

APPENDIX 6.2 - AIR QUALITY ASSESSMENT INPUTS

CAMPDOWN PURBROOK

REC REFERENCE: AQ104889R1

DATE: OCTOBER 2019



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ASSESSMENT INPUTS

The proposed development has the potential to impact air quality at existing sensitive receptor locations. Dispersion modelling using ADMS Roads was therefore undertaken to predict NO₂ and PM₁₀ concentrations at sensitive locations both with and without the development in order to consider potential changes as a result of the proposals.

The dispersion model requires input data that details the following parameters:

- ▶ Assessment area;
- ▶ Traffic flow data;
- ▶ Vehicle emission factors;
- ▶ Spatial co-ordinates of emissions;
- ▶ Street width;
- ▶ Meteorological data;
- ▶ Roughness length; and
- ▶ Monin-Obukhov length.

Assessment inputs are described in the following subsections.

Dispersion Model

Dispersion modelling was undertaken using the ADMS Roads dispersion model (version 4.0.1.0). ADMS Roads is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the world for the prediction of pollutant dispersion from road sources. Modelling predictions from this software package are accepted within the UK by the Environment Agency and DEFRA.

Assessment Area

Ambient concentrations were predicted over the area NGR: 468600, 106570 to 469530, 107500. One Cartesian grid at a height of 1.5m was used within the model to represent concentrations at ground floor level to produce data suitable for contour plotting using the Surfer software package.

Reference should be made to Figure 6.1 within Appendix 6.1 for a graphical representation of the assessment grid extents.

Traffic Flow Data

Traffic data for use in the assessment, including development flows, was provided by Paul Basham Associates, the Transport Consultant for the project.

Growth factors provided by the Trip End Model Presentation Program (TEMPO) software package were utilised to allow for conversion from the obtained 2016 traffic flow year to 2025 and 2035, which was used to represent the development operation year and opening year respectively.

Road widths were estimated from aerial photography and UK highway design standards. Reference should be made to Figure 6 within Appendix I for a graphical representation of the road link locations.



A summary of the traffic data used in the verification scenarios is provided in Table All.1.

Table All.1 2016 Traffic Data

Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
1a	College Road - Junction Slowdown	6.5	3,723	5.62	24
1b	College Road	6.5	3,723	5.62	56
2a	Purbrook Way (E) (Eastbound)	5.8	12,083	6.12	56
2b	Purbrook Way (E) (westbound)	5.3	12,349	3.91	56
3a	Purbrook Way - West of College Road	9.6	21,415	2.05	40
4	Roundabout Purbrook Road/ Stakes Hill Road	6.0	14,860	1.37	24
5a	Stokes Hill Road (Slow Down)	11.7	16,683	1.05	24
5b	Stokes Hill Road	7.9	16,683	1.05	40
6a	Crookhorn lane	7.2	8,025	1.24	40
6b	Crookhorn Lane (Junction Slowdown)	7.2	8,025	1.24	24
7a	Stakes Road (Junction Slowdown)	7.2	13,316	1.11	24
7b	Stakes Road	7.2	13,316	1.11	40
8a	Slip - A3 Motorway (Northbound)	6.0	11,160	1.70	32
9	Roundabout - Purbrook Road	10.0	12,004	4.01	24
10a	Purbrook Way (Eastbound) continued	7.0	12,116	4.29	40
10b	Purbrook Way (Westbound) continued	5.7	12,311	4.05	40
11a	Slip - A3 Motorway (Southbound)	5.7	10,956	1.77	32
12	Roundabout - Purbrook Road	8.9	10,662	2.92	24
13a	Slip towards B&Q	7.8	3,211	1.22	24
14a	Purbrook Way (Eastbound)	6.3	12,645	3.77	24
14b	Purbrook Way (Westbound)	6.8	12,731	2.40	24
15	Roundabout - Purbrook Way/ Hulbert Road	9.2	5,074	2.73	24
16a	Purbrook Way - Eastbound	7.5	6,899	3.77	24
16b	Purbrook Way - Westbound	5.7	7,381	3.77	24
16c	Purbrook Way - Main	13.5	14,280	3.77	56



Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
17a	Hulbert Road - Northbound - Junction Slowdown	4.8	6,201	3.77	24
17b	Hulbert Road - Southbound - Junction Slowdown	3.8	4,010	3.77	24
17c	Hulbert Road - Main	9.0	10,211	3.77	56
18a	ASDA - Northbound	5.9	2,121	1.13	24
18b	ASDA - Southbound	5.4	2,489	1.31	24
19a	B2150- Northbound - Junction Slowdown	7.0	3,159	0.85	24
19b	B2150- Southbound - Junction Slowdown	7.0	2,089	1.36	24
19c	B2150 - Main Road	6.5	5,248	1.05	40
20a	Purbrook Way - Eastbound - Junction Slowdown	6.3	7,208	3.77	24
20b	Purbrook way - Westbound - Junction Slowdown	7.9	9,180	3.77	24
20c	Purbrook Way - Main	10.0	16,388	3.77	40
21a	Crookhorn Lane	7.2	8,621	5.15	48
21b	Crookhorn Lane - Northbound - Junction Slowdown	5.7	4,288	4.29	24
21c	Crookhorn Lane - Southbound - Junction Slowdown	6.9	4,333	6.01	24
22a	Portshill Road - Westbound	6.6	17,066	1.62	48
23a	Portshill Road - Eastbound	6.0	13,632	2.83	48
24a	A3 Motorway - Northern Point - (Northbound)	7.4	32,057	4.30	97
24b	A3 Motorway - Southern Point (Northbound)	7.4	44,852	3.76	97
25a	A3 Motorway - Northern Point (Southbound)	7.5	32,057	4.30	97
25b	A3 Motorway - Southern Point (Southbound)	7.5	44,852	3.76	97
26a	Portsdown Hill Road	7.0	11,062	1.20	48
26b	Portsdown Hill Road - Junction Slowdown	5.3	11,062	1.20	24
27a	Maylands Avenue - Junction Slowdown	4.7	2,363	1.05	24
27b	Maylands Avenue	5.8	2,363	1.05	40
28a	Bedhampton Hill Road - Junction Slowdown	4.6	15,507	2.83	24
28b	Bedhampton Hill Road	8.9	15,507	2.83	40
28c	Bedhampton Hill Road - Northbound (Junction slowdown)	7.7	8,011	2.65	24



Road Link		Road Width (m)	24-hour AADT Flow	HDV Prop. (%)	Mean Vehicle Speed (km/h)
28d	Bedhampton Hill Road - Southbound (Junction Slowdown)	7.3	7,496	3.03	24
30a	Bedhampton Road - Eastbound	4.5	11,649	1.11	40
30b	Bedhampton Road - Westbound	7.1	11,855	1.12	40
30c	Bedhampton Road	10.4	23,504	1.12	24
31	Roundabout - Ladybride/ London Road	7.4	16,047	1.01	24
32a	London Road - North of Ladybridge Road (Junction Slowdown)	8.4	18,539	0.91	24
32b	London Road - North of Ladybridge Road	8.4	18,539	0.91	40
33a	London Road - South of Ladybridge Road (Junction Slowdown)	10.9	18,539	0.91	24
33b	London Road - South of Ladybridge Road	10.9	18,539	0.91	40
34	Roundabout -Bedhampton Hill/ A27	8.6	19,328	3.94	32
35a	Slip - A2030 Roundabout on to A3 - Northbound	6.5	8,970	3.76	97
35b	Slip - A3 to Bedhampton Roundabout - Southbound	8.1	8,970	3.76	97
36a	A2030 - Eastbound to Bedhampton Hill Road	7.0	11,399	4.30	97
36b	A2030 - Westbound from Bedhampton Hill Road to A2030	7.0	11,399	4.30	97
36c	A2030 - Havanat road	8.6	22,797	4.30	48
37a	A3 M Slip to Bedhampton Roundabout	6.2	8,970	3.76	97
37b	Slip - From A27 to Bedhampton Hill Roundabout (Northbound)	3.5	15,983	2.82	32
37c	Slip Bedhampton Hill to A27 (Southbound)	7.6	15,983	2.82	32
37d	A27	11.2	22,797	4.30	80

