10. Air Quality

Introduction

10.1 This chapter assesses the effects of the Proposed Development on Air Quality. In particular, it identifies and assesses the anticipated effects of change resulting from the Proposed Development on the air quality in the Assessment Study Area.

10.2 The chapter describes the methods used to assess the likely significant effects, the baseline conditions currently existing at the site and surroundings, the potential direct and indirect effects of the development arising from emissions from road traffic associated with the operation of the Proposed Development, the mitigation measures required to prevent, reduce, or offset the identified significant effects and the residual effects. It has been written by Melody Horan of Miller Goodall Limited.

10.3 This Chapter is supported by the following figures and appendices:

- Appendix 10.1: Legislation and Guidance – Air Quality;
- Appendix 10.2: ADMS Parameters;
- Appendix 10.3: Site Suitability; and
- Figure 10.1: Location of Site, WBC monitoring, proposed and existing receptors and modelled roads.

Assessment Methodology and Significance Criteria

Legislative Framework, Policy and Guidance

10.4 The following legislation has informed the assessment of effects within this Chapter and is detailed further in **Appendix 10.1**:

- European Parliament (1996), Council Directive 96/62/EC on Ambient Air Quality Assessment and Management[i];
- European Parliament (2008), Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe[ii];
- HMSO, (2010) Air Quality Standards Regulations 2010[iii].; and
- Welsh Government (February 2024) Planning Policy Wales Edition 12[iv].

10.5 The following guidance has informed the assessment of effects within this Chapter, and is detailed further in **Appendix 10.1**:

- WCBC (2023) Wrexham County Borough Local Development Plan 2013 – 2028[v];
- Department of Environment Food and Rural Affairs (Defra), (2022) Local Air Quality Management Technical Guidance TG(22) (LAQMTG22)[vi];
- IAQM, (January 2017) Land Use Planning and Development Control: Planning for Air Quality[vii];

- IAQM (2024) "Guidance on the assessment of dust from demolition and construction" v2.2 2024[viii];
- Defra Background Maps[ix];
- Defra Air Quality Management Area Maps[x]; and
- Defra NO_x to NO_2 Calculator[xi].

Identification of the Study Area

10.6 The extent of the study area in relation to road traffic emissions associated with the operation of the Proposed Development has been informed by the influence of road traffic associated with it and the location of relevant sensitive receptors around the Site.

Construction Phase

10.7 With respect to demolition and construction dust, guidance from the Institute of Air Quality Management[viii] advises that, with appropriate mitigation in place, the impacts of demolition and construction dust will not be significant. The characteristics of the site and the surrounding area suggest that mitigation would not be impracticable or ineffective. These mitigation measures will be included within a Construction Environment Management Plan (CEMP) for the Proposed Development.

10.8 In terms of traffic generation during the demolition and construction phase of the development, it is anticipated that there will not be a change in:

- Light-duty vehicle (LDV) flows of more than 500 annual average daily traffic (AADT) on roads with relevant receptors; and
- Heavy-duty vehicle (HDV) flows of more than 100 AADT on roads with relevant receptors.

10.9 IAQM guidance[vii] indicates that the likely impacts of construction traffic on local air quality will not, therefore, be significant.

10.10 In the unlikely event that flows are higher than anticipated, the impacts will be temporary.

10.11 Therefore, the effect of construction dust and emissions from construction vehicles associated with the Proposed Development on existing human receptors is not considered to be significant and have not been considered further in the EIA or reported in the ES.

Operational Phase

10.12 The technical approach to the air quality assessment has been undertaken in accordance with the DEFRA publication LAQMTG22[vi] and EPUK/IAQM guidance[vii].

10.13 A review of existing air quality information within the North Wales Authorities Collaborative 2023 Air Quality Progress Report[xii] which includes data from WCBC, has been completed. This includes a review of existing levels of pollutants of interest, in particular nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$).

10.14 The location of areas of known poor air quality, in particular Air Quality Management Areas (AQMAs) in relation to the study area has been identified using the DEFRA interactive map[x].

10.15 The locations and results of NO_2 diffusion tube monitoring of NO_2 levels around the site have also been identified.

