Land at Mounton Road, Chepstow

Barwood Development Securities Limited

Air Quality Assessment

November 2025

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Executive Summary

Rappor Consultants Limited was appointed by Barwood Development Securities Ltd (Barwood Land) to undertake an air quality assessment to support an outline planning application for a mixed-use development on land at Mounton Road in Chepstow. The proposals are development of up to 146 dwellings together with a hotel, residential care home, mobility hub, highway access, provision of green infrastructure, open space, on site play provision, drainage attenuation and infrastructure works.

The Site is located in the administrative area of Monmouthshire County Council and lies approximately 60m west of the Chepstow Air Quality Management Area, which was declared for the exceedance of the annual mean nitrogen dioxide air quality objective.

A qualitative construction phase dust assessment was undertaken in accordance with Institute of Air Quality Management guidance and measures were recommended to minimise emissions during construction activities. With the implementation of these mitigation measures the impact of construction phase dust emissions was considered to be 'not significant' in accordance with Institute of Air Quality Management guidance.

A detailed operational phase road traffic emissions assessment was undertaken to consider the impact of development-generated road traffic on local air quality at identified existing receptor locations. Road traffic emissions were modelled using the dispersion model ADMS-Roads and concentrations of nitrogen dioxide and particulate matter (PM_{10} and $PM_{2.5}$) were predicted at identified sensitive receptor locations. The modelling assessment was undertaken in accordance with Defra Local Air Quality Management Technical Guidance and Institute of Air Quality Management & Environmental Protection UK guidance. The development was not predicted to result in any new exceedances of the relevant air quality objectives and the impact of the development on local air quality was predicted to be 'negligible' in accordance with guidance.

Concentrations of NO_2, PM_{10} and $PM_{2.5}$ were also predicted across the site and the suitability of the site for the proposed uses considered with regard to air quality. Pollutant concentrations were predicted to be below the relevant air quality objectives and the site was therefore considered suitable for the proposed uses with no constraint to planning approval with regard to air quality.

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1 Introduction

General

1.1 Rappor Consultants Limited was instructed by Barwood Development Securities Ltd (Barwood Land) to undertake an air quality assessment to support an outline planning application for land at Mounton Road in Chepstow ('the Site'). The proposals are development of up to 146 dwellings together with a hotel, residential care home, mobility hub, highway access, provision of green infrastructure, open space, on site play provision, drainage attenuation and infrastructure works.

1.2 The assessment considers the potential impacts of the proposed development during both the construction and operational phases. A qualitative construction phase assessment was undertaken in accordance with relevant guidance. A detailed operational phase road traffic emissions impact assessment was undertaken to determine the impact of development-generated road traffic on local air quality. Pollutant concentrations were predicted across the Site and compared to the relevant air quality objectives to consider the suitability of the Site for the proposed uses.

1.3 The assessment takes account of relevant local and national policy and guidance. A glossary of terms utilised in this report is provided in **Appendix A**.

Site Location

1.4 The Site is located to the west of the A466 in the town of Chepstow and lies within the administrative area of Monmouthshire County Council (MCC). The Site currently comprises agricultural land. To the north of the Sites lies existing residential properties and Mounton Road. The A466 forms the eastern boundary of the Site with existing residential properties beyond. To the south of the Site is the A48 with commercial and residential properties beyond. St Lawrence Lane forms the western boundary of the Site with agricultural land beyond.

1.5 The Site is not located in an Air Quality Management Area (AQMA) however the Chepstow AQMA is located approximately 70m east of the Site. The AQMA was declared by MCC for the exceedance of the annual mean nitrogen dioxide (NO_2) air quality objective and covers a stretch of the A48 through Chepstow town centre.

1.6 The site location is illustrated in **Figure 1.1**.

Figure 1.1 Site Location

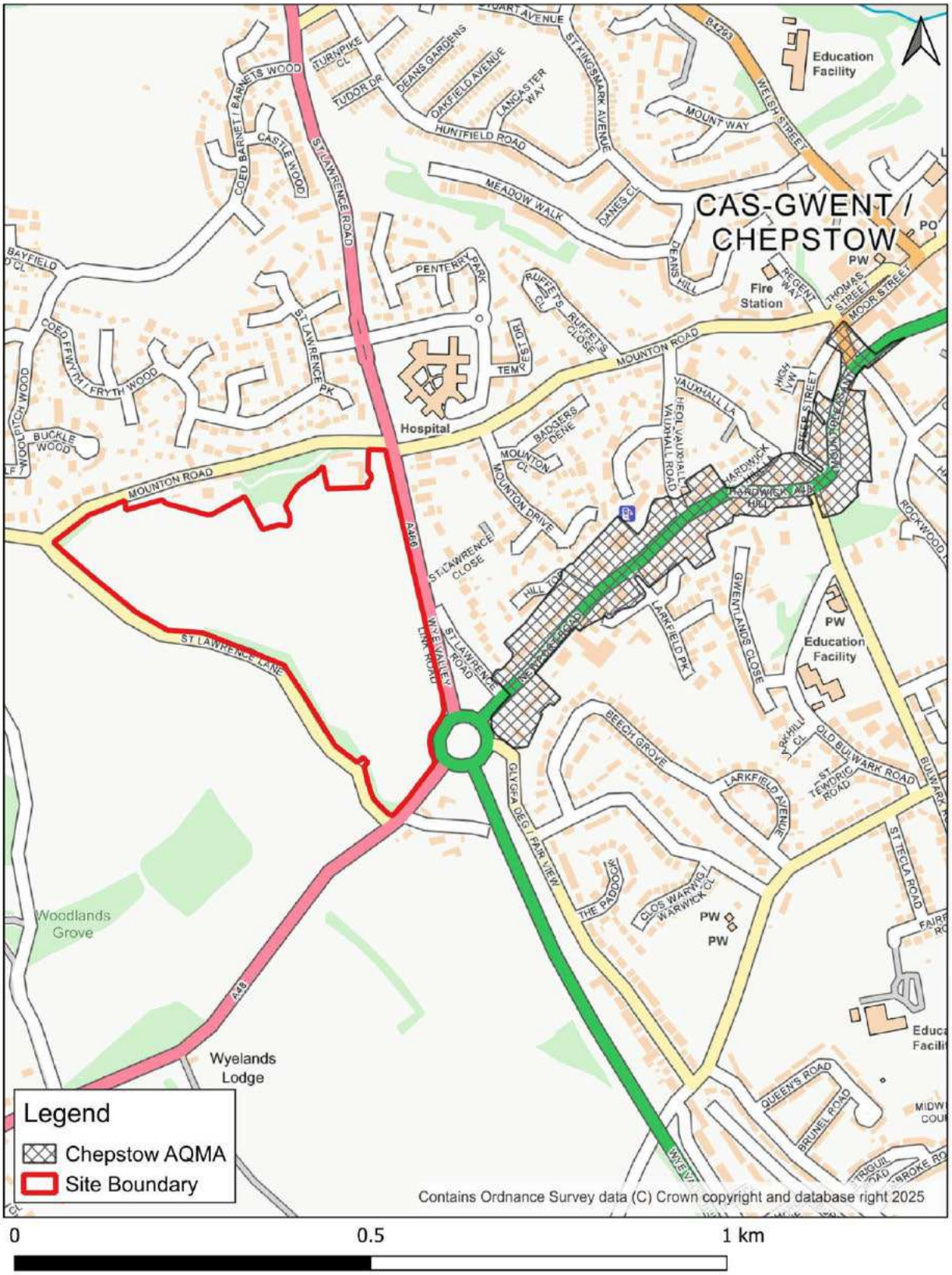


Figure 1.1: Site Location

2 Relevant Policy and Guidance

National Legislation and Planning Policy

2.1 The following national legislation and planning policy is relevant to air quality and was considered throughout this air quality assessment:

- European Parliament, EU 2008 Ambient Air Quality Directive (2008)[1];
- HMSO, Air Quality (Wales) Regulations (2000)[2];
- Welsh Government, Planning Policy Wales Edition 12 (2024)[3]; and
- Welsh Government, Future Wales: The National Plan 2040 (2021)[4].

Local Planning Policy

2.2 The following local planning policy was reviewed with regards to air quality and a summary of any relevant policies in provided in **Appendix B**:

- Monmouthshire County Council, Local Development Plan 2011 – 2021[5]; and
- Monmouthshire County Council, Replacement Local Development Plan 2018 - 2033[6].

Air Quality Guidance

2.3 The following air quality guidance was utilised in the air quality assessment:

- Welsh Government, Local Air Quality Management in Wales Policy Guidance (2017)[7];
- Institute of Air Quality Management (IAQM), Guidance on the assessment of dust from demolition and construction (2024)[8]; and
- IAQM and Environmental Protection UK (EPUK), Land-Use Planning and Development Control: Planning for Air Quality (2017)[9].

[1] European Parliament (2008) Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe
[2] HMSO (2002) The Air Quality (Wales) Regulations 2000 (as amended by the Air Quality (Wales) (Amendment), London: HMSO
[3] Welsh Government (2024) Planning Policy Wales Edition 12
[4] Welsh Government (2021) Future Wales National Plan 2040
[5] Monmouthshire County Council (2014) Local Development Plan 2011 - 2021
[6] Monmouthshire County Council (2024) Replacement Local Development Plan 2018 - 2033
[7] Welsh Government (2017) Local Air Quality Management in Wales Policy Guidance
[8] Institute of Air Quality Management (2024) Guidance on the assessment of dust from demolition and construction, Institute of Air Quality Management, London
[9] Institute of Air Quality Management and Environmental Protection UK (2017) Land-Use Planning and Development Control: Planning for Air Quality

3 Assessment Methodology

Consultation

3.1 During initial communications with MCC, the Environmental Health department provided a response stating:

> *"An updated air quality assessment is required prior to allocation. The updated air quality assessment will be required to include data from the updated Transport Assessment. Data used in the air quality assessment would need to be undertaken to the satisfaction of the relevant Highways Authority.*
>
> *Furthermore, MCC would need to commission its own air quality assessment and undertake a full review of the submitted air quality assessment, both would be need [sic] to take into account other local developments, in addition the impact on other road networks outside the AQMA should be considered."*

3.2 Further consultation was undertaken with the Environmental Health Department at MCC detailing the proposed scope of works and assessment methodology to be utilised within the air quality assessment. A response was received from MCC in which the assessment methodology was agreed. Details of the consultation with MCC is provided in **Appendix C**.

3.3 The assessment methodology is detailed below.

Construction Phase - Dust Assessment

3.4 A qualitative assessment of the potential for construction phase activities to influence local air quality through dust soiling, human health and ecological effects was undertaken utilising the methodology set out in IAQM guidance[8]. The IAQM guidance provides a four-step approach, summarised below:

- Step 1: Screen the need for a detailed assessment. Where relevant sensitive receptors are located within 250m of the site boundary, or within 50m of roads used by construction vehicles up to 250m from the site, the assessment should progress to Step 2. No further assessment is required if there are no receptors within the specified distances of the works.
- Step 2: Assess the risk of dust impacts using the following steps:
  - a) Define the potential dust emission magnitude for demolition, earthworks, construction and trackout, as appropriate;
  - b) Define the sensitivity of the area to dust; and
  - c) Define the risk of impacts.
- Step 3: Identify appropriate site-specific mitigation based on the identified dust risk;
- Step 4: Determine the significance of residual effects.

Operational Phase – Impact Assessment

Air Dispersion Modelling

3.5 Air dispersion modelling software ADMS-Roads, version 5.0.1.3, was utilised to predict concentrations of NOx and particulate matter (PM_{10} and $PM_{2.5}$) at identified sensitive receptor locations in the vicinity of the site and roads anticipated to experience changes in traffic as a result of the proposals, including the Chepstow AQMA. The assessment was undertaken in accordance with the principles set out in Welsh Government guidance[7] and the IAQM and EPUK guidance[9].

Assessment, Scenarios, Study Area and Sensitive Receptors

3.6 The following assessment scenarios were considered in the assessment:

- Scenario 1: 2023 Model Verification;
- Scenario 2: 2024 Base Year;
- Scenario 3: 2026 First Operational Year without Development;
- Scenario 4: 2026 First Operational Year with Development;
- Scenario 5: 2029 Future Year without Development; and
- Scenario 6: 2029 Future Year with Development.

