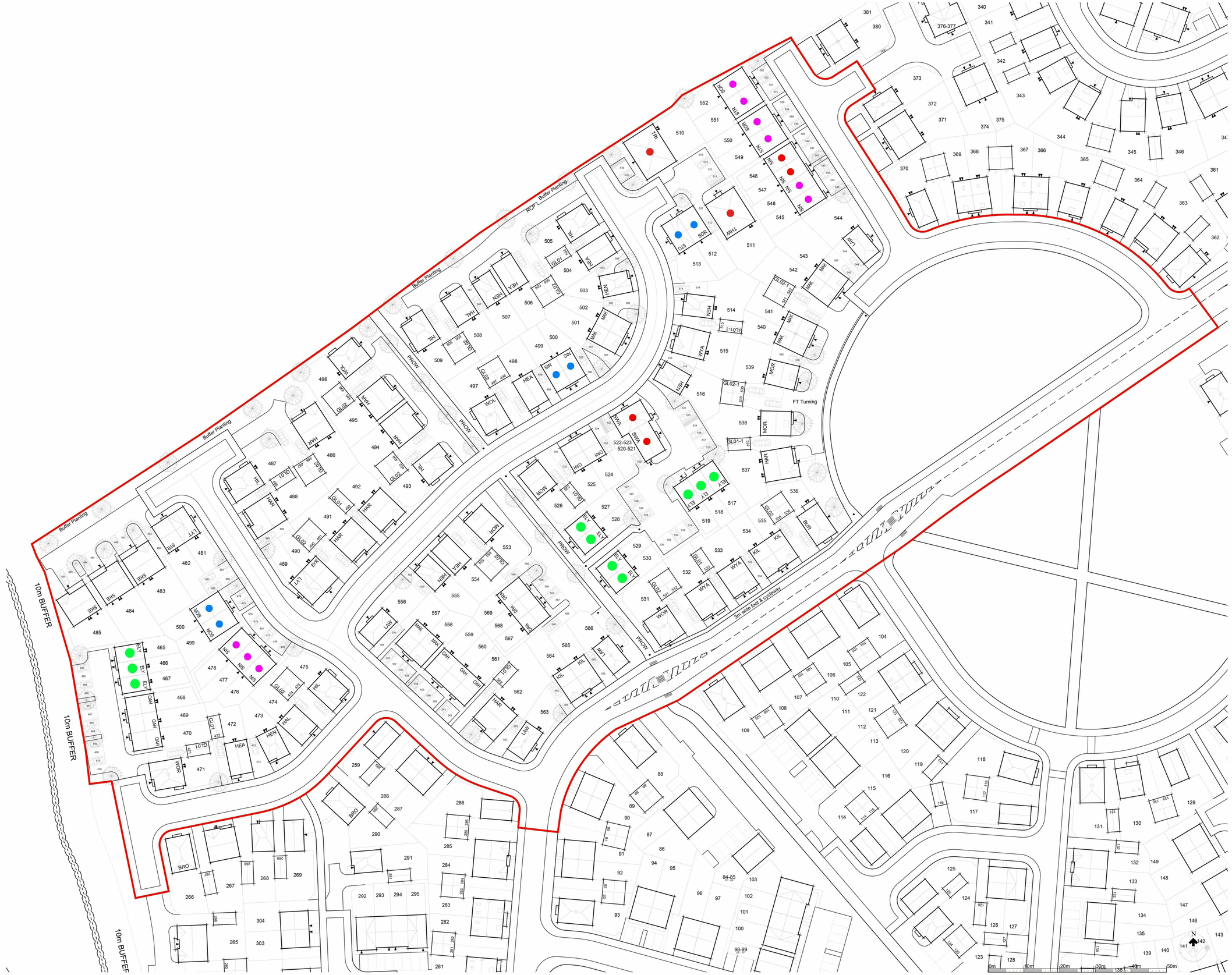
APPENDICES

APPENDIX A: GLOSSARY OF TERMS

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.
NO_x	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 $1\mu g.m^{-3}$ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.