10.16 Background concentrations of NO_2, PM_{10} and $PM_{2.5}$ have been obtained from the DEFRA background maps[ix].

10.17 The validated Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) v5.0.1.3 has been used to calculate the impact of development-generated vehicle exhaust emissions, on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at existing receptors located adjacent to the assessed road network.

Road Traffic Emissions – Air Dispersion Modelling

10.18 ADMS-Roads is a comprehensive tool for investigating air pollution in relation to road networks. The model uses algorithms for the height-dependence of wind speed, turbulence and stability to produce improved predictions. It can predict long-term and short-term concentrations, as well as calculations of percentile concentrations.

10.19 ADMS-Roads has been comprehensively validated in a large number of studies by the software manufacturer CERC (Cambridge Environmental Research Consultants). This includes comparisons with data from the UK's Automatic Urban Network (AUN) and specific validation exercises using standard field, laboratory and numerical data sets. CERC is also involved in European programmes on model harmonisation, and their models have been compared favourably against other EU and US EPA systems. Further information in relation to this is available from the CERC website at www.cerc.co.uk

10.20 The technical inputs into the model are described in **Appendix 10.2**.

Identification of Sensitive Receptors

10.21 This assessment of likely significant effects to sensitive receptors applies to annual mean objectives for the pollutants considered and these apply at all locations where members of the public might be regularly exposed to relevant pollutants such as building façades of residential properties, schools, hospitals and care homes[vi].

10.22 Sensitive receptors considered in this assessment have been selected based on their proximity to the road network which will be affected by road traffic associated with the Proposed Development. Receptors have also been selected to be representative of worst-case exposure as they are close to the main junctions used by development traffic. The annual mean objectives apply to all of the selected receptors in this assessment.

10.23 The sensitivity of receptors has been defined at these selected individual receptor locations according to the criteria within the EPUK/IAQM guidance[vii] shown in **Table 10.1**.

Table 10.1 – Defining Sensitivity of Receptor

Sensitivity	Long-term average concentration at the receptor in assessment year
Very high	110% or more of the Air Quality Assessment Level (AQAL)
High	103-109% of AQAL
Moderate	95-102% of AQAL
Low	76-94% of AQAL
Negligible	75% or less of AQAL

10.24 The sensitivity of each receptor has, therefore, been defined based on the long term average concentration at the receptor in the assessment year. The greater the long term average concentration at the receptor, the more sensitive it becomes to the magnitude of change. 'Very high' has been included because the EPUK/IAQM guidance splits the long term average concentration into five groups.

Characterisation of Effect

10.25 Effects are characterised as being positive, negative or no change. A positive effect is when the Proposed Development results in a reduction in pollutant concentrations at the assessed receptor; a negative effect is when it results in an increase in pollutant concentrations at the assessed receptor and no change is when the Proposed Development does not cause a change in pollutant concentrations at the assessed receptor.

10.26 The magnitude of effect for annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ has been calculated at individual receptor locations according to the criteria within EPUK/IAQM guidance[vii].

10.27 The guidance bands the change in concentration of the pollutant relative to the Air Quality Assessment Level into the following bands; $\leqslant$ 1%; 2-5%; 6-10% and >10%. The annual mean objective for NO_2 and PM_{10} is 40 µg/m^3. The annual mean target for $PM_{2.5}$ is 25 µg/m^3. The magnitude of effect for individual receptors is shown in **Table 10.2.**

Table 10.2 – Defining Magnitude of Effect

Level of Magnitude - % change in concentration relative to the air quality assessment level	Definition of Magnitude
≤1	Negligible
2-5	Minor
6-10	Moderate
>10	Major

10.28 The duration of the effect has been assessed as either 'short-term', 'medium-term' or 'long-term'. Short-term is considered to be up to 0 - 5 years, medium-term is considered to be between 5 and 15 years and long-term is considered to be greater than 15 years. The effect of the operational phase of the Proposed Development is deemed to be long-term.

Significance Criteria

10.29 The significance of likely effects arising from the operation of the Proposed Development on air quality has been determined by identifying the sensitivity of the receptor (on a scale of very high, high, moderate, low and negligible) and the magnitude of the effect (on a scale of large, moderate, small and negligible) to determine the level of the impact on a scale of major, moderate, minor or negligible. The impact descriptors are shown in **Table 10.3**.