The road width and mean vehicle speed shown in Table All.1 remained the same for 2022. A summary of the 2022 traffic data is shown in Table All.2.



Table AII.2 2025 Traffic Data

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
1a	College Road - Junction Slowdown	4,291	5.62	6,405	5.84
1b	College Road	4,291	5.62	6,405	5.84
2a	Purbrook Way (E) (Eastbound)	13,927	6.12	15,174	6.12
2b	Purbrook Way (E) (westbound)	14,233	3.91	15,480	3.91
3a	Purbrook Way - West of College Road	24,683	2.05	25,529	2.05
4	Roundabout Purbrook Road/ Stakes Hill Road	17,128	1.37	17,551	1.37
5a	Stokes Hill Road (Slow Down)	19,230	1.05	19,780	1.05
5b	Stokes Hill Road	19,230	1.05	19,780	1.05
6a	Crookhorn lane	9,250	1.24	9,250	1.24
6b	Crookhorn Lane (Junction Slowdown)	9,250	1.24	9,250	1.24
7a	Stakes Road (Junction Slowdown)	15,349	1.11	15,645	1.11
7b	Stakes Road	15,349	1.11	15,645	1.11
8a	Slip - A3 Motorway (Northbound)	12,863	1.70	13,793	1.70
9	Roundabout - Purbrook Road	13,835	4.01	15,019	4.01
10a	Purbrook Way (Eastbound) continued	13,965	4.29	15,212	4.29
10b	Purbrook Way (Westbound) continued	14,189	4.05	15,436	4.05
11a	Slip - A3 Motorway (Southbound)	12,863	1.70	13,793	1.70
12	Roundabout - Purbrook Road	12,328	2.91	13,004	2.91
13a	Slip towards B&Q	3,701	1.22	3,701	1.22
14a	Purbrook Way (Eastbound)	14,575	3.77	14,892	3.77
14b	Purbrook Way (Westbound)	14,673	2.40	14,990	2.40
15	Roundabout - Purbrook Way/ Hulbert Road	3,540	2.73	3,667	2.73
16a	Purbrook Way - Eastbound	4,814	3.77	5,131	3.77
16b	Purbrook Way - Westbound	5,150	3.77	5,467	3.77
16c	Purbrook Way - Main	9,964	3.77	10,598	3.77
17a	Hulbert Road - Northbound - Junction Slowdown	4,327	3.77	4,475	3.77



Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
17b	Hulbert Road - Southbound - Junction Slowdown	2,798	3.77	2,946	3.77
17c	Hulbert Road - Main	10,211	3.77	10,552	3.77
18a	ASDA - Northbound	1,480	1.13	1,480	1.13
18b	ASDA - Southbound	1,737	1.31	1,737	1.31
19a	B2150- Northbound - Junction Slowdown	2,204	0.85	2,204	0.85
19b	B2150- Southbound - Junction Slowdown	1,458	1.36	1,458	1.36
19c	B2150 - Main Road	3,662	1.05	3,662	1.05
20a	Purbrook Way - Eastbound - Junction Slowdown	5,030	3.77	5,199	3.77
20b	Purbrook way - Westbound - Junction Slowdown	6,405	3.77	6,574	3.77
20c	Purbrook Way - Main	11,435	3.77	11,773	3.77
21a	Crookhorn Lane	9,936	5.15	10,824	5.15
21b	Crookhrn Lane - Northbound - Junction Slowdown	4,942	4.29	5,386	4.29
21c	Crookhorn Lane - Southbound - Junction Slowdown	4,994	6.01	5,438	6.01
22a	Portshill Road - Westbound	19,670	1.62	20,176	1.62
23a	Portshill Road - Eastbound	15,713	5.66	16,095	5.66
24a	A3 Motorway - Northern Point - (Northbound)	36,949	4.30	36,949	4.30
24b	A3 Motorway - Southern Point (Northbound)	51,696	3.76	52,626	3.76
25a	A3 Motorway - Northern Point (Southbound)	36,949	4.30	36,949	4.30
25b	A3 Motorway - Southern Point (Southbound)	51,696	3.76	52,626	3.76
26a	Portsdown Hill Road	12,751	1.20	13,131	1.20
26b	Portsdown Hill Road - Junction Slowdown	12,751	1.20	13,131	1.20
27a	Maylands Avenue - Junction Slowdown	2,724	1.05	2,724	1.05
27b	Maylands Avenue	2,724	1.05	2,724	1.05
28a	Bedhampton Hill Road - Junction Slowdown	17,873	2.83	17,873	2.83
28b	Bedhampton Hill Road	17,873	2.83	17,873	2.83
28c	Bedhampton Hill Road - Northbound (Junction slowdown)	9,233	2.65	9,233	2.65



Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
28d	Bedhampton Hill Road - Southbound (Junction Slowdown)	8,640	3.03	8,640	3.03
30a	Bedhampton Road - Eastbound	13,426	1.11	13,616	1.11
30b	Bedhampton Road - Westbound	13,664	1.12	13,854	1.12
30c	Bedhampton Road	27,090	1.12	27,470	1.12
31	Roundabout - Ladybride/ Loondon Road	18,496	1.01	18,721	1.01
32a	London Road - North of Ladybridge Road (Junction Slowdown)	21,368	0.91	21,516	0.91
32b	London Road - North of Ladybridge Road	21,368	0.91	21,516	0.91
33a	London Road - South of Ladybridge Road (Junction Slowdown)	21,368	0.91	21,516	0.91
33b	London Road - South of Ladybridge Road	21,368	0.91	21,516	0.91
34	Roundabout -Bedhampton Hill/ A27	7,507	3.94	7,507	3.94
35a	Slip - A2030 Roundabout on to A3 - Northbound	10,339	3.76	10,525	3.76
35b	Slip - A3 to Bedhamoton Roundabout - Southbound	10,339	3.76	10,525	3.76
36a	A2030 - Eastbound to Bedhampton Hill Road	13,138	4.30	13,138	4.30
36b	A2030 - Westbound from Bedhampton Hill Road to A2030	13,138	4.30	13,138	4.30
36c	A2030 - Havanat road	26,276	4.30	26,276	4.30
37a	A3 M Slip to Bedhampton Roundabout	10,339	3.76	10,525	3.76
37b	Slip - From A27 to Bedhampton Hill Roundabout (Northbound)	18,422	2.82	18,422	2.82
37c	Slip Bedhampton Hill to A27 (Southbound)	18,422	2.82	18,422	2.82
37d	A27	26,276	4.30	26,276	4.30