APPENDIX B: PROPOSED DEVELOPMENT MASTERPLAN



J.S BLOOR (SERVICES) LIMITED
ASHBY ROAD, MEASHAM, SWADLINCOTE,
DERBYSHIRE DE12 7JP
TELEPHONE 01530 270100 FACSIMILE 01530 272006

Private			70.5%
Type	Beds	Storeys	No
Drake	2	2	4
Drake MT	2	2	1
Oahstone	2	2	8
Byron	3	2	2
Lyttelton SD	3	2	2
Lawrence	3	2	4
Kilburn	3	2	4
Henley	3	2	6
Worsley	3	2	2
Makenzie	3	2.5	8
Heaton	3	2	5
Hallam	4	2	2
Hillcott	4	2	6
Skelton	4	2	3
Wyatt	4	2	3
Wollaton	4	2	1
Harwood	4	2	8
Morris	4	2.5	4
Burns	4	2	1
			74

Aff. Rent			6.7%
Type	Beds	Storeys	No
2B4P Sinclair	2	2	3
3B5P Sorley	3	2	2
4B6P Strand	4	2	2
			7

Shared			5.7%
Type	Beds	Storeys	No
2B4P Sinclair	2	2	2
3B5P Sorley	3	2	3
3B5P C Storer	3	2	1
			6

Social Rent			7.6%
Type	Beds	Storeys	No
M4(3)-2B3P Thwaite	2	1	1
M4(3)-3B5P Tring	3	1	1
2B4P Sinclair	2	2	2
Swan GF	1	1	2
Swan FF	1	1	2
			8

First Homes			9.8%
Type	Beds	Storeys	No
Elyot	2	2	10
			10

Total	105

KEY

- Social Rented Units
- Affordable Rented Units
- Shared Ownership Units
- First Home units
- Indicative planting (refer to landscaping proposal drawings)

Revision.

A	Redrawn following internal review	18.08.22	EAH
B	Minor updates to reflect internal comments	24.08.22	EAH
C	New red line added to plan as per planning request.	24.10.22	BAZ
D	Grovier updated to Oahstone. Schedule amended to suit.	30.11.22	FM

Land off Roman Road
Holmer, Hereford
Phase 4

Site Layout

DATE: **July 2022**
SCALE: **1:500 @ A1**
DRAWN: **MS/JA**
CHECKED: **EAH**

BLOOR HOMES

Drawing No. WE086-SL-4001D

APPENDIX C: PLANNING POLICY AND LEGISLATION

National Legislation and Planning Policy

The UK Air Quality Strategy

European Union (EU) legislation forms the basis of air quality policy and legislation in the UK. The EU 2008 ambient Air Quality Directive[1] sets limits for ambient concentrations of air pollutants including nitrogen dioxide (NO_2) and particulate matter (PM_{10} and $PM_{2.5}$). The air quality standards and objectives are prescribed through the Air Quality (England) Regulations 2000[2], as amended, for the purpose of the Local Air Quality Management Framework.

The UK Government are required under the Environment Act 1995[3] to produce a national Air Quality Strategy (AQS). The AQS was first published in 1997[4] and was most recently reviewed and updated in 2007[5]. The AQS provides an overview of the Government's ambient air quality policy and sets out the air quality standards and objectives to be achieved and measures to improve air quality.

Part IV of the Environment Act[3] requires local authorities in the UK to review local air quality within their administrative area and, if relevant air quality standards and objectives are likely to be exceeded, designate Air Quality Management Areas (AQMAs). Following the designation of an AQMA, local authorities are required to publish an Air Quality Action Plan (AQAP) detailing measures to be taken to improve local air quality and work towards meeting the relevant air quality standards and objectives.

National Planning Policy Framework

The National Planning Policy Framework (NPPF)[6] was amended in July 2021 and sets out the Government's planning policies for England and how these are expected to be applied.

The NPPF[6] recognises air quality within Section 15: Conserving and enhancing the natural environment, and states that:

> *"Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *[…]*
>
> *e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans;*
>
> *[…]*
>
> *Ground conditions and pollution*
>
> *[…]*

Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.
[…]
Planning policies and decisions should sustain and contribute towards compliance with relevant limit values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and Clean Air Zones, and the cumulative impacts from individual sites in local areas. Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and green infrastructure provision and enhancement. So far as possible these opportunities should be considered at the plan-making stage, to ensure a strategic approach and limit the need for issues to be reconsidered when determining individual applications. Planning decisions should ensure that any new development in Air Quality Management Areas and Clean Air Zones is consistent with the local air quality action plan."

With regard to assessing cumulative effects the NPPF[6] states:

"Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development.

[...]"

Planning Practice Guidance

The Planning Practice Guidance (PPG) for air quality[7] was updated in November 2019 and provides guiding principles on how the planning process can take account of the impacts of new development on air quality.