Table 10.3 – Impact descriptors for individual receptors

Long term average Concentration at receptor in assessment year (Sensitivity of Receptor)	% Change in concentration relative to Air Quality Assessment Level (AQAL)* (Magnitude of effect)			
	+/- 1	+/- 2-5	+/- 6-10	+/- >10
Negligible	Negligible	Negligible	Minor	Moderate
Low	Negligible	Minor	Moderate	Moderate
Moderate	Minor	Moderate	Moderate	Major
High	Moderate	Moderate	Major	Major
Very High	Moderate	Major	Major	Major

**If the change in air pollution is positive, then the effect is beneficial. If the change in air pollution is adverse, then the effect is beneficial. Changes of 0%, i.e. less than 0.5%, are Negligible.*

10.30 EPUK/IAQM guidance[vii] advises that the overall assessment of significance is to be based on professional judgement. Therefore, the overall significance of effects has been determined using professional judgement, taking into account such factors as:

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

10.31 Professional judgement has, therefore, been used to assess the overall air quality impact of the Proposed Development as either 'Significant' or 'Not Significant'. Major and Moderate Adverse Impacts are considered to be Significant. Negligible and Minor impacts are considered to be Not significant.

Assumptions / Limitations

10.32 The assessment is based on the design and operational details available at the time of preparing the ES, and all values presented in this chapter are the best possible estimates. To ensure transparency within the EIA process, the following limitations and assumptions have been identified.

10.33 There are several limitations and uncertainties associated with the modelling of air quality and, where applicable, realistic worst-case scenarios have been assumed (based on professional judgement):

- Modelling simplifies real-world processes into a series of algorithms;
- There is an element of uncertainty in all measured and modelled data used within ADMS; and
- Regarding the aspects of the assessment which do not rely on detailed dispersion modelling, the conclusions of the assessment are reliant on the professional judgement of the consultants involved and the validity of the guidance and tools utilised.

10.34 A summary of the consultation with statutory and non-statutory consultees is provided in **Table 10.4**.

Table 10.4 – Consultation Table

Consultation	Date and Time	Comments	Actions
Consultation document emailed to Paul Campini of WCBC by Miller Goodall Ltd	02/01/2024 at 16:01	No reply	NA
Email sent to Public Protection Service of WCBC by Miller Goodall Ltd to request the North Wales Authorities Collaborative Project 2023 Air Quality Progress Report as the 2022 report was the latest available online.	17/01/2024 at 12:55	Paul Campini replied with the North Wales Authorities Collaborative Project 2023 Air Quality Progress Report. Email from Paul Campini to Miller Goodall Ltd received on 17/01/2024 at 14:02.	2023 Air Quality Progress Report utilised in the Air Quality chapter
Consultation document resent via email to Paul Campini of WCBC by Miller Goodall Ltd	18/01/2024 at 16:01	No reply	NA

Baseline Conditions

Local Air Quality Management

10.35 A review of existing air quality information relating to concentrations of NO_2, PM_{10} and $PM_{2.5}$ at and around the study area has been completed. Baseline air quality conditions within the study area have been established by reviewing the Defra AQMA interactive map[x], examining monitoring data produced by WCBC (provided in the North Wales Authorities Collaborative 2022 Air Quality Progress Report[xii]) and by reviewing background concentration maps provided by Defra for the grid squares covering the proposed development[ix].

10.36 There are currently no AQMAs declared in North Wales.

Background Concentrations

10.37 There are no background monitoring locations in the vicinity of the Proposed Development and receptor locations. Therefore, background NO_2, PM_{10} and $PM_{2.5}$ concentrations have been obtained from the Defra LAQM support tools[ix] for the 1km x 1km grid squares covering the Proposed Development site and receptor locations for the years of assessment. The background pollutant concentrations are provided in **Table 10.5**.