3.7 Traffic data used in both Scenario 4 and Scenario 6 included traffic associated with the full potential development quantum in operation to represent a robust and conservative assessment of development-generated road traffic impacts. In reality, the proposed development would be opened in phases, reducing the absolute change in road traffic levels on the road network in any one year.

3.8 Traffic data used in Scenarios 3 -Scenario 6 also included for local growth in road traffic levels, enabling the consideration of cumulative effects that may arise from concurrent operation of the proposed development and other planned local developments.

3.9 Traffic data were obtained for the above scenarios from Rappor, the Project Transport Consultants, for the study area listed below:

- M48 motorway, west and east of Junction 2;
- A48 west of A466;
- A48 Newport Road;
- A48 Hardwick Hill;
- A466 Wye Valley Link Road;
- A466 St Lawrence Road;
- Bulwark Road; and
- Mounton Road.

3.10 The study area was determined based on the proposed development trip generation and distribution provided by Rappor, taking into consideration the screening criteria set out in IAQM and EPUK guidance[9], and the proximity of sensitive receptor locations. Traffic data used in the assessment are detailed in **Appendix D**.

3.11 Receptors were chosen based on their relative proximity to roads forecast to experience the greatest change in traffic as a result of the proposed development. Receptors were modelled at a height of 1.5m to represent average breathing height at ground floor. Additionally, short term receptors were considered where users may be present for periods of time relevant to the short-term air quality objectives, but would not reasonably be present for periods of time relevant to the annual mean air quality objectives. Such locations include public houses, hotels and sporting facilities.

3.12 **Table 3.1** and **Figure 3.1** detail the locations of existing sensitive receptors considered in the air quality assessment.

Table 3.1: Existing Sensitive Receptor Locations

Receptor ID	Receptor Name	X	Y	Height (m)
R1	Dwelling on Wye Valley Link Road	352560	193434	1.5
R2	Dwelling on St Lawrence Close	352598	193369	1.5
R3	Dwelling on Wye Valley Link Road	352552	193488	1.5
R4	Dwelling on St Lawrence Park	352489	193552	1.5
R5	Chepstow Community Hospital	352574	193556	1.5
R6	Dwelling on Mounton Road	352487	193493	1.5
R7	Dwelling on St Lawrence Road	352690	193195	1.5
R8	Dwelling on Fair View	352695	193113	1.5
R9	Dwelling on High Beech Lane	352569	193009	1.5
R10	Dwelling on A48	351872	192488	1.5
R11	Dwelling on A48	352009	192587	1.5
R12	Dwelling on Pwllmeyric Close	351718	192373	1.5
R13	Dwelling on Larkfield Park	352797	193272	1.5
R14	Dwelling on Hardwick Hill	353005	193441	1.5
R15	Dwelling on Bulwark Road	353138	193452	1.5
R16	Dwelling on Harwick Hill	353106	193467	1.5
R17	Dwelling on Mount Pleasant	353168	193588	1.5
R18	Dwelling on James Stephens Way	353892	191502	1.5
R19	Dwelling on Maple Avenue	353359	191867	1.5
R20	Dwelling on Mathern Road	352197	191307	1.5
ST1	Marstons Public House and Hotel	352826	193338	1.5
ST2	Chepstow RFC	353507	191705	1.5

Figure 3.1: Existing Receptor Locations

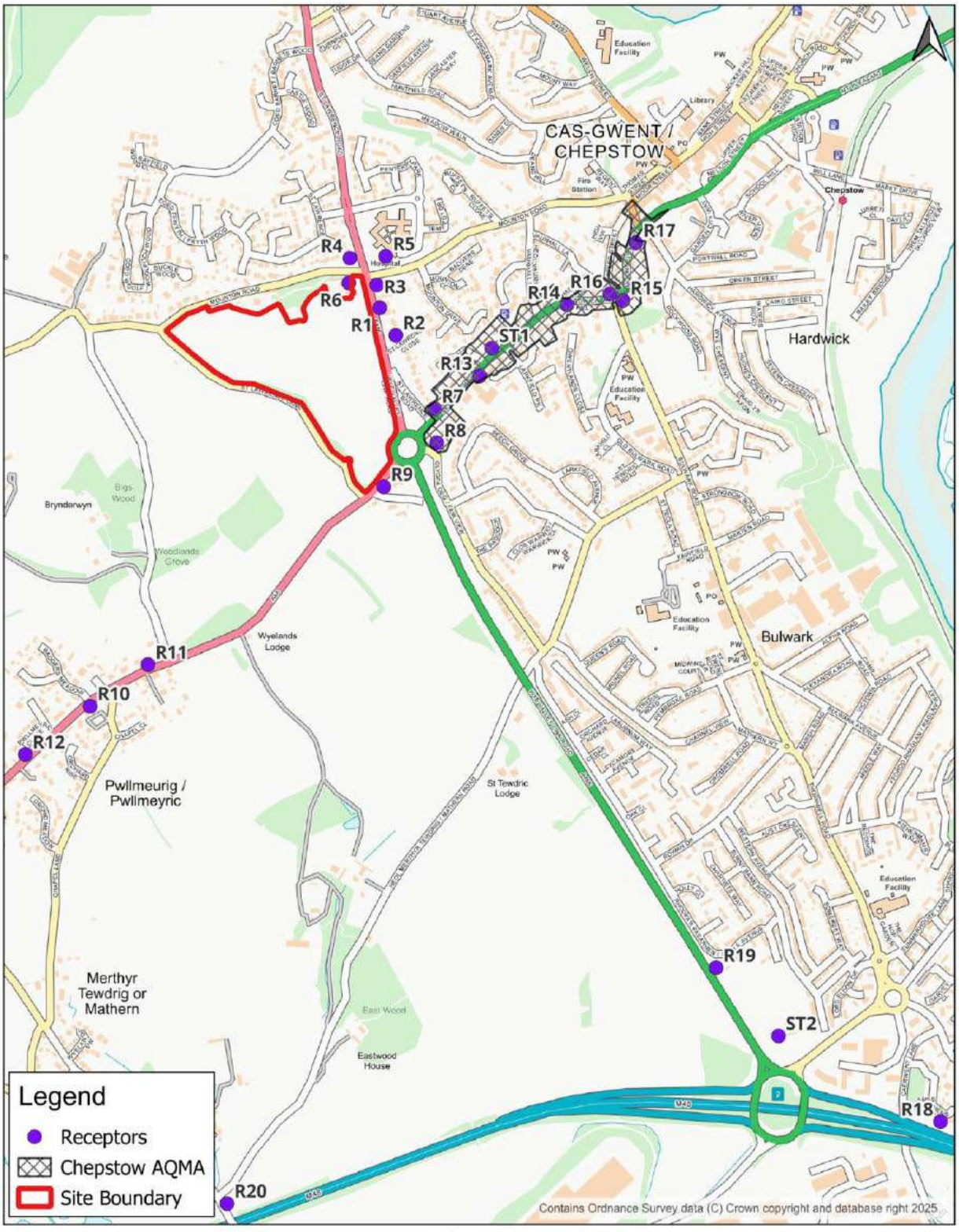


Figure 3.1: Existing Sensitive Receptor Locations

3.13 Additionally, as the proposed development will introduce new sensitive uses to the site, consideration was given to the suitability of the site for the proposed uses with regard to air quality. Pollutant concentrations were predicted across the site using a Cartesian grid from co-ordinates X 351900, Y 193647 to X 352769, Y 192803 at a height of 1.5m.

Dispersion Model Inputs

3.14 A summary of the model inputs utilised in the air dispersion modelling is provided below, with full details provided in **Appendix E**, alongside all relevant assumptions and limitations.

- Emission Factors Toolkit version 13.0[10] was utilised to obtain traffic data emissions for the years of assessment;
- NOx – NO_2 Calculator version 9.1[11] was utilised to convert oxides of nitrogen to NO_2;
- Background concentrations were obtained from the Defra background maps[12] for the years of assessment, in the absence of any representative background monitoring data in the study area;
- Meteorological data from the Almondsbury recording station was utilised in the assessment for the 2023 year, to align with the model verification year. The windrose is presented in **Appendix F**; and
- Model verification was undertaken utilising local representative monitoring data from monitoring locations operated by MCC. Full details of the model verification process are detailed in **Appendix G**.

Assessment Criteria

3.15 Predicted pollutant concentrations were compared to the current relevant air quality objectives detailed in **Table 3.2**.

Table 3.2: Relevant Air Quality Standards and Objectives utilised in the Assessment

Pollutant	Averaging Period	Air Quality Objective (µg.m^{-3})	Date to Achieve by
NO_2	Annual Mean	40	31 December 2005
	1-hour mean not to be exceeded more than 18 times per year	200	31 December 2005
PM_{10}	Annual Mean	40	31 December 2004
	24-hour mean not to be exceeded more than 35 times per year	50	31 December 2004
$PM_{2.5}$	Annual Mean	20	1 January 2020
	Annual Mean	*10*	*31 December 2040*
	*Annual Mean Interim Target**	*12*	*31 January 2028*

*Detailed within the Environmental Improvement Plan 2023.
Italics denotes future air quality objectives that will come into force in the future.

[10] Defra (2024) Emission Factor Toolkit [https://laqm.defra.gov.uk/review-and-assessment/tools/emissions-factors-toolkit.html]
[11] Defra (2024) NOx to NO2 Calculator [https://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc]
[12] Defra (2024) background pollutant concentration maps [https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2021]

3.16 The IAQM and EPUK guidance[9] provides criteria to determine the significance of air quality impacts associated with development-generated road traffic emissions. **Table 3.3** details the impact descriptors utilised in the assessment, with an impact assigned to each individual receptor considered in the assessment, for each pollutant modelled.

Table 3.3: Impact Descriptors for Individual Receptors

Long term average concentration at receptor	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	1	2 - 5	6 - 10	>10
75% or less	Negligible	Negligible	Slight	Moderate
76 – 94%	Negligible	Slight	Moderate	Moderate
95 – 102%	Slight	Moderate	Moderate	Substantial
103 – 109%	Moderate	Moderate	Substantial	Substantial
110% or more	Moderate	Substantial	Substantial	Substantial

Note: The table is intended to be used by rounding the change in percentage pollutant concentration to whole numbers, which then makes it clearer which cell the impact falls within. The user is encouraged to treat the numbers with recognition of their likely accuracy and not assume a false level of precision. Changes of 0% i.e. less than 0.5% will be described as Negligible.
The table is only to be used with annual mean concentrations.

4 Baseline Conditions

Introduction

4.1 Baseline air quality conditions in the study area were defined based on a review of the following sources of data:

- Defra and the Welsh Government's Local Air Quality Management support pages;
- MCC's Local Air Quality Management reports[13] and monitoring data; and
- Aerial imagery, maps and plans of the Site and study area.

Local Air Quality Management and Monitoring

4.2 The site is not located within an AQMA, however the Chepstow AQMA is located approximately 60m east of the site covering the A48 Newport Road from the junction with Highbeech Roundabout in the west to Moor Street in the east. The AQMA was declared for exceedances of the annual mean NO_2 air quality objective.

Nitrogen Dioxide Monitoring

4.3 MCC undertakes monitoring of NO_2 within its administrative area using a network of diffusion tubes and automatic monitoring stations. The closest, most representative monitoring locations to the site are detailed in **Table 4.1** below. Monitoring data from 2020 and 2021 are considered to be influenced by COVID-19 lockdown restrictions due to reductions in local vehicle traffic in these years. Data for these years should therefore be treated as outlier data, with data for 2019 and earlier considered the 'pre-pandemic baseline'[14].

