.6	3.6	1.4
F [c]	523090	274222	1.8	0.7	3.8	1.5
G	523269	274399	6.7	2.6	8.7	3.4
1-hour Mean Toluene EAL (8,000 µg/m³)						
Max on Grid [c]	523150	274083	285.6	3.6	289.6	3.6
A	523152	273979	107.4	1.3	111.4	1.4
B	523204	273964	117.6	1.5	121.6	1.5
C	523126	273851	49.0	0.6	53.0	0.7
D	523048	273961	57.3	0.7	61.3	0.8
E	523079	274168	83.0	1.0	87.0	1.1
F	523090	274222	89.0	1.1	93.0	1.2
G	523269	274399	72.5	0.9	76.5	1.0

[a] Based on unrounded numbers.

[b] After adding the relevant baseline concentrations from Table 5-4.

[c] This row has been greyed out as the assessment criterion does not apply at this location.

8.2 Figure 8-1 and Figure 8-2 present isopleths of the modelled process contributions assuming emissions from the facility are entirely toluene. The isopleths depict the area where the long-term PCs are greater than 1% of the assessment criterion. Since the short-term PCs do not exceed 10% of the EAL at any location, the isopleths depict the area where the PCs exceed 0.5% and 1% of the EAL to demonstrate the dispersion pattern of the plume. The isopleths also show the locations where the maximum PCs are predicted at any location on the modelled grid.

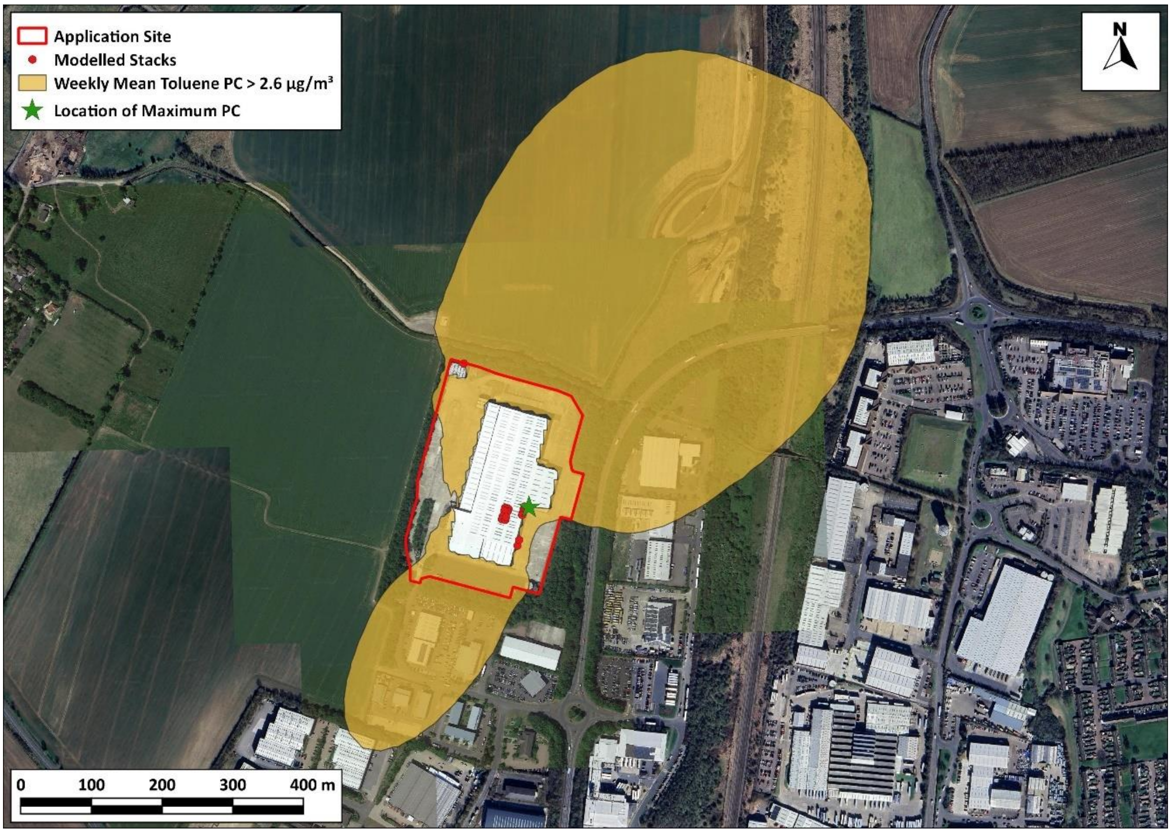

Figure 8-1: Contour Plot of Weekly Mean Toluene PCs and Location of Maximum PC on Entire Grid

Imagery ©2025 Airbus, Maxar Technologies.