Table AII.3 2035 Traffic Data

Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
1a	College Road - Junction Slowdown	4,559	5.62	8,787	5.94
1b	College Road	4,559	5.62	8,787	5.94
2a	Purbrook Way (E) (Eastbound)	14,797	6.12	17,291	6.12
2b	Purbrook Way (E) (westbound)	15,122	3.91	17,616	3.91
3a	Purbrook Way - West of College Road	26,225	2.05	27,916	2.05
4	Roundabout Purbrook Road/ Stakes Hill Road	18,198	1.37	19,043	1.37
5a	Stokes Hill Road (Slow Down)	20,431	1.05	21,531	1.05
5b	Stokes Hill Road	20,431	1.05	21,531	1.05
6a	Crookhorn lane	9,827	1.24	9,827	1.24
6b	Crookhorn Lane (Junction Slowdown)	9,827	1.24	9,827	1.24
7a	Stakes Road (Junction Slowdown)	16,307	1.11	16,899	1.11
7b	Stakes Road	16,307	1.11	16,899	1.11
8a	Slip - A3 Motorway (Northbound)	13,666	1.70	15,526	1.70
9	Roundabout - Purbrook Road	14,700	4.01	17,067	4.01
10a	Purbrook Way (Eastbound) continued	14,837	4.29	17,332	4.29
10b	Purbrook Way (Westbound) continued	15,076	4.05	17,570	4.05
11a	Slip - A3 Motorway (Southbound)	13,416	1.77	15,277	1.77
12	Roundabout - Purbrook Road	13,056	2.92	14,409	2.92
13a	Slip towards B&Q	3,931	1.22	3,931	1.22
14a	Purbrook Way (Eastbound)	15,485	3.77	16,119	3.77
14b	Purbrook Way (Westbound)	15,590	2.40	16,224	2.40
15	Roundabout - Purbrook Way/ Hulbert Road	6,183	2.73	6,467	2.73
16a	Purbrook Way - Eastbound	8,448	3.77	9,082	3.77
16b	Purbrook Way - Westbound	9,039	3.77	9,673	3.77
16c	Purbrook Way - Main	17,487	3.77	18,755	3.77
17a	Hulbert Road - Northbound - Junction Slowdown	7,594	3.77	7,890	3.77



Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
17b	Hulbert Road - Southbound - Junction Slowdown	4,910	3.77	5,206	3.77
17c	Hulbert Road - Main	12,504	3.77	13,096	3.77
18a	ASDA - Northbound	2,597	1.13	2,597	1.13
18b	ASDA - Southbound	3,048	1.31	3,048	1.31
19a	B2150- Northbound - Junction Slowdown	3,869	0.85	3,869	0.85
19b	B2150- Southbound - Junction Slowdown	2,258	1.36	2,558	1.36
19c	B2150 - Main Road	6,127	1.04	6,427	1.05
20a	Purbrook Way - Eastbound - Junction Slowdown	8,827	3.77	9,166	3.77
20b	Purbrook way - Westbound - Junction Slowdown	11,242	3.77	11,580	3.77
20c	Purbrook Way - Main	20,069	3.77	20,746	3.77
21a	Crookhorn Lane	10,557	5.15	12,333	5.15
21b	Crookhrn Lane - Northbound - Junction Slowdown	5,251	4.29	6,139	4.29
21c	Crookhorn Lane - Southbound - Junction Slowdown	5,306	6.01	6,194	6.01
22a	Portshill Road - Westbound	20,899	0.00	21,913	1.62
23a	Portshill Road - Eastbound	16,694	5.66	17,455	5.66
24a	A3 Motorway - Northern Point - (Northbound)	39,257	4.30	39,257	4.30
24b	A3 Motorway - Southern Point (Northbound)	54,926	3.76	56,786	3.76
25a	A3 Motorway - Northern Point (Southbound)	39,257	4.30	39,257	4.30
25b	A3 Motorway - Southern Point (Southbound)	54,926	3.76	56,786	3.76
26a	Portsdown Hill Road	13,547	1.20	14,308	1.20
26b	Portsdown Hill Road - Junction Slowdown	13,547	1.20	14,308	1.20
27a	Maylands Avenue - Junction Slowdown	2,894	1.05	2,894	1.05
27b	Maylands Avenue	2,894	1.05	2,894	1.05
28a	Bedhampton Hill Road - Junction Slowdown	18,990	2.83	18,990	2.83
28b	Bedhampton Hill Road	18,990	2.83	18,990	2.83
28c	Bedhampton Hill Road - Northbound (Junction slowdown)	9,810	2.65	9,810	2.65
28d	Bedhampton Hill Road - Southbound (Junction Slowdown)	9,180	3.03	9,180	3.03