Table 4.1: MCC NO_2 Monitoring Data (µg.m^{-3})

Site ID	X	Y	Site Type	Monitored Concentration						
				2017	2018	2019	2020	2021	2022	2023
AQMS	353126	193470	Roadside	35	36	39	26	29	28	26.0
CH1	352800	193274	Roadside	22.2	19.1	20.1	13.6	15.6	14.9	14.0
CH2a	352822	193306	Kerbside	27.9	27.8	28.4	22.6	27.9	27.3	25.6
CH3	352970	193452	Roadside	29.9	26.5	28.8	20.4	23.4	22.5	20.8
CH4	353009	193444	Roadside	**51.1**	**42.5**	**42.3**	31.6	36	33.9	30.9
CH5	353139	193454	Roadside	26.8	23.5	26	19.1	19	19.3	17.5
CH6	353166	193586	Roadside	37.1	34.3	34.7	27.4	28.2	26.3	23.0
CH9	353304	193685	Roadside	26.8	23.6	24.2	17.4	20.5	20.4	17.6
PWLL1	351991	192576	Kerbside	-	-	25.5	32	35.8	33	30.8

[13] Monmouthshire County Council (2023) Annual Status Report 2022
[14] IAQM (2023) Use of 2020 and 2021 Monitoring Datasets Version 1.1 December 2023

Site ID	X	Y	Site Type	Monitored Concentration						
				2017	2018	2019	2020	2021	2022	2023
PWLL2	351871	192491	Kerbside	-	-	26.5	19.9	23.8	22.8	20.6
PWLL3	351722	192372	Kerbside	-	-	29.9	30.6	32.9	33	29.5
PWLL4	351665	192301	Roadside	-	-	21	14	16.4	15.5	14.4

Data presented to level of accuracy provided in MCC 2023 ASR. -denotes monitoring at this location was not undertaken in this year. Bold denotes exceedance of the annual mean NO_2 air quality objective.

4.4 Monitoring data at the monitoring locations in the vicinity of the site recorded concentrations below the annual mean NO_2 objective of 40µg.m$_{-3}$ at all locations detailed in **Table 4.1**, with the exception of CH4. Monitoring location CH4 is located within the Chepstow AQMA on the A48 Hardwick Hill which has a steep incline with a high proportion of HGV traffic. These factors are considered to give rise to the exceedances recorded at this location.

4.5 CH4 has not recorded any exceedances of the NO_2 objective since 2019, including in 2022 and 2023 which are considered the new post-pandemic baseline. Additionally, there is an overall downward trend in monitored concentrations within Chepstow, demonstrating that air quality is improving in the area.

4.6 Of the monitoring locations detailed in **Table 4.1**, CH1 and CH2a are considered most representative of conditions at the site as they are located closest to the site, and on a flat section of road. Whilst most representative, CH1 and CH2a are located within the Chepstow AQMA whereas the site is not. Additionally, the A48 Newport Road carries approximately 40% more traffic than the A466 Wye Valley Link Road which runs adjacent to the site. Therefore, NO_2 concentrations at the site are considered to be lower than those recorded at CH1 and CH2a, and below the annual mean NO_2 air quality objective.

4.7 Due to the proximity of the monitoring locations to the site, the affected road network and existing sensitive receptors in the study area, all monitoring locations detailed in **Table 4.1** were utilised in model verification. The full model verification process is detailed in **Appendix G**.

Particulate Matter (PM_{10} and $PM_{2.5}$)

4.8 MCC monitors PM_{10} and $PM_{2.5}$ concentrations at the automatic monitor AQMS in Chepstow AQMA. **Table 4.2** details the monitored PM_{10} and $PM_{2.5}$ concentrations at the automatic monitor in recent years. The number of days on which monitored PM_{10} concentrations exceeded 50µg.m^{-3} is provided in brackets for consideration of the short term PM_{10} objective.

Table 4.2: MCC PM_{10} and $PM_{2.5}$ AQMS Monitoring Data (µg.m^{-3})

Pollutant	Monitored Concentration						
	2017	2018	2019	2020	2021	2022	2023
PM_{10}	16 (2)	18 (0)	20 (7)	17 (0)	16 (1)	18 (0)	16 (0)
$PM_{2.5}$	10	10	13	9	8	9	8

4.9 Monitored PM_{10} and $PM_{2.5}$ concentrations in Chepstow were well below the current air quality objectives of 40µg.m^{-3} and 20µg.m^{-3} respectively. No exceedances of the objectives were recorded at the AQMS monitoring locations since monitoring commenced.

4.10 With regard to the daily PM_{10} air quality objective, the greatest number of days where PM_{10} concentrations exceeded 50µg.m^{-3} was 7 in 2019, which is significantly below the 35 days permitted annually.

4.11 In 2023, additional air quality legislation was published which set out interim and future $PM_{2.5}$ air quality objective targets to reduce $PM_{2.5}$ concentrations as quickly as possible in the UK. The interim target of 12µg.m^{-3} is to be achieved by 2028 and was only exceeded in 2019 at the AQMS monitoring location. All other years recorded concentrations below the interim target and there is an overall downward trend evident. The future target of 10µg.m^{-3} is to be achieved by 2040 and monitored concentrations have been below this target value since 2020. Given the significant period of time until the future target is to be achieved, and the overall downward trend, it is considered that $PM_{2.5}$ concentrations will be compliant with the future target value in 2040.

Background Concentrations

4.12 There are no background monitoring locations in the study area, or within the MCC administrative area and therefore, background concentrations of NO_2, PM_{10} and $PM_{2.5}$ were obtained from the Defra background maps[12]. **Table 4.3** details the background pollutant concentrations utilised in the assessment.

Table 4.3: Background Pollutant Concentrations (µg.m^{-3})

Grid Square	Receptors	NO_2				PM_{10}				$PM_{2.5}$			
		2023	2024	2026	2029	2023	2024	2026	2029	2023	2024	2026	2029
353500, 193500	AQMS, CH4 – CH6, CH9, R14 – R17	6.6	6.3	5.8	5.1	10.9	10.8	10.6	10.4	6.7	6.6	6.4	6.2
352500, 193500	CH1 – CH3, R1 – R9, R13, ST1	5.9	5.7	5.2	4.5	10.6	10.5	10.4	10.1	6.5	6.4	6.3	6.0
351500, 192500	PWLL1 – 4, R10, R12	5.0	4.8	4.5	4.0	10.4	10.3	10.2	9.9	6.1	6.0	5.9	5.7
352500, 192500	R11, R20	5.6	5.4	5.0	4.4	10.4	10.3	10.2	9.9	6.1	6.0	5.9	5.7
353500, 191500	R18, R19, ST2	6.5	6.2	5.7	5.0	11.5	11.4	11.2	10.9	6.5	6.4	6.3	6.1

4.13 Background concentrations in all grid squares utilised in the assessment were below the relevant air quality objectives for each pollutant. NO_2 concentrations are forecast to be lower than PM_{10} concentrations due to the contribution of residual salts to background PM_{10} concentrations as a result of proximity to the coast.

5 Construction Phase Dust Assessment

5.1 Construction phase activities associated with demolition, earthworks, construction and trackout have the potential to generate dust and particulate matter which may influence local air quality at sensitive receptor locations.

5.2 As there are existing sensitive receptors within the distances set out in IAQM guidance[8], a construction phase dust assessment was undertaken. The assessment includes determining the dust emission magnitude for construction phase activities and identifying the sensitivity of the area to determine the overall risk of construction phase dust impacts. Mitigation measures proportionate to the level of dust impacts identified are then recommended to minimise the impact of construction phase activities on local air quality.

Assessing Risk of Dust Impacts

Defining the Dust Emission Magnitude

5.3 The scale and nature of construction phase activities were compared to the criteria set out in IAQM guidance[8] to define the initial dust emission magnitude for each activity. **Table 5.1** summarises the dust emission magnitude for each activity and provides the justification for each assigned magnitude. As no demolition activities are required, this was not considered further in the assessment.

Table 5.1: Dust Emission Magnitude

Activity	Dust Emission Magnitude	Justification
Earthworks	Large	Total site area is greater than 100,000m^2.
Construction	Medium	Total volume of buildings to be constructed between 12,000 and 75,000m^3.
Trackout	Medium	Potential for up to 50 outward HDV movements to occur in any one day at peak of construction phase.

Defining the Sensitivity of the Area

5.4 The proximity of receptors to construction phase activities was reviewed alongside meteorological conditions and receptor use classes to define the sensitivity of the area. In accordance with IAQM guidance[8], different use classes can be more or less sensitive to dust and particulate matter emissions during the construction phase based on parameters such as the level of amenity typically expected and the duration of time spent at the location. **Table 5.2** details the sensitivity of the area to dust soiling and human health effects for the different phases of construction activities. **Figure 5.1** was utilised to identify the number of sensitive receptors within the distances set out in IAQM guidance[8].

Table 5.2: Sensitivity of Study Area

Activity	Sensitivity to Dust Soiling	Sensitivity to Human Health
Earthworks	**High** – between 10 and 100 highly sensitive receptors within 50m of potential earthworks activities. Receptors include residential dwellings and car parks.	**Low** – between 10 and 100 residential dwellings located within 50m of potential earthworks areas. Local PM_{10} concentrations less than 24µg.m^{-3}.

Activity	Sensitivity to Dust Soiling	Sensitivity to Human Health
Construction	**High** – between 10 and 100 highly sensitive receptors within 50m of potential construction activities. Receptors include residential dwellings and car parks.	**Low** – between 10 and 100 residential dwellings located within 50m of potential construction activity areas. Local PM_{10} concentrations less than 24µg.m^{-3}.
Trackout	**Medium** – between 10 and 100 highly sensitive receptors within 50m of roads that may be used by construction HDVs, up to 200m from the Site access points.	**Low** – between 10 and 100 residential dwellings located within 50m of road that may be used by construction HDVs, up to 200m from the Site access points.

Figure 5.1: Construction Phase Dust Buffers

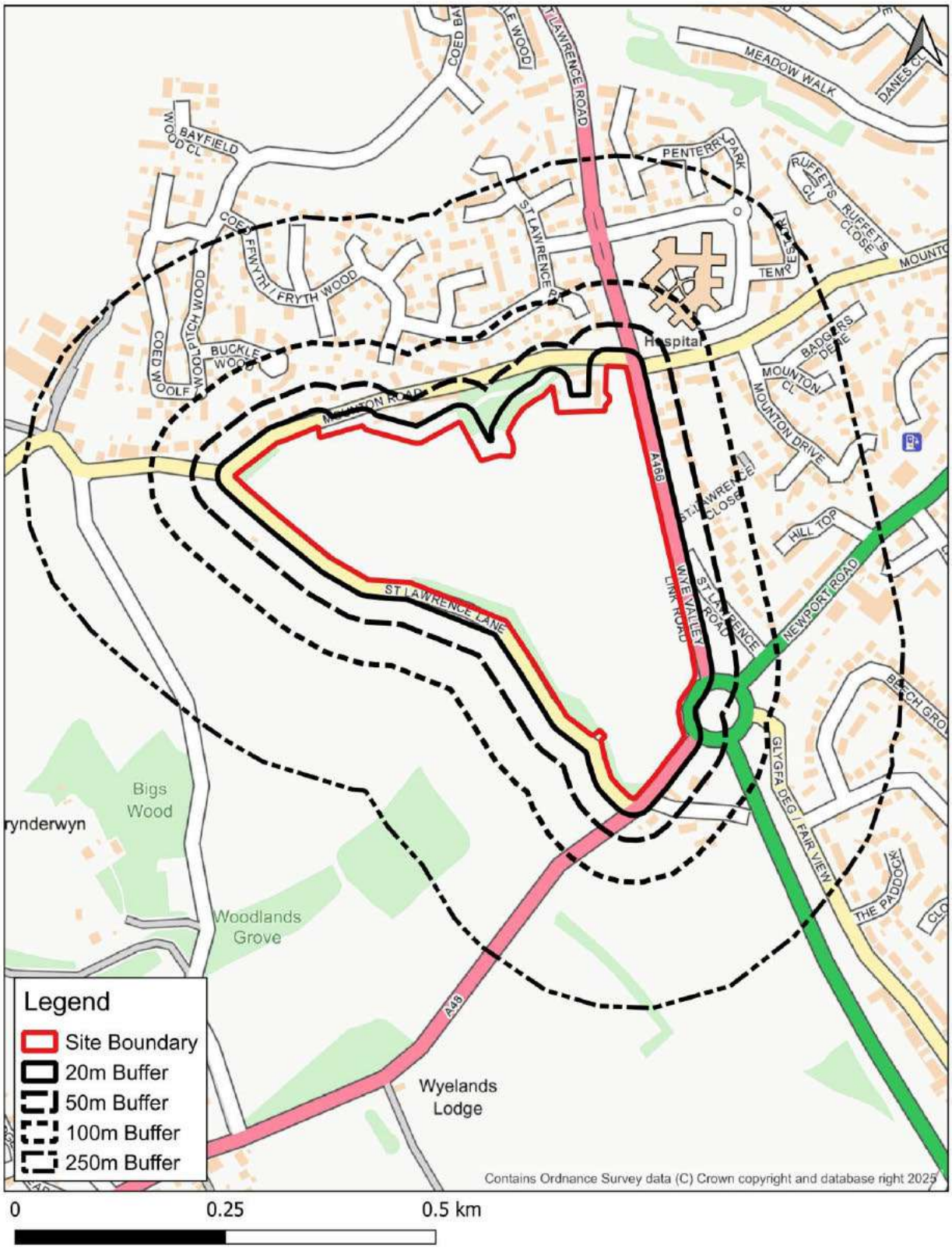


Figure 5.1: Construction Phase Dust Buffers

Defining the Risk of Impacts

5.5 The dust emission magnitude and sensitivity of the area for earthworks, construction and trackout are then combined to determine the overall risk of impacts associated with each activity. **Table 5.3** below summarises the risk of dust impacts for each activity.