Table 10.5 – Background Pollutant Concentrations Obtained for the 1km x 1km Grid Squares Covering the Site and Receptor Locations*

Grid Square	Pollutant	2022	2026
		(µg/m³)	(µg/m³)
334500, 350500 (ESR5 and ESR6)	NO_2	8.14	7.61
	PM_{10}	11.21	10.98
	$PM_{2.5}$	7.65	7.47
335500, 350500 (ESR7 – ESR10 and PSR1 – PSR4)	NO_2	7.16	6.72
	PM_{10}	10.77	10.55
	$PM_{2.5}$	7.06	6.88
335500, 351500	NO_2	7.81	7.28

(ESR1 – ESR4 and PSR5)	PM_{10}	11.53	11.31
	$PM_{2.5}$	7.40	7.22
335500, 352500 (WBC-042)	NO_2	7.59	7.04
	PM_{10}	10.77	10.54
	$PM_{2.5}$	6.95	6.77

** Background concentrations obtained from the latest 2018 based background maps*

10.38 The background concentrations in **Table 10.5** indicate that background concentrations of NO_2, PM_{10} and $PM_{2.5}$ are well below health-based air quality objectives of 40 µg/m^3 for both pollutants.

Local Air Quality Monitoring Data

10.39 Monitoring data has been obtained from the North Wales Authorities Collaborative (2022) Air Quality Progress Report[xii].

10.40 WCBC monitors NO_2 using diffusion tubes at 26 locations, including one diffusion tube triplicate site which is co-located with an automatic monitoring station which is part of the Automatic Urban and Rural Network (AURN).

10.41 The AURN site is located approximately 2.5 km southwest of the Proposed Development. Therefore, it is not representative of the conditions at the Proposed Development. There is another automatic monitoring station, Wrexham Chirk. However, this station is located in Chirk approximately 14 km southwest of the Proposed Development. Therefore, the station is not representative of the conditions at the Proposed Development.

There are four NO_2 diffusion tube monitoring sites within 2 km of the Proposed Development. The results from these diffusion tubes are shown in **Table 10.6** and their locations are shown in **Figure 10.1**.

Table 10.6 – Annual Mean NO_2 Concentrations Monitored by WCBC within the Study Area

Site ID	Location		Annual Mean NO_2 Concentrations (µg/m^3)				
			2018	2019	2020	2021	2022
WBC-021 (roadside)	334100	350700	18.8	NA	NA	NA	NA
WBC-033 (roadside)	333981	350171	18.5	15.6	19.3	21.0	17.4
WBC-042 (roadside)	335359	352178	23.2	20.6	17.1	19.6	18.3
WBC-043 (roadside)	333966	349691	19.3	17.0	14.4	16.5	17.5
Annual Mean NO_2 air quality objective			40 µg/m^3				

10.42 The monitoring results in **Table 10.6** indicate that annual mean concentrations of NO_2 were below the NO_2 annual mean objective at the identified monitoring sites during the period shown.

10.43 The results also indicate that the short-term objective for NO_2 was unlikely to be exceeded at the identified monitoring sites as monitored annual mean concentrations were well below the indicative screening concentration of 60 µ/gm^3 during the period shown.

10.44 WCBC has one PM_{10} and $PM_{2.5}$ monitoring location. This is at the automatic station AURN. As discussed, this AURN is not representative of the conditions at the development site.

Air Quality Receptors

10.45 The coordinates of the existing sensitive receptors (ESRs) and proposed sensitive receptors (PSRs) are provided in **Table 10.7** and shown in **Figure 10.1**. A description of each receptor is also provided in **Table 10.7**.

Table 10.7 – Location and descriptors of receptors

Receptor ID	Descriptor	Location	
ESR1	Residential dwelling	335829	351856
ESR2	Residential dwelling	335155	351241
ESR3	Residential dwelling	335160	351307
ESR4	Residential dwelling	335113	351258
ESR5	Residential dwelling	334535	350863
ESR6	Residential dwelling	334419	350851
ESR7	Plas Rhosnesni Care Home	335241	350910
ESR8	Fairpark Care - Hullah Farm Residential Care Home	335312	350683
ESR9	Residential dwelling	335300	350648
ESR10	Residential dwelling	335374	350433
PSR1	Located at the site boundary on the roadside	335232	350996
PSR2	Located at the site boundary on the roadside	335278	350845
PSR3	Located at the site boundary on the roadside	335347	350594
PSR4	Located at the site boundary on the roadside	335409	350411
PSR5	Located at the site boundary on the roadside	335404	351227

Embedded Mitigation

10.46 This section describes the measures which have been 'embedded' into the development. As the development is an outline application the specifics regarding heating and electric vehicle charging points have not been confirmed. However, the operational phase of the Proposed Development will meet the IAQM recommended mitigation measures:

- Electric Vehicle (EV) charging points:
    - Unallocated parking: the provision of at least 1 Electric Vehicle (EV) "fast charge" point per 10 residential dwellings and/or 1000m^2 of commercial floorspace.
    - Allocated parking: one EV charging point per residential dwelling.
- Heating:
    - All gas-fired boilers will meet a minimum standard of <40 mgNO_x/kWh.
    - All gas-fired CHP plant to meet a minimum emissions standard of:
        - Spark ignition engine: 250 mgNO_x/Nm3;
        - Compression ignition engine: 400 mgNO_x/Nm3;
        - Gas turbine: 50 mgNO_x/Nm3.
- Solid biomass boiler: 275 mgNO_x/Nm^3 and 25 mgPM/Nm^3.

Assessment of Likely Significant Effects

The Operational Development

10.47 The effects of road traffic emissions from road traffic associated with the operational phase of the Proposed Development have been calculated using the desk-based computer model ADMS-Roads v5.0.1.3, using the inputs described in **Appendix 10.2**. These have been compared to a baseline model of road traffic emissions without the Proposed Development traffic.

10.48 The assessment considers the impact of the Proposed Development during Phase 1 of the Proposed Development which will open in 2026. Phase 2 of the Proposed Development is set as the year 2035.

10.49 Although certain roads will experience greater traffic flows in Phase 2 of the Proposed Development compared to Phase 1, Phase 1 is deemed the worst case because background concentrations and emission factors are predicted to improve in the future. Therefore, 2026 background concentrations and emission factors are higher than in 2035. In addition, Phase 2 includes a link road which will travel through KSS2 North. This link road will result in a reduction in traffic along the following roads: Stryt Holt / Holt Road, Cefn Road and Borras Park Road thus reducing the effect of the Proposed Development on these roads compared to Phase 1.

10.50 Committed traffic is included in both the "without" Proposed Development and "with" Proposed Development scenarios.

10.51 **Table 10.8** details the results of the baseline modelling results, this consists of two scenarios:

- The base year of 2022 (obtained from traffic surveys), used for verification; and
- 2026 baseline (calculated from the surveyed traffic with a growth factor applied to represent 2026) plus the committed traffic.

Table 10.8 – Predicted Baseline NO_2, PM_{10} and $PM_{2.5}$ Annual Mean Concentrations (µg/m³) at Existing Sensitive Receptor Locations

Receptor ID	Base Year (2022)			2026 Baseline + Committed		
	NO_2 (µg/m³)	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)	NO_2 (µg/m³)	PM_{10} (µg/m³)	$PM_{2.5}$ (µg/m³)
ESR1	11.60	12.02	7.66	9.92	11.79	7.48
ESR2	15.85	12.42	7.88	12.43	12.11	7.64
ESR3	15.17	12.30	7.82	12.09	12.00	7.59
ESR4	16.36	12.45	7.90	12.86	12.16	7.67
ESR5	9.93	11.47	7.79	8.76	11.22	7.60
ESR6	10.46	11.63	7.88	9.04	11.37	7.68
ESR7	9.57	11.21	7.29	8.19	10.95	7.08
ESR8	10.39	11.36	7.37	8.67	11.08	7.15
ESR9	9.12	11.07	7.21	7.95	10.82	7.02
ESR10	8.19	10.96	7.16	7.37	10.73	6.97

10.52 The baseline air quality assessment for the base year (2022) and 2026 baseline plus committed development scenarios indicate that concentrations of NO_2, and PM_{10} are below the respective annual mean air quality objectives and the $PM_{2.5}$ annual mean target at all sensitive receptors assessed.

10.53 The impact assessment consists of two scenarios:

- 2026 baseline (calculated from the surveyed traffic with a growth factor applied to represent 2026) plus the committed traffic; and
- 2026 baseline (calculated from the surveyed traffic with a growth factor applied to represent 2026) plus the committed traffic plus development traffic.