Figure 8-2: Contour Plot of 1-hour Mean Toluene PCs and Location of Maximum PC on Entire Grid

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Sensitivity Tests

8.3 Table 8-2 presents the maximum PCs at any assessed receptor assuming that emissions from the facility comprise either naphthalene (for comparison against the long-term standard) or styrene (for comparison against the short-term standard). As these are only present in very small quantities in a limited number of products, it would be overly conservative to assume that the total mass of VOCs released is accounted for by either naphthalene or styrene. Consequently, the total VOC PCs have been factored by the maximum percentage of each compound in any of the products used at the facility; for naphthalene, it is only present in quantities no greater than 5.9% (w/w) in one product, whilst styrene is only present in quantities no greater than 3% (w/w) in one product.

Table 8-2: Sensitivity Test for Applied EALs at Worst-case Locations

Location	X Coordinate	Y Coordinate	PC (µg/m³) [a]	PC (% of assessment level) [b]
24-hour Mean Naphthalene EAL (3 µg/m³)				
Max on Grid	523270	274113	1.4	47.1
1-hour Mean Styrene EAL (800 µg/m³)				
Max on Grid	523150	274083	8.6	1.1

[a] Factored to reflect the relative proportions of naphthalene and styrene present in products used in the facility (5.9% and 3%, respectively).

[b] Based on unrounded numbers.

8.4 Whilst neither styrene nor naphthalene are routinely monitored across the UK, literature sources in the United States estimate ambient levels of styrene to range from 0.28 µg/m³ to 20 µg/m³ (Agency for Toxic Substances and Disease Registry, 2014), with average values generally less than 4.3 µg/m³ (National Centre of Biotechnical Information, 2019). For naphthalene, ambient concentrations range between 0.02 to 0.31 µg/m³ in urban areas, largely as a result of combustion and off-gassing (Jia and Batterman, 2011). There is, therefore, considered to be sufficient headroom to account for ambient levels, such that the PECs for both compounds would be below the corresponding EALs.

Particulate Matter

PM_{10}

8.5 Table 8-3 presents the maximum PCs and PECs at any assessed receptor, as well as the specific receptors identified in Figure 6-3 and Table 6-1, for PM_{10}.

Table 8-3: Maximum PM_{10} PCs and PECs at Relevant Human Health Receptors

Location	X Coordinate	Y Coordinate	PC (µg/m³)	PC (% of assessment level) [a]	PEC (µg/m³) [b]	PEC (% of assessment level) [a]
Annual Mean PM_{10} AQS (40 µg/m³)						
Max on Grid [c]	523255	274068	551.3	1,378.2	567.4	1,418.5
A [c]	523270	274113	16.4	41.0	32.5	81.3
B [c]	523152	273979	18.3	45.7	34.4	85.9
C	523204	273964	3.0	7.5	19.1	47.7
D	523126	273851	2.6	6.4	18.7	46.6
E	523048	273961	1.0	2.6	17.1	42.8
F [c]	523079	274168	1.2	2.9	17.3	43.2
G	523090	274222	4.1	10.2	20.2	50.5
24-hour Mean PM_{10} AQS (50 µg/m³)						
Max on Grid [c]	523255	274068	951.5	1,903.0	983.7	1,967.4
A [c]	523270	274113	64.2	128.4	96.4	192.8
B [c]	523152	273979	79.2	158.5	111.4	222.9
C	523204	273964	13.7	27.5	45.9	91.9
D	523126	273851	10.7	21.3	42.9	85.7
E	523048	273961	4.5	9.0	36.7	73.4
F [c]	523079	274168	3.8	7.5	36.0	71.9
G	523090	274222	12.1	24.2	44.3	88.6

[a] Based on unrounded numbers.