Table 5.3: Summary of Risk of Dust Impacts

Activity	Dust Emission Magnitude	Highest Sensitivity of Area	Risk of Dust Impact
Earthworks	Large	High	High Risk
Construction	Medium	High	Medium Risk
Trackout	Medium	Medium	Medium Risk

Mitigation

5.6 IAQM guidance[8] provides a list of dust mitigation measures that should be implemented on site during the construction phase, where practicable. Mitigation measures proportionate to the level of dust risk identified in **Table 5.3** are detailed in **Appendix H**. With the implementation of these measures, the residual impacts associated with construction phase activities are considered to be 'not significant'.

6 Operational Phase Impact Assessment

Baseline Assessment

6.1 Predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ at existing sensitive receptor locations in the 2024 Base Year, 2026 Opening Year and 2029 Future year without development are detailed in **Table 6.1**.

Table 6.1: 2024 Base Year, 2026 Opening Year and 2029 Future Year without development Annual Mean Concentrations (µg.m^{-3})

Receptor	2024 Base Year			2026 Opening Year without development			2029 Future Year without development		
	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$	NO_2	PM_{10}	$PM_{2.5}$
R1	9.4	12.6	6.9	8.3	12.3	6.8	6.7	12.1	6.5
R2	7.8	11.7	6.7	6.9	11.4	6.5	5.7	11.2	6.3
R3	8.9	12.2	6.9	7.8	12.0	6.7	6.3	11.7	6.4
R4	7.5	11.5	6.7	6.7	11.3	6.5	5.6	11.1	6.3
R5	7.2	11.3	6.6	6.4	11.1	6.4	5.4	10.9	6.2
R6	7.1	11.3	6.6	6.3	11.1	6.4	5.3	10.8	6.2
R7	11.9	13.9	7.3	10.3	13.6	7.1	8.1	13.3	6.8
R8	10.2	12.8	7.0	8.9	12.6	6.8	7.1	12.3	6.6
R9	10.4	12.9	7.0	9.1	12.7	6.8	7.3	12.4	6.6
R10	10.3	13.1	6.7	8.9	12.9	6.6	7.1	12.5	6.3
R11	10.9	13.2	6.9	9.5	12.9	6.7	7.5	12.6	6.5
R12	10.2	13.0	6.7	8.8	12.8	6.5	7.0	12.5	6.3
R13	13.4	14.8	7.5	11.5	14.5	7.3	9.0	14.2	7.0
R14	16.7	15.5	7.8	14.3	15.1	7.6	11.0	14.8	7.3
R15	13.5	14.0	7.4	11.6	13.7	7.2	9.1	13.4	6.9
R16	16.6	15.4	7.8	14.2	15.1	7.5	11.0	14.7	7.3
R17	16.2	15.2	7.7	13.9	14.9	7.5	10.7	14.5	7.2
R18	10.0	12.4	6.7	8.9	12.2	6.6	7.3	11.9	6.3
R19	11.0	13.7	7.0	9.7	13.5	6.9	7.9	13.2	6.6
R20	7.5	11.4	6.3	6.7	11.3	6.2	6.4	10.9	6.4
ST1	*11.3*	*13.6*	*7.2*	*9.8*	*13.3*	*7.0*	*7.7*	*13.0*	*6.8*
ST2	*9.1*	*12.6*	*6.8*	*8.1*	*12.4*	*6.6*	*6.7*	*12.2*	*6.4*

Italics denotes receptors relevant to short term air quality objectives only.

6.2 Predicted concentrations of NO_2, PM_{10} and $PM_{2.5}$ were below the current relevant annual mean air quality objectives in both the base year, opening year and future year without development scenarios. Annual mean NO_2 concentrations at all receptors were below 60µg.m^{-3} and therefore, based on the relationship between hourly and annual mean NO_2 concentrations as detailed in guidance, exceedances of the hourly mean NO_2 objective are

unlikely. The number of days where PM_{10} concentrations were predicted to exceed 50µg.m^{-3} was less than 35 and therefore, no exceedances of the short term PM_{10} air quality objective were predicted.

6.3 With regard to the interim $PM_{2.5}$ target of 12µg.m^{-3} to be achieved by January 2028, $PM_{2.5}$ concentrations predicted at the receptors were below the interim target and future objective.

Impact Assessment

Opening Year

6.4 Predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ for the 2026 Opening Year with development were compared to concentrations for the 2026 Opening Year without development scenario to consider the impact of development-generated road traffic emissions on local air quality.

Nitrogen Dioxide Concentrations

6.5 Predicted annual mean NO_2 concentrations in the Opening Year scenarios are detailed in **Table 6.2** below.

Table 6.2: Annual Mean NO_2 Concentrations and Development Impact (µg.m^{-3})

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	8.3	8.4	+0.1	0	Negligible
R2	6.9	7.0	0.0	0	Negligible
R3	7.8	7.9	+0.1	0	Negligible
R4	6.7	6.8	0.0	0	Negligible
R5	6.4	6.5	0.0	0	Negligible
R6	6.3	6.4	0.0	0	Negligible
R7	10.3	10.4	0.0	0	Negligible
R8	8.9	9.0	0.0	0	Negligible
R9	9.1	9.1	0.0	0	Negligible
R10	8.9	9.0	0.0	0	Negligible
R11	9.5	9.5	0.0	0	Negligible
R12	8.8	8.8	0.0	0	Negligible
R13	11.5	11.6	0.0	0	Negligible
R14	14.3	14.3	0.0	0	Negligible
R15	11.6	11.7	0.0	0	Negligible
R16	14.2	14.2	0.0	0	Negligible
R17	13.9	13.9	0.0	0	Negligible
R18	8.9	8.9	0.0	0	Negligible
R19	9.7	9.8	0.0	0	Negligible
R20	6.7	6.7	0.0	0	Negligible

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
ST1	9.8	9.8	0.0	0	Negligible
ST2	8.1	8.1	0.0	0	Negligible

*Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

6.6 Predicted annual mean NO_2 concentrations were below the current annual mean NO_2 objective of 40µg.m^{-3} at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation. All changes in annual mean NO_2 concentrations as a result of the proposed development were 1% or less of the objective and total NO_2 concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance[9], the impact of the proposed development on annual mean NO_2 concentrations is **negligible**.

6.7 In accordance with Defra guidance[7], where annual mean NO_2 concentrations do not exceed 60µg.m^{-3}, exceedances of the hourly NO_2 objective are unlikely to occur. All predicted annual mean NO_2 concentrations were below 60µg.m^{-3} and therefore, no exceedances of the short term NO_2 objective are anticipated.

Particulate Matter (PM_{10}) Concentrations

6.8 Predicted annual mean PM_{10} concentrations in the Opening Year scenarios are detailed in **Table 6.3** below.

Table 6.3: Annual Mean PM_{10} Concentrations and Development Impact (µg.m^{-3})

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	12.3	12.4	+0.1	0	Negligible
R2	11.4	11.5	0.0	0	Negligible
R3	12.0	12.1	+0.1	0	Negligible
R4	11.3	11.4	0.0	0	Negligible
R5	11.1	11.1	0.0	0	Negligible
R6	11.1	11.1	0.0	0	Negligible
R7	13.6	13.6	0.0	0	Negligible
R8	12.6	12.6	0.0	0	Negligible
R9	12.7	12.7	0.0	0	Negligible
R10	12.9	12.9	0.0	0	Negligible
R11	12.9	13.0	0.0	0	Negligible
R12	12.8	12.8	0.0	0	Negligible
R13	14.5	14.5	0.0	0	Negligible
R14	15.1	15.2	0.0	0	Negligible
R15	13.7	13.7	0.0	0	Negligible
R16	15.1	15.1	0.0	0	Negligible
R17	14.9	14.9	0.0	0	Negligible
R18	12.2	12.2	0.0	0	Negligible

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R19	13.5	13.5	0.0	0	Negligible
R20	11.3	11.3	0.0	0	Negligible
ST1	13.3	13.3	0.0	*0*	*Negligible*
ST2	12.4	12.4	0.0	*0*	*Negligible*

*Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

6.9 Predicted annual mean PM_{10} concentrations were below the current annual mean PM_{10} objective of 40µg.m^{-3} at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation. All changes in annual mean PM_{10} concentrations as a result of the proposed development were less than 0.5% of the objective and total PM_{10} concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance[9], the impact of the proposed development on annual mean PM_{10} concentrations is **negligible**.

6.10 The greatest number of days where predicted PM_{10} concentrations exceed 50µg.m^{-3} was 2 days in both the without and with development scenarios. This is well below the 35 days set out in the daily mean PM_{10} objective and therefore, it is considered that the daily mean PM_{10} objective will not be exceeded with the proposed development in place.

Particulate Matter ($PM_{2.5}$) Concentrations

6.11 Predicted annual mean $PM_{2.5}$ concentrations in the Opening Year scenarios are detailed in **Table 6.4** below.

Table 6.4: Annual Mean $PM_{2.5}$ Concentrations and Development Impact (µg.m^{-3})

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	6.8	6.8	0.0	0	Negligible
R2	6.5	6.5	0.0	0	Negligible
R3	6.7	6.7	0.0	0	Negligible
R4	6.5	6.5	0.0	0	Negligible
R5	6.4	6.5	0.0	0	Negligible
R6	6.4	6.4	0.0	0	Negligible
R7	7.1	7.1	0.0	0	Negligible
R8	6.8	6.8	0.0	0	Negligible
R9	6.8	6.8	0.0	0	Negligible
R10	6.6	6.6	0.0	0	Negligible
R11	6.7	6.7	0.0	0	Negligible
R12	6.5	6.5	0.0	0	Negligible
R13	7.3	7.3	0.0	0	Negligible
R14	7.6	7.6	0.0	0	Negligible
R15	7.2	7.2	0.0	0	Negligible
R16	7.5	7.5	0.0	0	Negligible
R17	7.5	7.5	0.0	0	Negligible
R18	6.6	6.6	0.0	0	Negligible

Receptors	2026 Opening Year Without Development Concentration	2026 Opening Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R19	6.9	6.9	0.0	0	Negligible
R20	6.2	6.2	0.0	0	Negligible
ST1	*7.0*	*7.0*	*0.0*	*0*	*Negligible*
ST2	*6.6*	*6.6*	*0.0*	*0*	*Negligible*

* Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

6.12 Predicted annual mean $PM_{2.5}$ concentrations were below the current annual mean $PM_{2.5}$ objective of 20µg.m^{-3} at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation. All changes in annual mean $PM_{2.5}$ concentrations as a result of the proposed development were less than 0.5% of the objective and total $PM_{2.5}$ concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance[9], the impact of the proposed development on annual mean $PM_{2.5}$ concentrations is **negligible**.