The PPG[7] sets out the following with regard to air quality and planning:

- *"What air quality considerations does planning need to address;*
- *What is the role of plan-making with regard to air quality;*
- *Air quality concerns relevant to neighbourhood planning;*
- *What information is available about air quality;*
- *When could air quality considerations be relevant to the development management process;*
- *What specific issues may need to be considered when assessing air quality impacts;*
- *How detailed does an air quality assessment need to be; and*
- *How can an impact on air quality be mitigated".*

The PPG[7] sets out the pollutants for which there are legally binding limits for concentrations and those which the UK also has national emissions reduction commitments.

The PPG[7] states that development plans may need to consider:

- *"what are the observed trends shown by recent air quality monitoring data and what would happen to these trends in light of proposed development and / or allocations;*
- *the impact of point sources of air pollution (pollution that originates from one place);*
- *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments, including their implications for vehicle emissions;*
- *ways in which new development could be made appropriate in locations where air quality is or is likely to be a concern, and not give rise to unacceptable risks from pollution. This could, for example, entail identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable; and*
- *opportunities to improve air quality or mitigate impacts, such as through traffic and travel management and green infrastructure provision and enhancement".*

The PPG[7] also states what may be considered relevant to determining a planning application and these include whether a development would:

- *"Lead to changes (including any potential reductions) in vehicle-related emissions in the immediate vicinity of the proposed development or further afield. This could be through the provision of electric vehicle charging infrastructure; altering the level of traffic congestion; significantly changing traffic volumes, vehicle speeds or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; could add to turnover in a large car park; or involve construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more;*
- *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; biomass boilers or biomass-fuelled Combined Heat and Power plant; centralised boilers or plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area; or extraction systems (including chimneys) which require approval or permits under pollution control legislation;*
- *Expose people to harmful concentrations of air pollutants, including dust. This could be by building new homes, schools, workplaces or other development in places with poor air quality;*
- *Give rise to potentially unacceptable impacts (such as dust) during construction for nearby sensitive locations;*

- *Have a potential adverse effect on biodiversity, especially where it would affect sites designated for their biodiversity value".*

The PPG[7] provides guidance regarding what should be included within an air quality assessment. Examples of potential air quality mitigation measures are also provided.

Local Planning Policy

The Herefordshire Local Plan Core Strategy 2011 - 2031[9] is the most recent local guidance for air quality considerations in land use planning. The policies relating to air quality are detailed below:

> *"Policy SS4 – Movement and transportation*
> *Development proposals that generate high journey numbers should be in sustainable locations, accessible by means of other than private car. Alternatively, such developments will be required to demonstrate that they can be made sustainable by reducing unsustainable transport patterns and promoting travel by walking, cycling and public transport.*
>
> *[…]*
>
> *"Policy SS6 Environmental quality and local distinctiveness*
> *Development proposal should conserve and enhance those environmental assets that contribute towards the county's distinctiveness, in particular its settlement pattern, landscape, biodiversity and heritage assets and especially those with specific environmental designations. In addition, proposals should maintain and improve the effectiveness of those ecosystem essential to the health and wellbeing of the county's residents and its economy. Development proposals should be shaped through an integrated approach to planning the following environmental components from the outset, and based upon sufficient information to determine the effect upon each where they are relevant:*
> *[…]*
> *Local amenity, including light pollution, air quality, and tranquillity"*

The above policies were taken into consideration throughout the undertaking of the assessment.

APPENDIX D: TRAFFIC DATA UTILISED IN THE AIR QUALITY ASSESSMENT

Table D1: Traffic Data Utilised in the Air Dispersion Modelling Assessment

Road Link	Speed	Scenario 1: 2019 Verification Year		Scenario 2: 2022 Base Year		Scenario 3: 2024 Opening Year Without Development		Scenario 4: 2024 Opening Year With Development	
	Km.hr^{-1}	24 hour AADT Total	HDV Flow	24 hour AADT Total	HDV Flow	24 hour AADT Total	HDV Flow	24 hour AADT Total	HDV Flow
A49 (North of A4103)	48	16,451	595	16,982	614	18,394	665	18,682	665
A49 (South of A4103)	48	23,413	1,007	24,169	1,040	23,809	1,024	24,309	1,024
A4103 (East of A49)	48	20,931	757	21,607	781	23,403	846	23,453	846
A4103 (West of A49)	48	16,356	393	16,884	406	19,943	479	20,256	479
Holmer West South Access	48	5,106	185	5,271	191	5,709	206	6,015	206
Holmer West North Access	48	5,569	201	5,749	208	6,227	225	6,552	225
A49 Holmer Road	48	23,286	1,002	24,039	1,035	23,681	1,019	24,180	1,019
A49 Edgar Street	48	20,256	839	20,910	866	20,599	853	21,099	853
A4103 Roman Road West (West of Holmer West South Access)	48	16,356	393	16,884	406	19,943	479	19,943	479
A49 North of A4103 (North of Holmer West North Access)	48	16,451	595	16,982	614	18,394	665	18,432	665