Road Link		DM		DS	
		24-hour AADT Flow	HDV Prop. (%)	24-hour AADT Flow	HDV Prop. (%)
30a	Bedhampton Road - Eastbound	14,265	1.11	14,645	1.11
30b	Bedhampton Road - Westbound	14,518	1.12	14,898	1.12
30c	Bedhampton Road	28,783	1.12	29,543	1.12
31	Roundabout - Ladybride/ London Road	19,651	1.01	20,299	1.01
32a	London Road - North of Ladybridge Road (Junction Slowdown)	22,703	0.91	23,295	0.91
32b	London Road - North of Ladybridge Road	22,703	0.91	23,295	0.91
33a	London Road - South of Ladybridge Road (Junction Slowdown)	22,703	0.91	23,295	0.91
33b	London Road - South of Ladybridge Road	22,703	0.91	23,295	0.91
34	Roundabout -Bedhampton Hill/ A27	7,976	3.94	7,976	3.94
35a	Slip - A2030 Roundabout on to A3 - Northbound	10,985	3.76	11,357	3.76
35b	Slip - A3 to Bedhampton Roundabout - Southbound	10,985	3.76	11,357	3.76
36a	A2030 - Eastbound to Bedhampton Hill Road	13,959	4.30	13,959	4.30
36b	A2030 - Westbound from Bedhampton Hill Road to A2030	13,959	4.30	13,959	4.30
36c	A2030 - Havanat road	27,917	4.30	27,917	4.30
37a	A3 M Slip to Bedhampton Roundabout	10,985	3.76	11,357	3.76
37b	Slip - From A27 to Bedhampton Hill Roundabout (Northbound)	19,573	2.82	19,573	2.82
37c	Slip Bedhampton Hill to A27 (Southbound)	19,573	2.82	19,573	2.82
37d	A27	27,917	4.30	27,917	4.30

Emission Factors

NO_x Emission factors for the 2025 and 2035 future year scenarios were calculated using the Calculator Using Realistic Emissions for Diesels (CURED, version V3A), developed by Air Quality Consultants Ltd. This calculator gives realistic, worst case emission factors for diesels for future years which utilise recent real-world emissions test data.

Given the 2025 and 2035 opening years it would be unreasonable not to assume any reduction to emission factors as a direct result of increasing EV fleets and future advancements to low emission technologies. To present a worse-case sensitivity analysis of future year emission factor CURED was utilised. Whilst the toolkit considers future year emission reductions it doesn't support the extent



predicted by DEFRA's EFT. CURED crucially provides a more realistic and worse case assumption.

PM₁₀ Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 8.0.1) released in 2017, which incorporates updated COPERT 5 vehicle emissions factors for NO_x and vehicle fleet information.

There is current uncertainty over emission concentrations within the UK, with roadside levels not reducing as previously expected due to the implementation of new vehicle emission standards. Therefore, PM₁₀ 2016 emission factors have been utilised for the prediction of pollution levels for all scenarios in preference to the development opening year in order to provide a robust assessment.

Meteorological Data

Meteorological data used in this assessment was taken from Southampton Airport Meteorological station over the period 1st January 2016 to 31st December 2016 (inclusive). Southampton Airport Meteorological station is located at approximate NGR 445620, 117300, which is approximately 25.3km east of the proposed development.

All meteorological records used in the assessment were provided by Atmospheric Dispersion Modelling (ADM) Ltd, which is an established distributor of data within the UK. Reference should be made to Figure 5 within Appendix I for a wind rose of utilised meteorological data.

Roughness Length

A roughness length (z_0) of 0.5m was used in this dispersion modelling study. This value of z_0 is considered appropriate for the morphology of the assessment area and is suggested within ADMS-Roads as being suitable for 'parkland, open suburbia'.