Future Year

Nitrogen Dioxide (NO_2) Concentrations

6.13 Predicted annual mean NO_2 concentrations in the Future Year scenarios are detailed in **Table 6.4** below.

Table 6.4: Annual Mean NO_2 Concentrations and Development Impact (µg.m^{-3})

Receptors	2029 Future Year Without Development Concentration	2029 Future Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	6.7	6.8	+0.1	0	Negligible
R2	5.7	5.8	0.0	0	Negligible
R3	6.3	6.4	+0.1	0	Negligible
R4	5.6	5.6	0.0	0	Negligible
R5	5.4	5.4	0.0	0	Negligible
R6	5.3	5.4	0.0	0	Negligible
R7	8.1	8.1	0.0	0	Negligible
R8	7.1	7.2	0.0	0	Negligible
R9	7.3	7.3	0.0	0	Negligible
R10	7.1	7.1	0.0	0	Negligible
R11	7.5	7.5	0.0	0	Negligible
R12	7.0	7.0	0.0	0	Negligible
R13	9.0	9.0	0.0	0	Negligible
R14	11.0	11.1	0.0	0	Negligible
R15	9.1	9.1	0.0	0	Negligible
R16	11.0	11.0	0.0	0	Negligible

Receptors	2029 Future Year Without Development Concentration	2029 Future Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R17	10.7	10.8	0.0	0	Negligible
R18	7.3	7.3	0.0	0	Negligible
R19	7.9	7.9	0.0	0	Negligible
R20	6.4	6.4	0.0	0	Negligible
ST1	*7.7*	*7.8*	*0.0*	*0*	*Negligible*
ST2	*6.7*	*6.7*	*0.0*	*0*	*Negligible*

*Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

6.14 Predicted annual mean NO_2 concentrations were below the current annual mean NO_2 objective of 40µg.m^{-3} at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation in the future year of 2029. All changes in annual mean NO_2 concentrations as a result of the proposed development were 1% or less of the objective and total NO_2 concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance[9], the impact of the proposed development on annual mean NO_2 concentrations is **negligible**.

6.15 In accordance with Defra guidance[7], where annual mean NO_2 concentrations do not exceed 60µg.m^{-3}, exceedances of the hourly NO_2 objective are unlikely to occur. All predicted annual mean NO_2 concentrations were below 60µg.m^{-3} and therefore, no exceedances of the short term NO_2 objective are anticipated.

Particulate Matter (PM_{10}) Concentrations

6.16 Predicted annual mean PM_{10} concentrations in the Future Year scenarios are detailed in **Table 6.5** below.

Table 6.5: Annual Mean PM_{10} Concentrations and Development Impact (µg.m^{-3})

Receptors	2029 Future Year Without Development Concentration	2029 Future Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	12.1	12.1	+0.1	0	Negligible
R2	11.2	11.2	0.0	0	Negligible
R3	11.7	11.8	+0.1	0	Negligible
R4	11.1	11.1	0.0	0	Negligible
R5	10.9	10.9	0.0	0	Negligible
R6	10.8	10.8	0.0	0	Negligible
R7	13.3	13.3	0.0	0	Negligible
R8	12.3	12.3	0.0	0	Negligible
R9	12.4	12.4	0.0	0	Negligible
R10	12.5	12.6	0.0	0	Negligible
R11	12.6	12.7	0.0	0	Negligible

Receptors	2029 Future Year Without Development Concentration	2029 Future Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R12	12.5	12.5	0.0	0	Negligible
R13	14.2	14.2	0.0	0	Negligible
R14	14.8	14.8	0.0	0	Negligible
R15	13.4	13.4	0.0	0	Negligible
R16	14.7	14.7	0.0	0	Negligible
R17	14.5	14.5	0.0	0	Negligible
R18	11.9	11.9	0.0	0	Negligible
R19	13.2	13.2	0.0	0	Negligible
R20	10.9	10.9	0.0	0	Negligible
ST1	*13.0*	*13.0*	*0.0*	*0*	*Negligible*
ST2	*12.2*	*12.2*	*0.0*	*0*	*Negligible*

*Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

6.17 Predicted annual mean PM_{10} concentrations were below the current annual mean PM_{10} objective of 40µg.m^{-3} at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation. All changes in annual mean PM_{10} concentrations as a result of the proposed development were less than 0.5% of the objective and total PM_{10} concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance[9], the impact of the proposed development on annual mean PM_{10} concentrations is **negligible**.

6.18 The greatest number of days where predicted PM_{10} concentrations exceed 50µg.m^{-3} was 2 days in both the without and with development scenarios. This is well below the 35 days set out in the daily mean PM_{10} objective and therefore, it is considered that the daily mean PM_{10} objective will not be exceeded with the proposed development in place.

Particulate Matter ($PM_{2.5}$) Concentrations

6.19 Predicted annual mean $PM_{2.5}$ concentrations in the Future Year scenarios are detailed in **Table 6.6** below.

Table 6.6: Annual Mean $PM_{2.5}$ Concentrations and Development Impact (µg.m^{-3})

Receptors	2029 Future Year Without Development Concentration	2029 Future Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R1	6.5	6.5	0.0	0	Negligible
R2	6.3	6.3	0.0	0	Negligible
R3	6.4	6.5	0.0	0	Negligible
R4	6.3	6.3	0.0	0	Negligible
R5	6.2	6.2	0.0	0	Negligible
R6	6.2	6.2	0.0	0	Negligible
R7	6.8	6.8	0.0	0	Negligible

Receptors	2029 Future Year Without Development Concentration	2029 Future Year With Development Concentration	Change*	% Change Relative to Objective	Significance
R8	6.6	6.6	0.0	0	Negligible
R9	6.6	6.6	0.0	0	Negligible
R10	6.3	6.3	0.0	0	Negligible
R11	6.5	6.5	0.0	0	Negligible
R12	6.3	6.3	0.0	0	Negligible
R13	7.0	7.1	0.0	0	Negligible
R14	7.3	7.3	0.0	0	Negligible
R15	6.9	6.9	0.0	0	Negligible
R16	7.3	7.3	0.0	0	Negligible
R17	7.2	7.2	0.0	0	Negligible
R18	6.3	6.3	0.0	0	Negligible
R19	6.6	6.6	0.0	0	Negligible
R20	6.4	6.4	0.0	0	Negligible
ST1	*6.8*	*6.8*	*0.0*	*0*	*Negligible*
ST2	*6.4*	*6.4*	*0.0*	*0*	*Negligible*

*Change presented to 1 decimal place. Discrepancies in changes due to rounding effects.

6.20 Predicted annual mean $PM_{2.5}$ concentrations were below the current annual mean $PM_{2.5}$ objective of 20µg.m^{-3} at all existing sensitive receptors considered in the assessment, both without and with the proposed development in operation. All changes in annual mean $PM_{2.5}$ concentrations as a result of the proposed development were less than 0.5% of the objective and total $PM_{2.5}$ concentrations were less than 75% of the objective; therefore in accordance with IAQM and EPUK guidance[9], the impact of the proposed development on annual mean $PM_{2.5}$ concentrations is **negligible**.

6.21 With regard to the interim annual mean $PM_{2.5}$ objective of 12µg.m^{-3} to be achieved by 31st January 2028, predicted annual mean $PM_{2.5}$ concentrations in the Future Year were below the interim objective both without and with the development in place.

6.22 With regard to the future annual mean $PM_{2.5}$ objective of 10µg.m^{-3}, this predicted to be met at all receptors in the 2029 scenario, both with and without the development in place.

Suitability Assessment

6.23 In addition to considering the impact of development-generated road traffic on local air quality at existing sensitive receptors, consideration was given to the suitability of the site for the proposed sensitive uses with regard to the current relevant air quality objectives.

6.24 **Table 6.7** details the highest predicted annual mean NO_2, PM_{10} and $PM_{2.5}$ concentration within the site during both the Opening Year and Future Year scenarios. Figures illustrating the predicted pollutant concentrations across the site in both the Opening Year and Future Year scenarios are provided in **Appendix I**.

Table 6.7: Highest Predicted Annual Mean NO_2, PM_{10} and $PM_{2.5}$ Concentration across the Site ($\mu g.m^{-3}$)

Scenario	Annual Mean NO_2	Annual Mean PM_{10}	Annual Mean $PM_{2.5}$
2026 Opening Year	10.3	13.8 (1 day)	6.8
2029 Future Year	8.2	13.6 (1 day)	6.6

6.25 As detailed in **Table 6.7**, annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ across the site were below the current relevant annual mean objectives in both the Opening and Future Year. With regard to the hourly mean NO_2 objective, as the highest predicted annual mean NO_2 concentration was significantly less than $60\mu g.m^{-3}$, in accordance with Defra guidance[7], exceedances of the hourly mean NO_2 objective are unlikely. With regard to the daily mean PM_{10} objective, the greatest number of days predicted to experience PM_{10} concentrations above $50\mu g.m^{-3}$ was two, which is well below the 35 days set out in the objective.

6.26 With regard to the interim annual mean $PM_{2.5}$ objective of $12\mu g.m^{-3}$ to be achieved by 31st January 2028, predicted annual mean $PM_{2.5}$ concentrations in the Future Year were below the interim objective across the Site.

6.27 With regard to the future annual mean $PM_{2.5}$ objective of $10\mu g.m^{-3}$, this predicted to be met across the Site in the Future Year of 2029 and therefore it is also considered that the objective will be met when the objective comes into force in 2040.

6.28 It is therefore considered that the Site is suitable for the proposed uses with regards to the current relevant air quality objectives.

7 Summary and Conclusions

7.1 Rappor was instructed by Barwood Development Securities Ltd (Barwood Land) to undertake an air quality assessment to support an outline planning application for a proposed residential-led mixed use development at land off Mounton Road, Chepstow.

7.2 A qualitative construction phase dust assessment was undertaken, and mitigation measures proportionate to the level of dust risk identified are recommended. With the implementation of these measures, the impact of construction phase dust is negligible, which is not significant.

7.3 A detailed operational phase road traffic emissions impact assessment was undertaken to predict pollutant concentrations at existing receptors and consider the impact of development-generated road traffic on local air quality. The assessment identified that the proposed development would have a negligible impact on local air quality in accordance with guidance, and all pollutant concentrations at identified existing receptor locations were below the current relevant air quality objectives.

7.4 Concentrations of NO_2, PM_{10} and $PM_{2.5}$ were also predicted across the proposed development site and the suitability of the site for the proposed uses considered with regard to air quality. Pollutant concentrations were predicted to be below the relevant air quality objectives and the site was therefore considered suitable for the proposed uses with no constraint to planning consent with regard to air quality.

Appendix A – Glossary

Term	Definition
AADT	Annual Average Daily Traffic flow.
Air quality objective	Policy target generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances within a specific timescale (see also air quality standard).
Air quality standard	The concentrations of pollutants in the atmosphere which can broadly be taken to achieve a certain level of environmental quality. The standards are based on the assessment of the effects of each pollutant on human health including the effects on sensitive sub groups (see also air quality objective).
Annual mean	The average (mean) of the concentrations measured for each pollutant for one year. Usually this is for a calendar year, but some species are reported for the period April to March, known as a pollution year. This period avoids splitting winter season between two years, which is useful for pollutants that have higher concentrations during the winter months.
AQAP	Air Quality Action Plan.
AQMA	Air Quality Management Area.
AQS	Air Quality Strategy.
Defra	Department for Environment, Food and Rural Affairs.
EPUK	Environmental Protection UK.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
HDV	Heavy Duty Vehicles (HGVs + buses and coaches)
HGV	Heavy Goods Vehicles.
IAQM	Institute of Air Quality Management.
LAQM	Local Air Quality Management.
LDV	Light Duty Vehicles (motorbikes, cars, vans and small trucks)
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO_2	Nitrogen dioxide.
NOx	Nitrogen oxides.
Percentile	The percentage of results below a given value.
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 micrometres.
micrograms per cubic metre ($\mu g.m^{-3}$)	A measure of concentration in terms of mass per unit volume. A concentration of 1μg.m-3 means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.

Appendix B – Local Planning Policy

Adopted Local Development Plan 2011 - 2021

The Local Development Plan 2011 – 2021 was adopted in 2014 and sets out MCC's vision and objectives for the development of use of land in Monmouthshire. Policies relevant to air quality within the Adopted Local Plan are detailed below.