[b] After adding the relevant baseline concentrations from Table 5-4.

[c] This row has been greyed out as the assessment criterion does not apply at this location.

8.6 Figure 8-3 and Figure 8-4 present isopleths of the modelled PM_{10} PCs. The isopleths depict the areas where the long-term and short-term PCs are greater than 1% and 10% of the respective assessment criteria, respectively. The isopleths also show the locations where the maximum PCs are predicted at any location on the modelled grid.

Figure 8-3: Contour Plot of Annual Mean PM_{10} PCs and Location of Maximum PC on Entire Grid

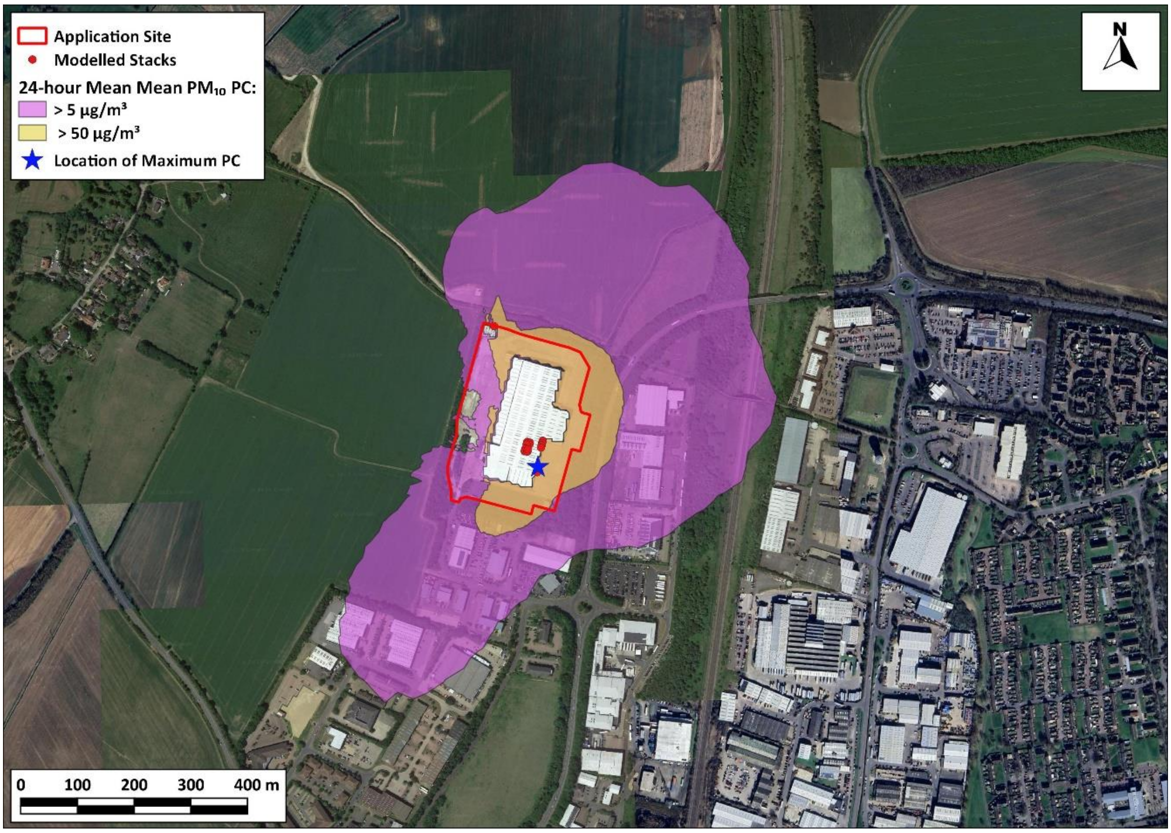

Figure 8-4: Contour Plot of 24-hour Mean PM_{10} PCs and Location of Maximum PC on Entire Grid

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$PM_{2.5}$

8.7 Table 8-4 presents the maximum annual mean $PM_{2.5}$ PCs and PECs at any assessed receptor, as well as the specific receptors identified in Figure 6-3 and Table 6-1.