10.54 The results of the impact assessment are presented in **Table 10.9**, **Table 10.10** and **Table 10.11**.

Table 10.9 – Proposed Development Operational - NO_2

Receptor	2026 Baseline + Committed (µg/m³)	2026 Baseline + Committed + Proposed Development (µg/m³)	Microgram Change (µg/m³)	% Change relative to AQAL	Magnitude of change	% of AQAL	Sensitivity of receptor	Impact
ESR1	9.92	10.08	0.16	0.40%	Negligible	25.20%	Negligible	Negligible
ESR2	12.43	13.45	1.02	2.55%	Negligible	33.63%	Negligible	Negligible
ESR3	12.09	12.76	0.67	1.68%	Low	31.90%	Negligible	Negligible
ESR4	12.86	13.57	0.71	1.78%	Low	33.93%	Negligible	Negligible
ESR5	8.76	8.8	0.04	0.10%	Low	22.00%	Negligible	Negligible
ESR6	9.04	9.2	0.16	0.40%	Negligible	23.00%	Negligible	Negligible
ESR7	8.19	8.61	0.42	1.05%	Negligible	21.53%	Negligible	Negligible
ESR8	8.67	9.35	0.68	1.70%	Negligible	23.38%	Negligible	Negligible
ESR9	7.95	8.14	0.19	0.48%	Low	20.35%	Negligible	Negligible
ESR10	7.37	7.58	0.21	0.53%	Negligible	18.95%	Negligible	Negligible

Table 10.10 – Proposed Development Operational - PM_{10}

Receptor	2026 Baseline + Committed ($\mu g/m^3$)	2026 Baseline + Committed + Proposed Development ($\mu g/m^3$)	Microgram Change ($\mu g/m^3$)	% Change relative to AQAL	Magnitude of change	% of AQAL	Sensitivity of receptor	Impact
ESR1	11.79	11.82	0.03	0.08%	Negligible	29.56%	Negligible	Negligible
ESR2	12.11	12.29	0.18	0.45%	Negligible	30.71%	Negligible	Negligible
ESR3	12.00	12.12	0.12	0.30%	Negligible	30.30%	Negligible	Negligible
ESR4	12.16	12.28	0.12	0.30%	Negligible	30.69%	Negligible	Negligible
ESR5	11.22	11.24	0.02	0.05%	Negligible	28.09%	Negligible	Negligible
ESR6	11.37	11.42	0.05	0.13%	Negligible	28.54%	Negligible	Negligible
ESR7	10.95	11.06	0.11	0.28%	Negligible	27.65%	Negligible	Negligible
ESR8	11.08	11.27	0.19	0.47%	Negligible	28.16%	Negligible	Negligible
ESR9	10.82	10.89	0.07	0.18%	Negligible	27.21%	Negligible	Negligible
ESR10	10.73	10.78	0.05	0.12%	Negligible	26.96%	Negligible	Negligible

Table 10.11 – Proposed Development Operational – $PM_{2.5}$

Receptor	2026 Baseline + Committed (µg/m³)	2026 Baseline + Committed + Proposed Development (µg/m³)	Microgram Change (µg/m³)	% Change relative to AQAL	Magnitude of change	% of AQAL	Sensitivity of receptor	Impact
ESR1	7.48	7.49	0.01	0.04%	Negligible	29.97%	Negligible	Negligible
ESR2	7.64	7.73	0.09	0.36%	Negligible	30.94%	Negligible	Negligible
ESR3	7.59	7.65	0.06	0.24%	Negligible	30.59%	Negligible	Negligible
ESR4	7.67	7.73	0.06	0.24%	Negligible	30.92%	Negligible	Negligible
ESR5	7.60	7.61	0.01	0.04%	Negligible	30.43%	Negligible	Negligible
ESR6	7.68	7.70	0.02	0.08%	Negligible	30.80%	Negligible	Negligible
ESR7	7.08	7.14	0.06	0.24%	Negligible	28.58%	Negligible	Negligible
ESR8	7.15	7.25	0.10	0.40%	Negligible	29.01%	Negligible	Negligible
ESR9	7.02	7.05	0.03	0.12%	Negligible	28.21%	Negligible	Negligible
ESR10	6.97	7.00	0.03	0.12%	Negligible	28.00%	Negligible	Negligible

10.55 The impact of the Proposed Development on air quality is adverse at all receptors during Phase 1. However, the results of the ADMS-Roads modelling assessment for 2026 indicate that annual mean concentrations of NO_2 and PM_{10} would be below the respective annual objectives as well as the $PM_{2.5}$ annual mean target, at all existing sensitive receptor locations within the study area, for both 'with' and 'without' the Proposed Development.