> *"EP1 – Amenity and Environmental Protection*
>
> *Development, including proposals for new buildings, extensions to existing buildings and advertisements, should have regard to the privacy, amenity and health of occupiers in neighbouring properties.*
>
> *Development proposals that would cause or result in an unacceptable risk / harm to local amenity, health, the character / quality of the countryside or interests of nature conservation, landscape or built heritage importance due to the following will not be permitted, unless it can be demonstrated that measures can be taken to overcome any significant risk:*
>
> - *Air pollution;*
> - *[…]"*

Monmouthshire Replacement Local Development Plan Deposit Plan 2024

At the time of assessment, MCC was preparing a Replacement Local Development Plan covering the period from 2018 to 2033. The document allocates land for development, designates areas for protection and contains policies against which future planning applications will be assessed. The following policies were identified within the RLDP relevant to air quality:

> *"Policy PM2 – Environmental Amenity*
>
> *Development proposals that would cause or result in a significant risk/harm to local amenity, health, the character/quality of the countryside or interests of nature conservation, landscape or built heritage importance, due to the following, will not be permitted unless it can be demonstrated that measures can be taken to overcome any significant risk:*
>
> - *Air pollution*
> - *[…]*
>
> *Strategic Policy S4 – Climate Change*
>
> *All development proposals will e required to address the causes of, and adapt to the impacts of, climate change. Means of achieving this will include:*
>
> *[…]*
>
> *viii) providing ultra low emission vehicle charging infrastructure to reduce emissions and improve air quality;*
>
> *[…]*
>
> *Strategic Policy S8 – Site Allocation Placemaking Principles*

All residential site allocations must comply with and incorporate the following placemaking principles into the schemes:

[…]

Residential amenity

[…]

- *Incorporate satisfactory air quality measures for mitigation and/or reducing emissions, as appropriate;*

[…]

Policy HA3 - Land at Mounton Road, Chepstow

In addition to the placemaking principles identified in Policy S8, the site must comply with the following criteria below:

[…]

Residential amenity

n) the incorporation of satisfactory air quality measures for mitigation and/or reducing emissions. Development must not significantly worsen (either individually or cumulatively) any air pollution emissions in areas where pollution levels are close to their objective, or limit value levels, nor result in a breach of an air quality objective of limit value."

Appendix C – Consultation

Freya Hoyle

From: Freya Hoyle
Sent: 06 February 2024 13:47
To: White, Paul
Cc: [redacted]
Subject: RE: Monton Road, Chepstow - air quality assessment

Good afternoon Paul,

Thank you very much for your response confirming you are happy with our proposals.

I have spoken to our in-house transport team who are working on providing the traffic data to be used in the air dispersion modelling with regard to your query on the candidate sites and associated traffic. They have advised that the traffic factors that will be used to apply traffic growth will include all allocated sites and planned for development with the local authority. Additionally, the growth forecasts also include assumed additional growth beyond allocation and therefore are considered to be robust with regard to cumulative road traffic impacts on air pollution.

I trust the above is of assistance in regard to that query but if you need anything further please do let me know.

Best regards,

Freya

Freya Hoyle MSc BSc MIAQM MIEnvSc
Associate Director – Air Quality
[redacted]
a Beehive Mill, Jersey Street, Ancoats, Manchester, M4 6JG

From: [redacted]
Sent: Thursday, February 1, 2024 8:58 AM
To: [redacted]
Subject: RE: Monton Road, Chepstow - air quality assessment

Good morning Freya,
Thank you for the email and information.
It all looks good to me.

For these LSP candidate sites, I have asked the planning authority to consider the impact of all candidate sites on an area (if they would have a traffic or air quality impact), as multiple sites within the same area could have a negative effect on air quality, even if one alone would not.

Cofion/Regards
Paul

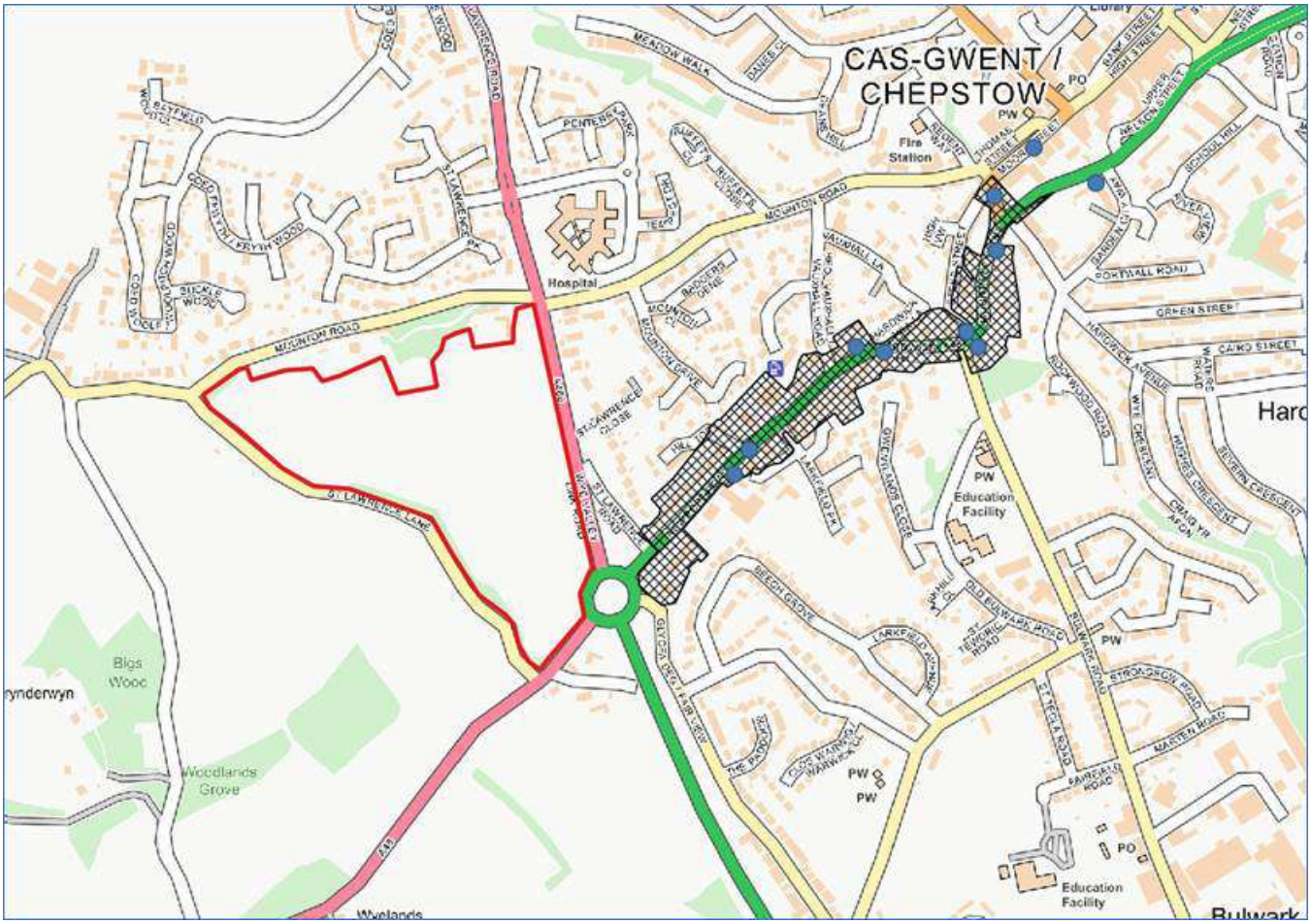
Paul White MSc. BSc. (Hons) MCIEH REnvH
Specialist Environmental Health Officer/ Swyddog Arbenigol Iechyd yr Amgylchedd
Monmouthshire County Council/ Cyngor Sir Fynwy
Environmental Health/ Iechyd yr Amgylchedd

From: [redacted]
Sent: Wednesday, January 31, 2024 3:05 PM
To: [redacted]
[redacted]
Subject: Monton Road, Chepstow - air quality assessment

Good afternoon Paul,

I hope you're well?

Rappor has been instructed to provide air quality consultancy services as part of the ongoing promotion works for the Mounton Road, Chepstow development site for allocation. We understand that a request was made that an updated air quality assessment be prepared for the site to consider both the impact of the proposals on local air quality, and determine the suitability of the site for the proposed uses. The site location is illustrated below for reference.



I have provided our scope of works for the air quality assessment below and we would be grateful if you could confirm if you are happy with the proposals, or if you have any queries that you would like to discuss.

Construction Phase:
As there are existing sensitive receptors adjacent to the site that may be impacted by dust soiling and human health effects during the construction phase of the proposed development. We will therefore undertake a qualitative construction phase dust assessment in accordance with IAQM guidance released in 2024, to identify the level of dust risk associated with construction activities. Mitigation measures proportionate to the level of dust risk identified will be recommended.

Operational Phase:
Development Impact Assessment:
The site is located close to the Chepstow Air Quality Management Area and the level of traffic generated by the proposals will exceed the 100 LDV screening criteria set out in IAQM and EPUK guidance. A detailed operational phase road traffic emissions impact assessment will therefore be undertaken to identify any significant air quality impacts on the local area. The latest version of ADMS-Roads will be used to predict concentrations of nitrogen dioxide and particulate matter (10 and 2.5) at existing sensitive receptor locations. Modelling will be undertaken in accordance with Defra TG.22 guidance and the significance criteria in IAQM and EPUK guidance will be used to determine the significance of any changes to local pollutant concentrations.

The latest Defra tools including the Emission Factor Toolkit, NOx-NO2 Calculator and background maps will be utilised in the assessment. The following model scenarios will be assessed:

- 2019 model verification (in accordance with the IAQM position statement);
- 2024 existing baseline;
- Opening year without development; and
- Opening year with development.

Meteorological data from the Bristol Filton recording station is proposed to be used in the assessment. This is considered to best represent the wind direction and meteorological conditions near the Site taking into account proximity to the Severn Estuary. If you would prefer an alternative recording station to be used, please do let us know.

Model verification will be undertaken in accordance with the process detailed in Defra TG.22 guidance using Monmouthshire monitoring in the Chepstow area.

Site Suitability:
In addition to assessing the impact of the development proposals on local air quality, as the site proposes to introduce new sensitive uses close to arterial roads, we will also be undertaking a detailed site suitability assessment. Concentrations of nitrogen dioxide and particulate matter will be predicted across the development site using ADMS-Roads, and compared to the current relevant air quality objectives. Consideration will also be given to the interim and future PM2.5 objectives released in 2023.

I trust the above is of assistance however, if you wish to discuss anything, please feel free to get in touch.

Best regards,

Freya

Freya Hoyle MSc BSc MIAQM MIEnvSc
Associate Director – Air Quality

[redacted]

a Beehive Mill, Jersey Street, Ancoats, Manchester, M4 6JG

Appendix D – Traffic Data

Table D1: Traffic Data used in Air Dispersion Modelling

Road	2023 Verification Year		2024 Base Year		2026 Opening Year Without Development		2026Opening Year With Development		2029 Future Year Without Development		2029 Future Year With Development	
	AADT	HDV	AADT	HDV	AADT	HDV	AADT	HDV	AADT	HDV	AADT	HDV
A466 St Lawrence Road North of Mounton Road	11,626	252	11,671	253	11,785	255	12,311	255	12,081	262	12,607	262
A466 Wye Valley Link Road North of Site Access	12,224	268	12,272	269	12,392	272	12,960	272	12,703	278	13,271	278
A466 Wye Valley Link Road South of Site Access	12,224	268	12,272	269	12,392	272	12,960	272	12,703	278	13,271	278
Mounton Road West of A466	269	2	270	2	273	2	280	2	280	2	287	2
A48 West of Highbeech Roundabout	12,788	506	12,838	508	12,964	513	13,081	513	13,289	526	13,406	526
A48 Newport Road	19,544	929	19,620	933	19,812	942	19,876	942	20,309	966	20,373	966
Bulwark Road	4,758	82	4,777	82	4,828	83	4,844	83	4,955	85	4,971	85
A466 Wye Valley Link Road South of Highbeech Roundabout	23,111	982	23,201	986	23,561	1,001	23,837	1,001	24,382	1,036	24,658	1,036
M48 motorway west of Junction 2	14,267	1,758	14,322	1,765	14,600	1,799	14,672	1,799	15,197	1,873	15,269	1,873
A48 motorway east of junction 2	21,845	1,848	21,930	1,855	22,355	1,891	22,527	1,891	23,270	1,968	23,442	1,968
Mounton Road East of A466	1,631	33	1,637	33	1,654	33	1,689	33	1,698	34	1,733	34

Appendix E – Dispersion Model Inputs

The following inputs were utilised in the atmospheric dispersion modelling undertaken as part of the air quality assessment:

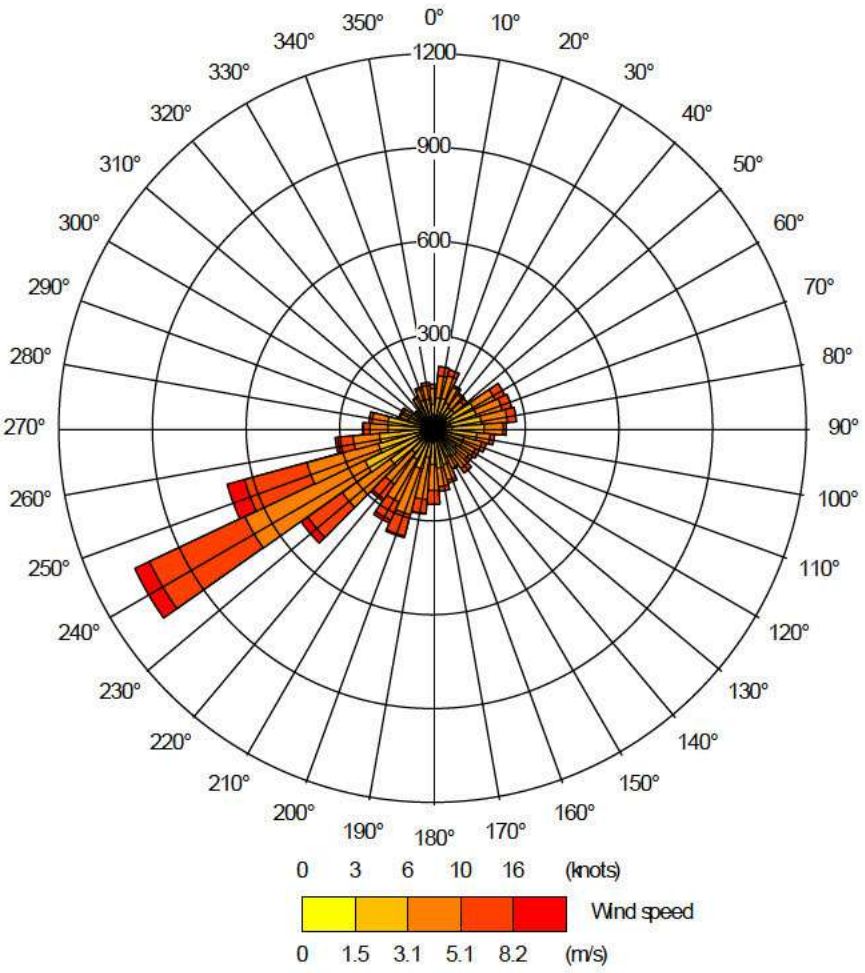
- The atmospheric dispersion modelling software AMDS-Roads version 5.0.1.3 was utilised in the assessment;
- Emission Factor Toolkit version 13.0 was utilised to obtain emission factors for the years of assessment (2023, 2024, 2026 and 2029);
- NOx-NO_2 Calculator version 9.1 was utilised to derive NO_2 concentrations from modelled Road NOx concentrations. The input parameter 'All other urban UK roads' was utilised to represent the roads included in the study area;
- Meteorological data from the Bristol Almondsbury recording station was utilised in the air dispersion model for the verification year of 2023. A surface roughness of 0.5m and a Monin-Obhukov length of 30m were utilised for the Site and meteorological recording station to represent their locations in a mixed suburban and rural area, with a mix urban and industrial uses locally; and
- Following the withdrawal of the IAQM position statement regarding sensitivity analyses, no sensitivity analysis scenario was included within the assessment.

The following limitations and assumptions are applicable to the air quality assessment:

- There are uncertainties associated with both measured and predicted concentrations. The model relies on input data (including projected traffic flows), which also have uncertainties associated with them. The model itself simplifies complex physical systems into a range of algorithms. In addition, local micro-climatic conditions may affect the concentrations of pollutants that the ADMS Roads model will not take into account.
- To reduce the uncertainty associated with predicted concentrations, model verification has been carried out following guidance set out in LAQM in Wales Technical Guidance, which recommends the use of roadside monitoring for this process. As the model has been verified against 2023 measured concentrations and has been adjusted to take account of the apparent under-prediction, there can be reasonable confidence in the predicted concentrations.

Appendix F – Wind Rose

The 2023 wind rose for the Bristol Almondsbury meteorological recording station is illustrated below. The prevailing wind direction is from the southwest.



Appendix G – Model Verification

Whilst ADMS Roads is widely validated for use in this type of assessment, model verification for the area around the Site will not have been included. To determine model performance at a local level, a comparison of modelled results with monitored results in the study area was done in line with methodology specific in LAQM in Wales Technical Guidance. This process of verification aims to minimise modelling uncertainty by correcting modelled results by an adjustment factor to give greater confidence to the results.

The model was run to predict the 2023 annual mean road-NOx, road-PM_{10} and road-$PM_{2.5}$ contributions at the MCC monitoring locations in the study area. For NO_2 verification, the model outputs were compared to the 2023 'measured' road-NOx, which was determined from the nitrogen dioxide concentration measured at the monitoring location, utilising the NOx from NO_2 calculator provided by Defra and the NO_2 background concentration.

For PM_{10} and $PM_{2.5}$ concentrations, the model outputs for PM_{10} and $PM_{2.5}$ were compared to the 'road-PM_{10}' and 'road-$PM_{2.5}$' derived through subtracting the background PM_{10} and $PM_{2.5}$ concentrations from the total monitored concentrations at the AQMS monitoring site.

Table G1 details the NOx model verification process.

Table G1: NOx Model Verification Process (µg.m^{-3})

Verification Step	AQMS	CH1	CH2a	CH3	CH4	CH5	CH6	CH9	PWLL1	PWLL2	PWLL3	PWLL4
2023 monitored NO_2	26.0	14.0	25.6	20.8	30.9	17.5	23.0	17.6	30.8	20.6	29.5	14.4
2023 background NO_2	6.6	5.9	5.9	5.9	6.6	6.6	6.6	6.6	5.0	5.0	5.0	5.0
Monitored road NOx	45.4	17.1	45.9	33.3	59.6	23.7	37.4	23.9	63.4	34.9	59.4	20.0
Modelled road NOx	15.6	9.7	12.2	9.7	11.4	10.3	13.1	9.8	40.2	27.4	46.3	15.8
Ratio between monitored and modelled road NOx	2.9	1.8	3.8	3.4	5.2	2.3	2.8	2.5	1.6	1.3	1.3	1.3
Adjustment factor	**1.7076**											
Adjusted modelled road NOx	26.6	16.5	20.8	16.5	19.5	17.5	22.4	16.7	68.6	46.8	79.1	27.0
Modelled total NO_2	18.7	13.7	15.6	13.7	15.7	14.8	17.0	14.4	32.5	25.1	35.6	17.4
% difference	-28.1	-2.1	-38.9	-34.0	-49.2	-15.3	-26.3	-18.0	5.4	21.9	20.6	20.8
% RMSE	4.9											

A road-NOx adjustment factor of **1.7076** was determined as the ratio of the 'measured' road contribution and the model derived road contribution. This factor was then applied to the modelled road-NOx concentration at each receptor, before conversion to NO_2 concentrations using the NOx to NO_2 calculator provided by Defra, and the NO_2 background concentration.

The verification factor identifies that the model was underpredicting NOx concentrations however, this is considered to be influenced by the absence of any local background monitoring data for use in verification. Defra background maps within the study area are very low and therefore are considered to influence the overall verification factor.

Statistical analysis of the verification process identified an RMSE of 4.9% which is well within the ideal range of 25%, and within the best range of 10%. There can therefore be statistical confidence in the results of the assessment once model outputs are verified using the verification factor detailed above.

Table G2 details the PM_{10} model verification process.

Table G2: PM_{10} Model Verification Process ($\mu g.m^{-3}$)

Site	2023 Monitored PM_{10}	2023 Background PM_{10}	'Road-PM_{10}'	Modelled PM_{10}	Ratio
AQMS	16	10.9	5.1	1.7	**3.067**

A road-PM_{10} adjustment factor of **3.067** was determined as the ratio of the 'measured' road contribution and the model derived road contribution. This factor was then applied to the modelled road-PM_{10} contribution at each receptor.

Table G3 details the $PM_{2.5}$ model verification process.

Table G3: $PM_{2.5}$ Model Verification Process ($\mu g.m^{-3}$)

Site	2023 Monitored $PM_{2.5}$	2023 Background $PM_{2.5}$	'Road-$PM_{2.5}$'	Modelled $PM_{2.5}$	Ratio
8	13	6.7	1.3	0.9	**1.449**

A road-$PM_{2.5}$ adjustment factor of **1.449** was determined as the ratio of the 'measured' road contribution and the model derived road contribution. This factor was then applied to the modelled road-$PM_{2.5}$ contribution at each receptor.

Appendix H – Construction Phase Dust Mitigation

Mitigation Measure	Highly Recommended	Desirable
Communication	Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	None
	Display the name and contact details of person(s) responsible for air quality and dust issues on the site boundary. This may be the environment manager / engineer or the site manager.	
	Display the head or regional office contact information.	
	Develop and implement a Dust Management Plan which may include measures to control other emissions, approved by the Local Authority.	
Site Management	Record all dust and air quality complaints, identify causes and take appropriate action to reduce emissions in a timely manner and record any measures taken.	None
	Make the complaints log available to the local authority when asked.	
	Record any exceptional incidents that cause dust or air emissions, either on or off site and the action taken to resolve the situation in the log book.	
Monitoring	Carry out regular inspections to monitor compliance with the Dust Management Plan, record inspection results and make an inspection log available to the local authority when asked.	None
	Undertake daily on site and off site inspections where receptors including roads are nearby, to monitor dust. Record inspection results and make the log available to the local authority when asked.	
	Increase the frequency of site inspections when activities with a high potential to produce dust are being carried our and during prolonged dry or windy conditions.	
	Agree dust deposition, dust-flux or real-time dust monitoring locations with the local authority, where monitoring is required. Baseline monitoring should commence at least three months prior to works on site, where possible.	
Preparing and maintaining the Site	Plan site layout so that machinery and dust causing activities are located away from receptors, as far as possible.	None
	Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as stockpiles on site.	
	Fully enclose the site or specific operations where there is a high potential for dust production and the site is active for an extensive period.	
	Avoid site runoff of water or mud.	
	Keep site fencing, barriers and scaffolding clean with wet methods.	
	Remove materials that have potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on site, cover as described below.	

Mitigation Measure	Highly Recommended	Desirable
	Cover, seed or fence stockpiles to prevent wind whipping.	
Operating vehicle / machinery and sustainable travel	Ensure all vehicles switch off engines when stationary – no idling.	None
	Impost and signpost a maximum 15 mph speed limit on surfaced and 10mph speed limited on unsurfaced haul roads and work areas.	
	Implement a Travel Plan that supports and encourages sustainable travel.	
	Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable.	
Operations	Implement a Travel Plan that supports and encourages sustainable travel.	None
	Ensure an adequate water supply to the site for effective dust suppression using non-potable water where possible and appropriate.	
	Use enclosed chutes and conveyors and covered skips.	
	Minimise drop heights from conveyors, loading shovels, hoppers and other loading and handling equipment and use fine water sprays on such equipment wherever appropriate.	
	Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable.	
Waste management	Avoid bonfires and burning of waste materials.	None
Earthworks	Re-vegetate earthworks and exposed areas / soil stockpiles to stabilise surfaces as soon as practicable.	None
	Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	
	Only remove the cover in small areas during work and not all at once.	
Construction	Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	Avoid scabbling (roughening of concrete surfaces) if possible.
		Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.
		For smaller supplies of fine powder materials, ensure bags are sealed after use and stored appropriately to prevent dust.
Trackout	Use water-assisted dust sweepers on the access and local roads to remove, as necessary, any material tracked out of the site.	None
	Avoid dry sweeping of large areas.	
	Ensure vehicles entering and leaving the site are covered to prevent any escape of materials during transportation.	
	Record all inspections of haul routes and any subsequent action taking in site log book.	

Mitigation Measure	Highly Recommended	Desirable
	Ensure vehicles entering and leaving the site are covered to prevent any escape of materials during transportation	
	Implement a wheel-washing system with rumble grids to dislodge mud prior to leaving the site, where practicable.	
	Ensure there is an adequate area of hard surfaced road between the wheel wash and the site exit.	
	Locate site access gates at least 10m from receptors, where possible.	