An illustration of the road links included in the ADMS-Roads model is provided in **Figure D1**.

Figure D1: Road Links Included in the ADMS-Roads Model

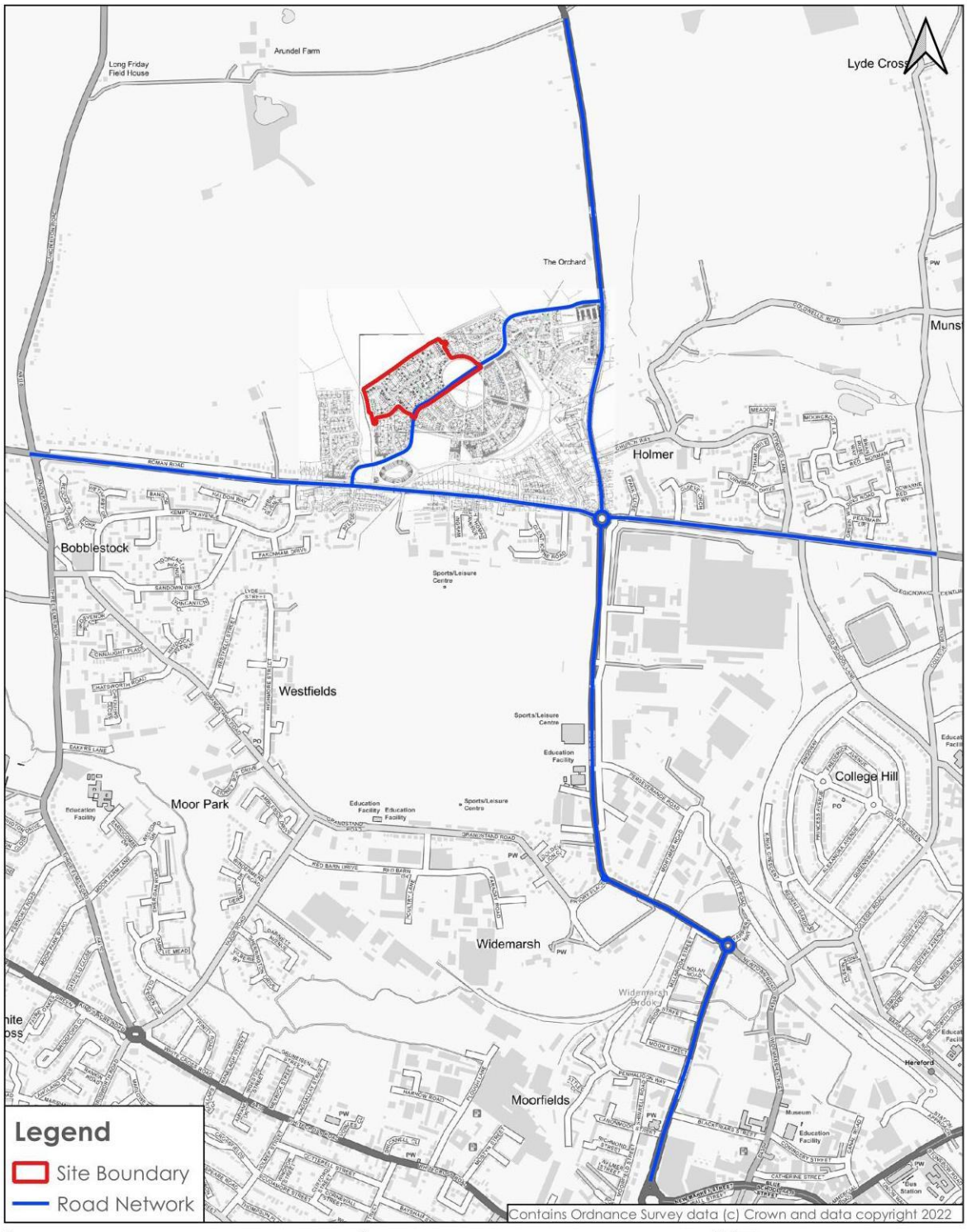


Figure D1: Modelled Road Network

Drawn by: FH
Date: 10/11/2022

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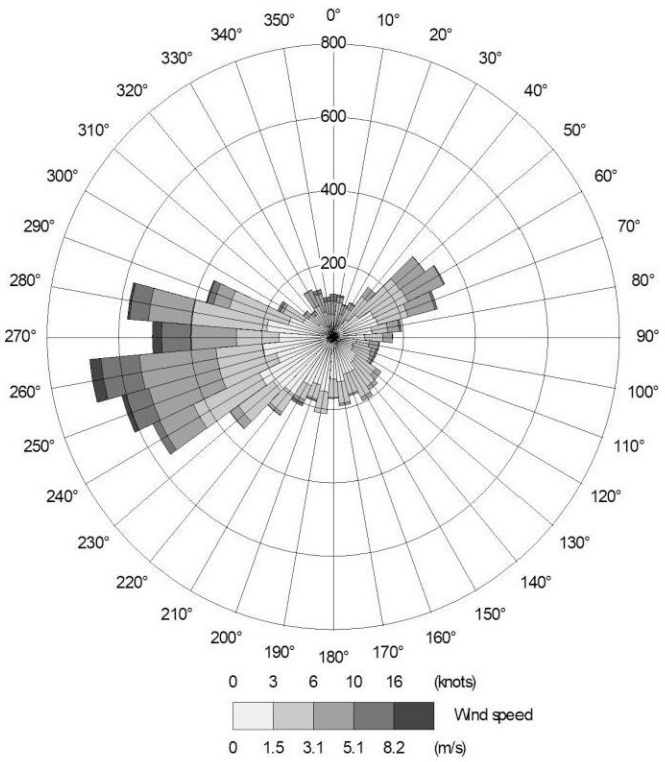
APPENDIX E: WIND ROSE FOR 2019 FOR HEREFORD CREDENHILL METEOROLOGICAL RECORDING STATION

Meteorological data for 2019 Verification Year scenario for the Hereford Credenhill recording station was obtained for use in the air dispersion modelling assessment. The wind rose for 2019 is detailed below and illustrates a predominant wind direction from the west.



APPENDIX F: 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 accordance with the methodology provided by Defra. 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 for Scenario 1: 2019 Verification Year to predict the 2019 annual mean road contributions of NO_2 at the monitoring locations in the study area. The model NO_2 outputs at these locations were compared to the 2019 monitored concentrations to provide adjustment factors. **Table F1** presents the verification process for NOx. **Figure F1** detailed the monitoring locations utilised in the model verification.

Monitoring locations 54 (A49 Holmer Road) and 95 (A49 Edgar Street) were excluded from use in model verification due to distance from road sources and absence of traffic data respectively.