Table 8-4: Maximum Annual Mean $PM_{2.5}$ PCs and PECs at Relevant Human Health Receptors

Location	X Coordinate	Y Coordinate	PC (µg/m³)	PC (% of assessment level) [a]	PEC (µg/m³) [b]	PEC (% of assessment level) [a]
Max on Grid [c]	523255	274068	551.3	2,756.4	560.8	2,803.9
A [c]	523270	274113	16.4	82.1	25.9	129.6
B [c]	523152	273979	18.3	91.4	27.8	138.9
C	523204	273964	3.0	15.0	12.5	62.5
D	523126	273851	2.6	12.8	12.1	60.3
E	523048	273961	1.0	5.2	10.5	52.7
F [c]	523079	274168	1.2	5.9	10.7	53.4
G	523090	274222	4.1	20.4	13.6	67.9

[a] Based on unrounded numbers.

[b] After adding the relevant baseline concentration from Table 5-4.

[c] This row has been greyed out as the assessment criterion does not apply at this location.

8.8 Figure 8-5 presents isopleths of the modelled annual mean $PM_{2.5}$ process contributions. The isopleths depict the area where the long-term PCs are greater than 1% of the long-term assessment criterion. The isopleths also show the location where the maximum PC is predicted at any location on the modelled grid.

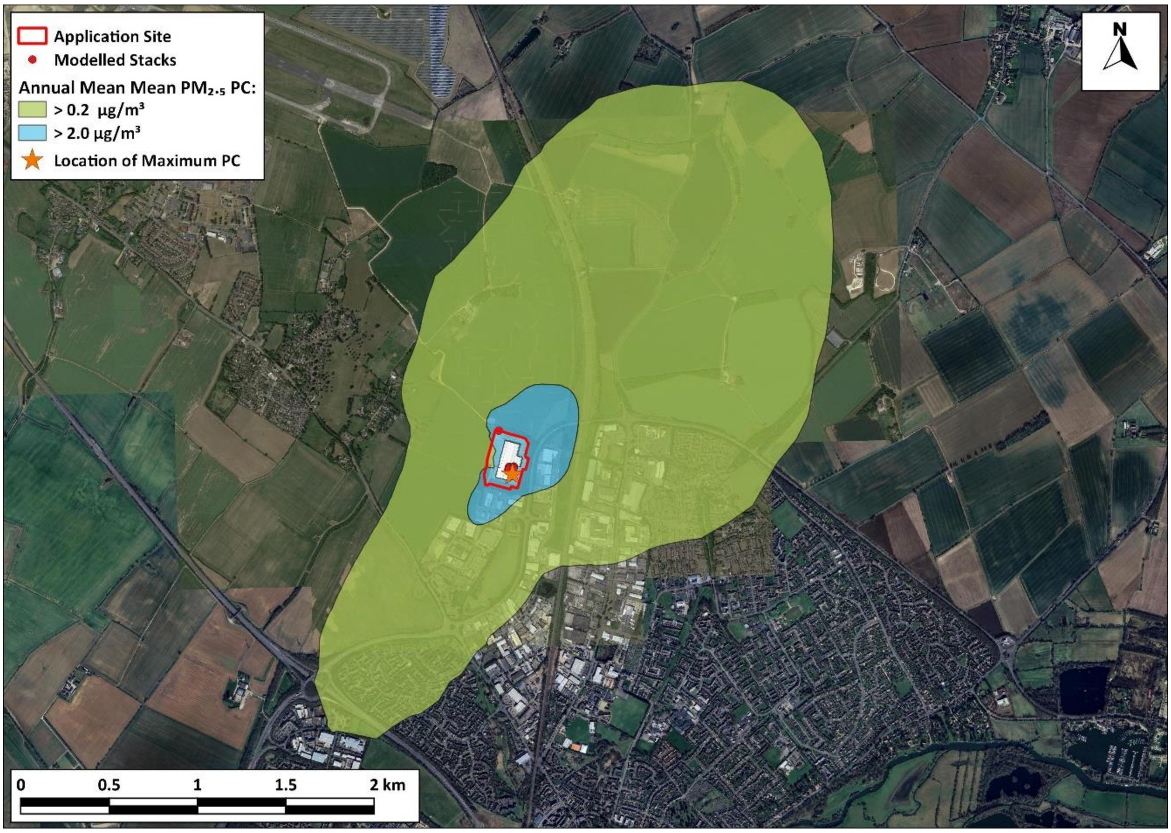

Figure 8-5: Contour Plot of Annual Mean $PM_{2.5}$ PCs and Location of Maximum PC on Entire Grid

Imagery ©2025 Airbus, Maxar Technologies.