Appendix I – Pollutant Concentration Figures

Figure I1: Annual Mean NO_2 Concentrations at the Site – 2026 Opening Year

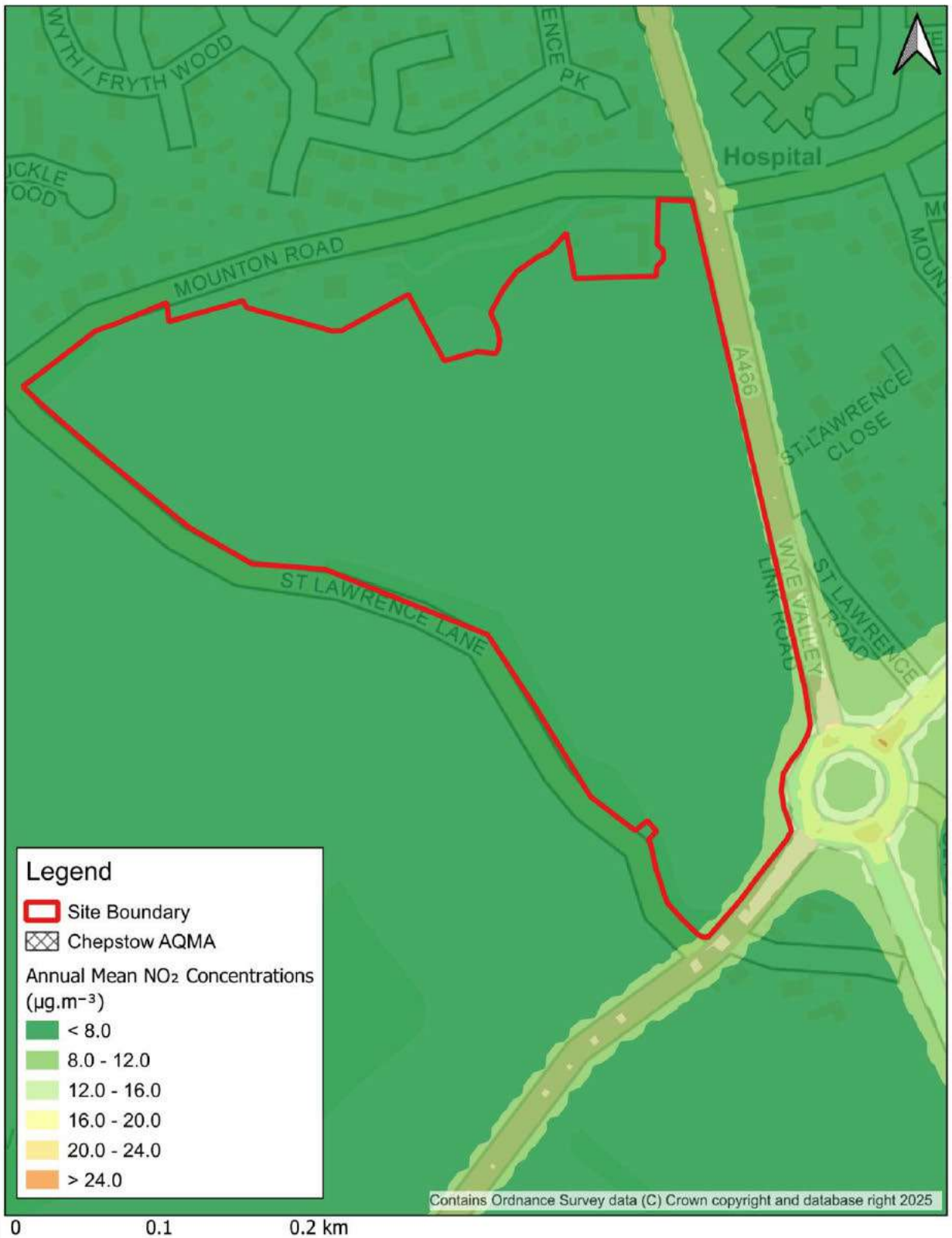


Figure I1: 2026 Opening Year Annual Mean NO_2 Concentrations

Figure I2: Annual Mean PM_{10} Concentrations at the Site – 2026 Opening Year

Figure I2: Opening Year Annual Mean PM_{10} Concentrations

Figure I3: Annual Mean $PM_{2.5}$ Concentrations at the Site – 2026 Opening Year

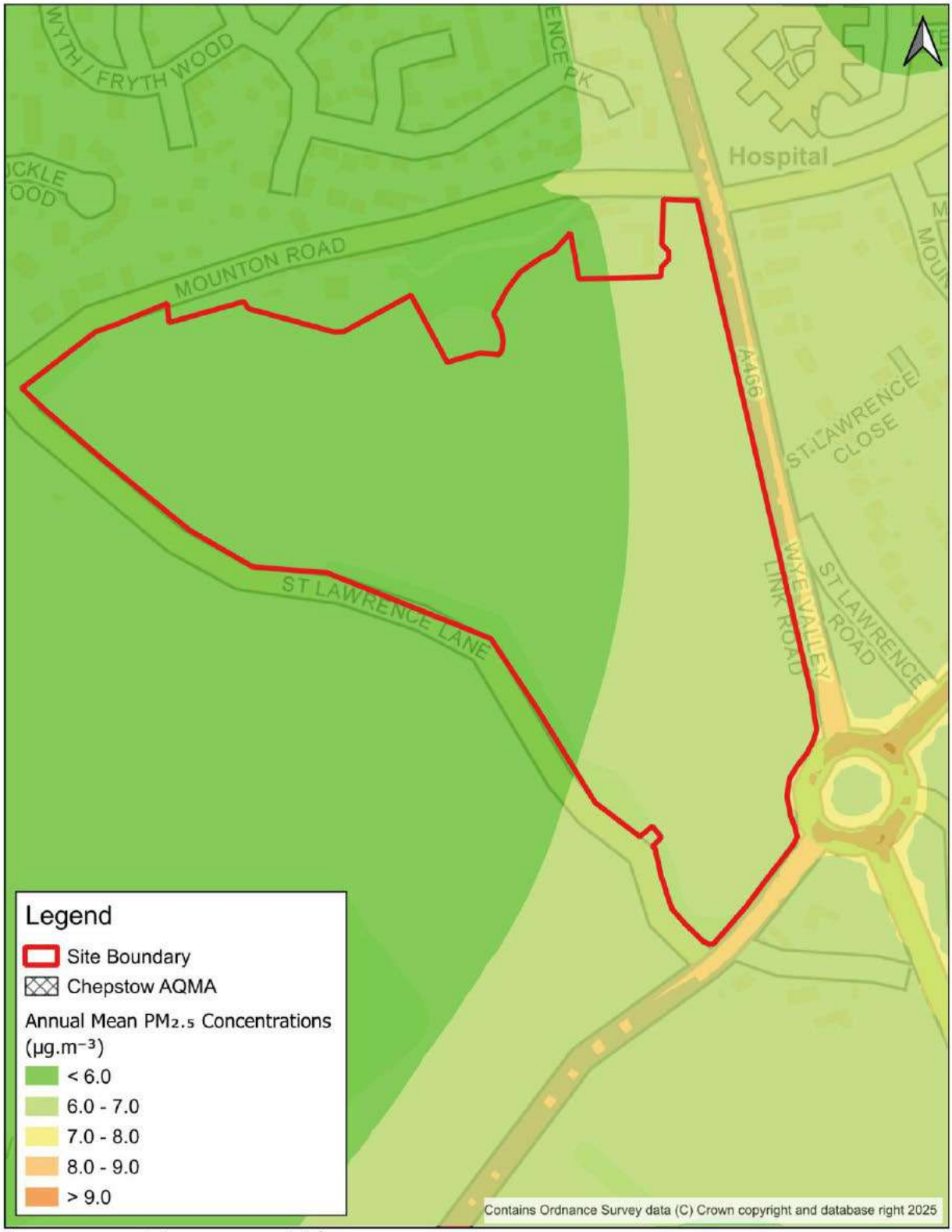


Figure I3: 2026 Opening Year Annual Mean $PM_{2.5}$ Concentrations

Figure I4: Annual Mean NO_2 Concentrations at the Site – 2029 Future Year

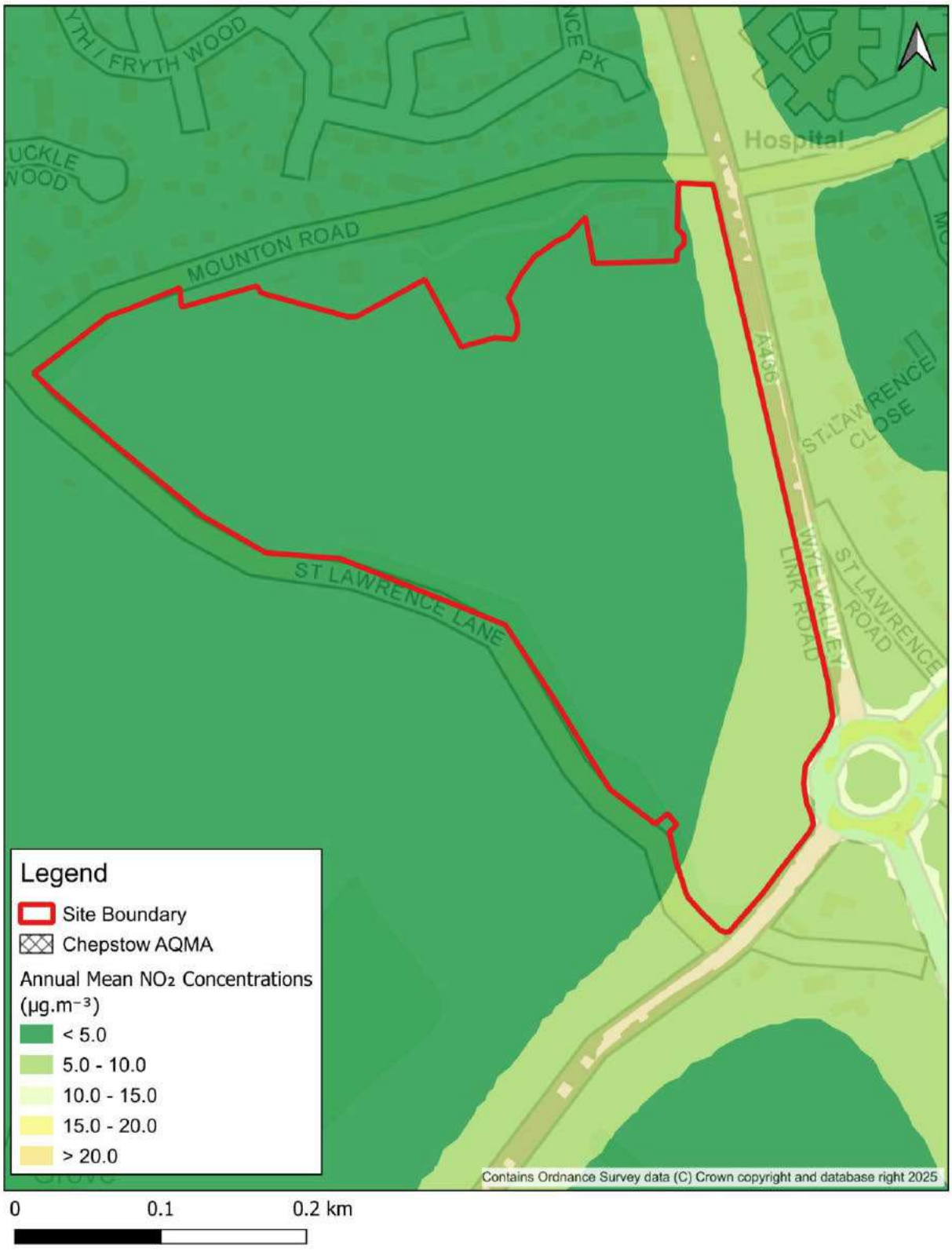


Figure I4: 2029 Future Year Annual Mean NO_2 Concentrations

Figure I5: Annual Mean PM_{10} Concentrations at the Site – 2029 Future Year

Figure I5: 2029 Future Year Annual Mean PM_{10} Concentrations

Figure I6: Annual Mean $PM_{2.5}$ Concentrations at the Site – 2029 Future Year

Figure I6: 2029 Future Year Annual Mean $PM_{2.5}$ Concentrations

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