No monitoring of PM_{10} or $PM_{2.5}$ is undertaken within the study area. Therefore the adjustment factor calculated during the NOx verification process was utilised to adjust predicted concentrations of PM_{10} and $PM_{2.5}$.

Table F1: NOx Verification Process

Model Verification Steps	22	89	94	96	108
2019 monitored total NO_2 ($\mu g.m^{-3}$)	27.7	36.9	29.4	36.9	22.6
2019 background NO_2 concentration ($\mu g.m^{-3}$)	14.5	14.5	14.5	14.5	7.8
Monitored road contribution NOx ($\mu g.m^{-3}$)	25.2	44.7	28.7	44.6	27.7
Modelled road contribution NOx ($\mu g.m^{-3}$)	12.6	13.1	20.4	16.8	14.7
Ratio of monitored road NOx to modelled road NOx	2.0	3.4	1.4	2.7	1.9
Adjustment factor for modelled road contribution NOx	2.1254				
Adjusted modelled road contribution NOx ($\mu g.m^{-3}$)	27.2	28.3	43.9	36.2	31.6
Modelled total NO_2 concentration ($\mu g.m^{-3}$)	28.6	29.2	36.6	33.0	24.5
Monitored total NO_2 concentration ($\mu g.m^{-3}$)	27.7	36.9	29.4	36.9	22.6
% difference between modelled and monitored total NO_2 concentration	3.4	-26.5	19.6	-11.8	7.9
RMSE % (should be less than 25% and ideally less than 10%)	5.1				

** Road-NOx component, determined from NOx to NO_2 calculator*

A road-NOx factor of **2.1254** was determined as the slope of the best fit line between the 'measured' road contribution and the model derived road contribution, forced through zero. This factor was then applied to the modelled road-NOx concentration at each receptor, before conversion to NO_2 concentrations using the NO_x to NO_2 calculator provided by Defra and the adjusted NO_2 background concentration.