9 Discussion

VOCs

9.1 When assuming that all VOC releases from the facility are 100% toluene, Table 8-1 demonstrates that the PECs are well below the weekly mean and 1-hour mean EALs at all locations, regardless of relevant exposure.

9.2 Further, the sensitivity test assuming VOCs comprise naphthalene or styrene demonstrates that the PCs are well below the relevant EALs, and whilst neither compound is routinely monitored in the UK, it is reasonable to expect PECs to be well below the relevant PECs.

9.3 Accounting for the worst-case assumptions adopted within this assessment, there is a negligible risk that emissions from the installation will cause an exceedance of any assessment level and, consequently, VOC effects are assessed as not significant.

Particulate Matter

9.4 Table 8-3 demonstrates that the maximum PM_{10} and $PM_{2.5}$ PECs at locations where there is relevant exposure are less than the respective assessment levels. Whilst the PECs exceed the respective assessment levels at the location of maximum impact anywhere across the modelled grid for both pollutants, Figure 8-3 to Figure 8-5 demonstrate that the locations of maximum impact in all cases is within the installation boundary. As discussed in Paragraph 4.5, there is no relevant exposure in places of work where members of the general public have no free access and where relevant provisions concerning health and safety at work apply.

9.5 The 24-hour mean PM_{10} PECs and annual mean $PM_{2.5}$ PECs also exceed the assessment levels at two specific receptor locations (A and B), however these are car garages, where the assessment criteria are considered not to apply.

9.6 Accounting for the worst-case assumptions adopted within this assessment, there is a negligible risk that emissions from the installation will cause an exceedance of any assessment level at locations of relevant exposure and, consequently, particulate matter impacts are assessed as not significant.

10 Conclusions

10.1 The assessment uses dispersion modelling to predict the impacts on local air quality associated with emissions to air from the paint shop installation on land adjacent to Washingley Road in Huntingdon.

10.2 Modelled PECs of all pollutants are less than the respective assessment levels at all locations where there is relevant exposure.

10.3 The assessment includes a number of conservative assumptions. It also uses sensitivity analysis to investigate the sensitivity of the model to certain assumptions and model treatments. These conservative assumptions include:

- the assessment of impacts assumes continuous operation of the installation throughout the year;
- emissions have been modelled at the respective emission limit values whilst, in actual operation, emissions are expected to be less than the emission limit values and, in many cases, significantly so;
- the assessment of VOC impacts assumes all VOC emissions occur as toluene in accordance with Environment Agency guidance. However, toluene is only present at proportions up to 50% (w/w) in any product, and thus in reality the PCs will be less than those presented in the assessment;
- the modelling has assumed that particulate matter emissions are either exclusively PM_{10} or $PM_{2.5}$. In reality, the particulate fraction will comprise a mixture of both size fractions; and
- the results presented are the maxima from modelling with five separate years of meteorological data.

10.4 It is, therefore, concluded that the air quality effects of the proposed installation will be not significant.

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12 Appendices

A1 Stack Parameters

Spray Booths, Mixing Room, Paint Kitchen and Recycling Room Extraction Vents

A1.1 The associated physical parameters and exhaust parameters for each modelled spray booth stack presented in Figure 6-1 are provided in Table A1-1.