10.56 All of the receptors considered are of Negligible sensitivity. Predicted annual mean concentrations of NO_2, PM_{10} and $PM_{2.5}$ are expected to have an increase of less than 2.55% at all existing sensitive receptors assessed i.e. the magnitude of change at all receptors is Negligible. The Proposed Development is therefore predicted to have a negligible impact on concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2026 at the selected receptors.

10.57 The suitability of the site has been assessed by predicting the NO_2, PM_{10} and $PM_{2.5}$ concentrations at PSR locations in the 2026 scenario which assesses 2026 traffic flows with committed traffic flows and Proposed Development traffic. The results are provided in **Appendix 10.3**.

Additional Mitigation / Enhancement Measures

10.58 No additional mitigation is required in regards to air quality.

Residual Effects

10.59 There is likely to be a **negligible** direct and permanent adverse effect on levels of NO_2, PM_{10} and $PM_{2.5}$ in the long term at a local level from road traffic emissions associated with the Proposed Development. The overall effect of the development on air quality is considered to be **Not Significant**.

Conclusions

10.60 The assessment of air quality associated with emissions from road traffic associated with the operation of the Proposed Development has been undertaken. The assessment indicates that the Proposed Development will have a **Not Significant** effect on local air quality.

Assessment of Cumulative Effects

Approach

10.61 The main assessment scenarios compare baseline 2026 traffic flows and committed traffic flows against 2026 traffic flows with committed traffic flows and Proposed Development traffic. Therefore, the cumulative effect has been assessed within the main assessment. One committed development was included within the assessment, as shown in **Table 10.12**.

Table 10.12 - Cumulative Sites

Site Ref.	Application No.	Distance and Direction	Proposal	Scoped-in / Scoped-out	Justification
1.	P/2021/0436 (original application reference) currently subject to a pending appeal (P/2021/0436)	Approx 250m north	Land South of Holt Road, Wrexham (KSS2 North) 'Outline application for construction of up to 600 dwellings, with social landscaping, public open space and on-site establishment, with all matters retained except for north site access'	Scoped in and considered in the main assessment.	