Figure F1: Monitoring Locations Utilised in the ADMS-Roads Model Verification Process

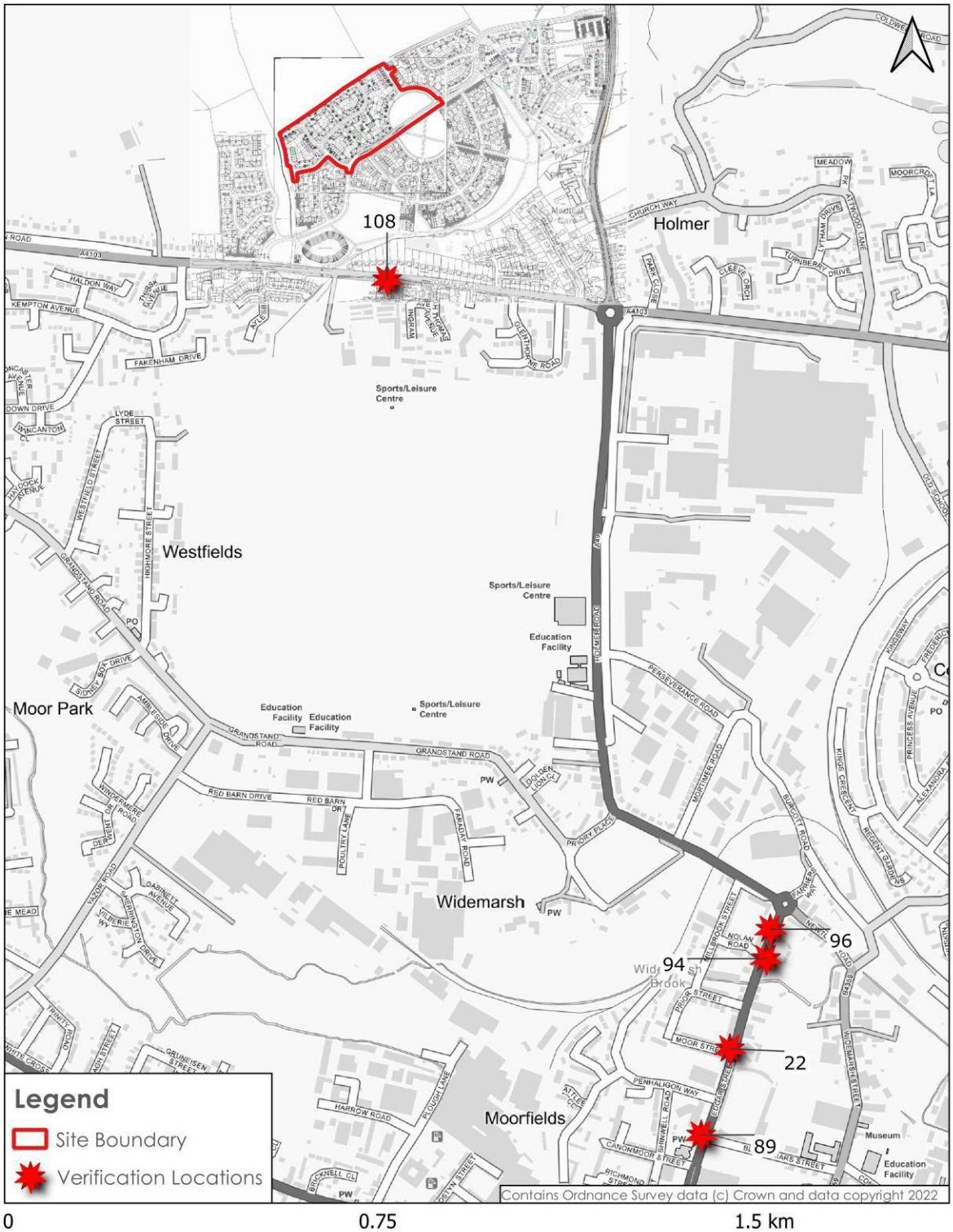


Figure F1: Model Verification Locations

Drawn by: FH
Date: 10/11/2022

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