Table A1-1: Spray Booth Stack and Emission Parameters

Parameter	Unit	Stack 1	Stack 2	Stack 3	Stack 4	Stack 5	Stack 6	Stack 7	Stack 8	Stack 12	Stack 13	Stack 14	Stack 15
Stack ID	-	1	2	3	4	5	6	7	8	12	13	14	15
Stack Coordinates (X, Y)	m	523236, 274112	523241, 274111	523240, 274107	523235, 274108	523233, 274100	523232, 274096	523237, 274095	523238, 274099	523264, 274114	523263, 274110	523262, 274106	523260, 274102
Discharge Height Above Ground	m	20.6								16.4			
Discharge Diameter	m	0.90								0.68			
Efflux Temperature	°C	25											
Volumetric Flow Rate	Nm^3/s [a]	9.3								5.3			
	Am^3/s [b]	10.2								5.8			
Efflux Velocity	m/s	16								16			
VOC Emissions	mg/Nm^3 [a]	50											
	g/s	0.130								0.074			
PM Emissions	mg/Nm^3 [a]	10											
	g/s	0.026								0.015			

[a] At Normalised conditions. Reference of 273 K and 101.325 kPa.
[b] At discharge conditions.

Blast Booths

A1.2 The associated physical parameters and exhaust parameters for each modelled blast booth stack presented in Figure 6-1 are provided in Table A1-2. The blast booths do not lead to the release of VOCs, and therefore only particulate matter emissions have been modelled from these stacks.

Table A1-2: Blast Booth Stack and Emission Parameters

Parameter	Unit	Stack 10	Stack 11
Stack ID	-	10	11
Stack Coordinates (X, Y)	m	523254, 274059	523256, 274067
Discharge Height Above Ground	m	4.0	
Discharge Diameter	m	0.56	
Efflux Temperature	°C	25	
Volumetric Flow Rate	Nm^3/s [a]	4.5	
	Am^3/s [b]	4.9	
Efflux Velocity	m/s	0.1 [c]	
PM Emissions	mg/Nm^3 [a]	50	
	g/s	0.062	

[a] At Normalised conditions. Reference of 273 K and 101.325 kPa.
[b] At discharge conditions.
[c] Stack is horizontal.

Underseal Bay

A1.3 The associated physical parameters and exhaust parameters for the underseal bay stack presented in Figure 6-1 are provided in Table A1-3.

Table A1-3: Underseal Bay Stack and Emission Parameters

Parameter	Unit	Stack 9
Stack ID	-	9
Stack Coordinates (X, Y)	m	523178, 274317
Discharge Height Above Ground	m	7.2
Discharge Diameter	m	0.63
Efflux Temperature	°C	25
Volumetric Flow Rate	Nm^3/s [a]	5.4
	Am^3/s [b]	5.9
Efflux Velocity	m/s	19
VOC Emissions	mg/Nm^3 [a]	50

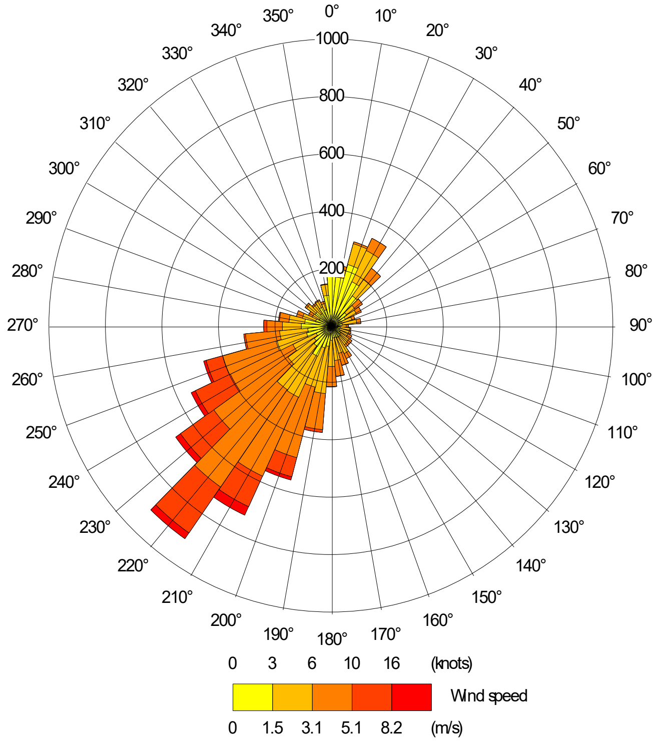
Parameter	Unit	Stack 9
	g/s	0.075
PM Emissions	mg/Nm^3 [a]	10
	g/s	0.015

[a] At Normalised conditions. Reference of 273 K and 101.325 kPa.