Likely Residual Cumulative Effects and their Significance

The Completed and Operational Development

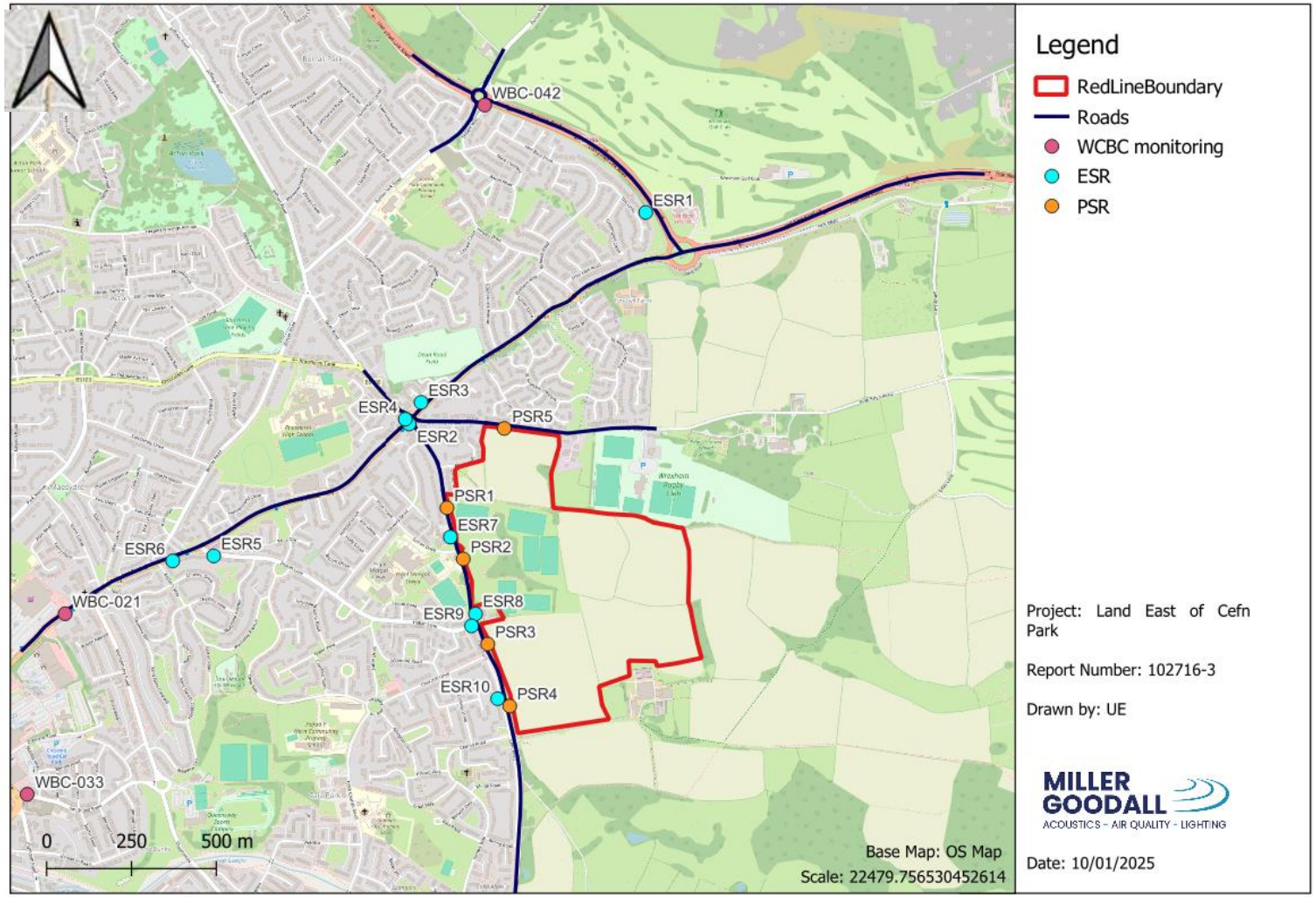
10.62 The cumulative effects of the Proposed Development with those of the development on land South of Holt Road, Wrexham (KSS2 North) have been considered in the main assessment above.

10.63 Therefore, the outcome of the cumulative assessment is the same as the standard assessment, the results for which are included in **Table 10.8 – 10.11**.

10.64 The annual mean concentrations of NO_2 and PM_{10} would be below the respective annual objectives as well as the $PM_{2.5}$ annual mean target, at all existing sensitive receptor locations within the study area, for both 'with' and 'without' the Proposed Development. The Proposed Development is therefore predicted to have a negligible impact on concentrations of NO_2, PM_{10} and $PM_{2.5}$ in 2026 at the selected receptors.

10.65 The suitability of the site has been assessed by predicting the NO_2, PM_{10} and $PM_{2.5}$ concentrations at PSR locations in the 2026 scenario which assesses 2026 traffic flows with committed traffic flows and Proposed Development traffic. The results are provided in **Appendix 10.3**.

Figure 10.1: Location of Site, WBC monitoring, proposed and existing receptors and modelled roads



References

[i] European Parliament (1996), Council Directive 96/62/EC on Ambient Air Quality Assessment and Management
[ii] European Parliament (2008), Council Directive 2008/50/EC on Ambient Air Quality and Cleaner Air for Europe
[iii] HMSO, (2010) Air Quality Standards Regulations 2010
[iv] Welsh Government (February 2024) Planning Policy Wales Edition 12
[v] Wrexham County Borough Council (2023) Wrexham County Borough Local Development Plan 2013 - 2028
[vi] Department for the Environment Food and Rural Affairs (2022). Local Air Quality Management Technical Guidance Document LAQM.TG(22)
[vii] IAQM, (January 2017) Land Use Planning and Development Control: Planning for Air Quality
[viii] IAQM (2024) "Guidance on the assessment of dust from demolition and construction" v2.2 2024
[ix] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018
[x] https://uk-air.defra.gov.uk/aqma/maps/
[xi] Defra NO_x to NO_2 Calculator
[xii] North Wales Authorities Collaborative (NWAC) (2023) North Wales Authorities Collaborative Project 2023 Air Quality Progress Report