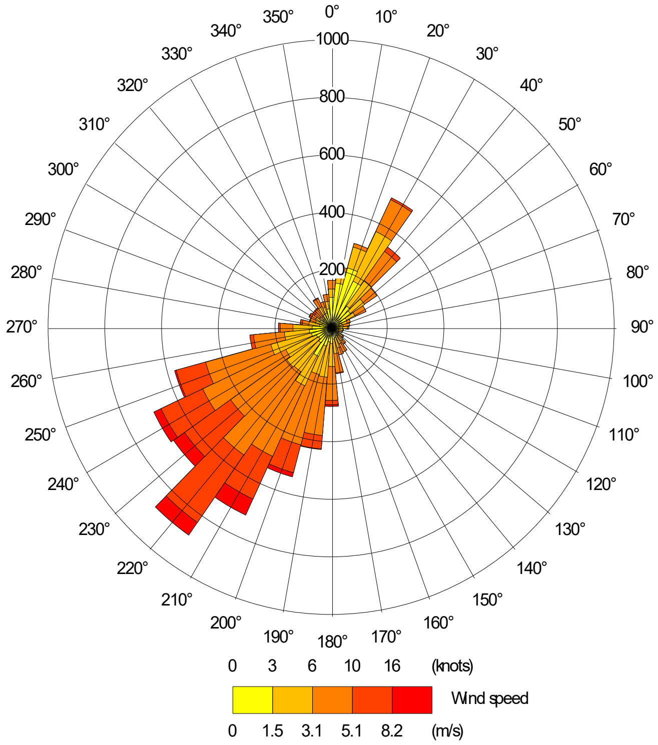
[b] At discharge conditions.

A2 Wind Roses for Monks Wood

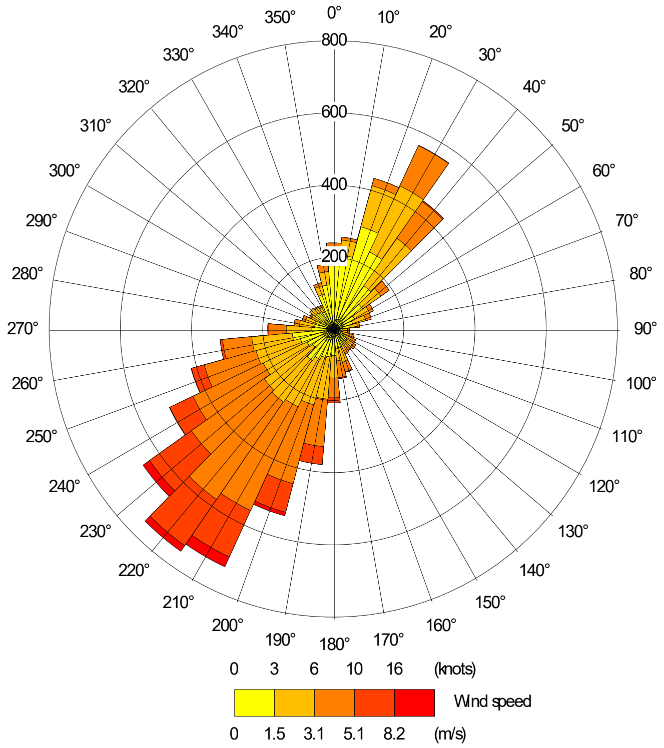
2019



2020



2021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330°
340°
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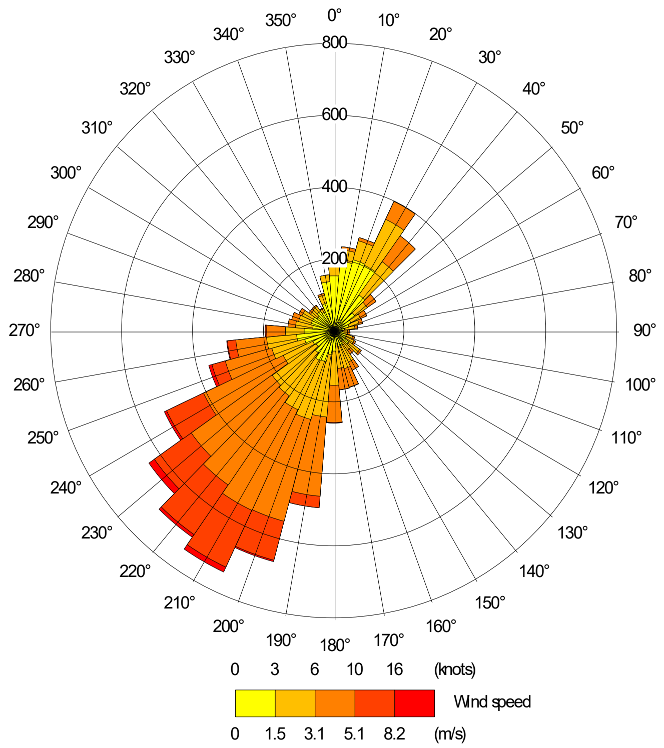
0 3 6 10 16 (knots)
Wind speed
0 1.5 3.1 5.1 8.2 (m/s)

2022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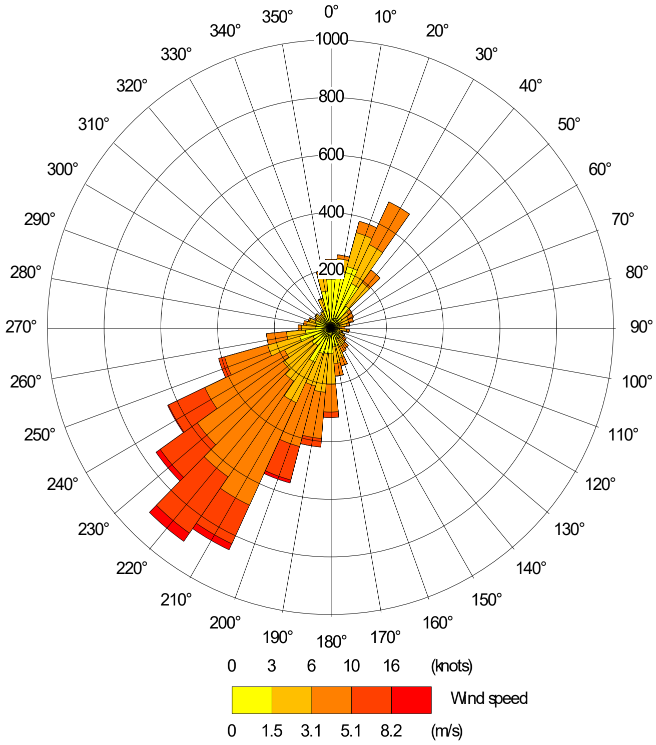
0 3 6 10 16 (knots)
Wind speed
0 1.5 3.1 5.1 8.2 (m/s)

2023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350°
1000
800
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200
0 3 6 10 16 (knots)
Wind speed
0 1.5 3.1 5.1 8.2 (m/s)

A3 EA Checklist for Dispersion Modelling Report for Installations

Table A3-1: EA Checklist for Dispersion Modelling Report for Installations

Item	Included	Comment
Location map	✓	See Figure 2-1
Site plan	✓	See Figure 3-1
List of emissions modelled	✓	See Paragraph 1.6
Details of modelled scenarios	✓	See Table 1-2 and Section 6
Details of relevant ambient concentrations used	✓	See Section 5
Model description and justification	✓	See Paragraph 6.2 through 6.4
Special model treatments used	✓	See Paragraph 6.33 through 6.35
Table of emission parameters used	✓	See Appendix A1
Details of modelled domain and receptors	✓	See Figure 2-1, Figure 6-2 and Figure 6-3, Table 6-1, and Paragraphs 6.10 to 6.13
Details of meteorological data used (including origin) and justification	✓	See Paragraphs 6.14 to 6.16, and Appendix **Error! Reference source not found.**
Details of terrain treatment	✓	See Paragraphs 6.26 and 6.27, and Figure 2-2
Details of building treatment	✓	See Paragraphs 6.23 through 6.25, Figure 6-5 and Table 6-4
Sensitivity analysis	✓	See Section 6, Table 6-5 and Table 6-6
Assessment of impacts	✓	See Sections 8 and 9
Model input files	✓	Sent electronically

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