A z_0 of 0.3m was utilised to represent the morphology of the meteorological station location and is suggested as being suitable for 'agricultural areas (man)'

Monin-Obukhov Length

The Monin-Obukhov length provides a measure of the stability of the atmosphere. A minimum Monin-Obukhov length of 10m was used in this dispersion modelling study. This value is considered appropriate for the nature of the assessment area and is suggested within ADMS-Roads as being suitable for 'small towns <50,000'.

Background Concentrations

An annual average mean NO₂ concentration of 16.27µg/m³ and an annual average PM₁₀ concentration of 15.01µg/m³, as predicted by DEFRA, was used in the dispersion modelling assessment to represent annual mean pollutant levels at the proposed development site.



It should be noted that both the diffusion tube monitoring and the sensitive receptor locations used throughout the assessment were located across several DEFRA grid squares. As such predicted background concentrations from their specific locations were used to represent their respective background conditions.

Table All.3 displays the specific background concentrations used for each diffusion tube in the verification process. This data was used in to ensure an accurate and robust model.

Table All.3 Predicted Diffusion Tube Monitoring Background Pollutant Concentrations

WBC Monitoring Location	Pollutant	2016 Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)
8 – London Road (Purbrook)	NO _x	19.51
	NO ₂	14.17
	PM ₁₀	14.68
25 (B) – Stakes Road	NO _x	19.30
	NO ₂	14.03
	PM ₁₀	14.20
26 – Ladybridge Road	NO _x	19.51
	NO ₂	14.17
	PM ₁₀	14.68

Table All.4 displays the predicted background concentrations by DEFRA used in the operational phase assessment for the sensitive receptor locations.

Table All.4 Predicted Background Pollutant Concentrations for Receptors

Receptor Grid Square	Receptors	Pollutant	Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)
			2016
468500, 107500	R1, R2, R3, R4, R5, R9, R11, R16, R18	NO _x	19.30
		NO ₂	14.03
		PM ₁₀	14.20
469500, 106500	R6, R7, R8, R12, R14, R15, R23, R24, R25	NO _x	26.63
		NO ₂	18.97
		PM ₁₀	15.68



Receptor Grid Square	Receptors	Pollutant	Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)
			2016
468500, 106500	R10	NO _x	20.68
		NO ₂	14.93
		PM ₁₀	14.50
470500, 106500	R13	NO _x	23.48
		NO ₂	16.74
		PM ₁₀	15.64
467500, 107500	R17, R19, R21, R22	NO _x	19.51
		NO ₂	14.17
		PM ₁₀	14.68
467500, 108500	R20	NO _x	17.54
		NO ₂	12.87
		PM ₁₀	14.73
469500, 105500	R26	NO _x	35.56
		NO ₂	23.03
		PM ₁₀	16.70
468500, 105500	R27, R28	NO _x	30.40
		NO ₂	20.98
		PM ₁₀	17.15

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO₂ concentrations using the spreadsheet provided by DEFRA, which is the method detailed within LAQM (TG16)^{Error! Bookmark not defined.}.

Verification

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including:

- ▶ Estimates of background concentrations;
- ▶ Uncertainties in source activity data such as traffic flows and emission factors;
- ▶ Variations in meteorological conditions;



- ▶ Overall model limitations; and
- ▶ Uncertainties associated with monitoring data, including locations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

For the purpose of this assessment model verification was undertaken for 2016, using traffic data, meteorological data and monitoring results from this year.

HBC undertakes monitoring of NO₂ concentrations at three locations suitable for verification purposes within the assessment extents. The road contribution to total NO_x concentration was calculated from the monitored NO₂ result for use in the verification process. This was undertaken following the methodology contained within IAQM and EPUK guidance LAQM (TG16)^{Error! Bookmark not defined.}.

The dispersion model was run with the traffic input data previously detailed for 2016 to predict the NO_x concentration at the monitoring locations. The results are shown in Table AII.5.

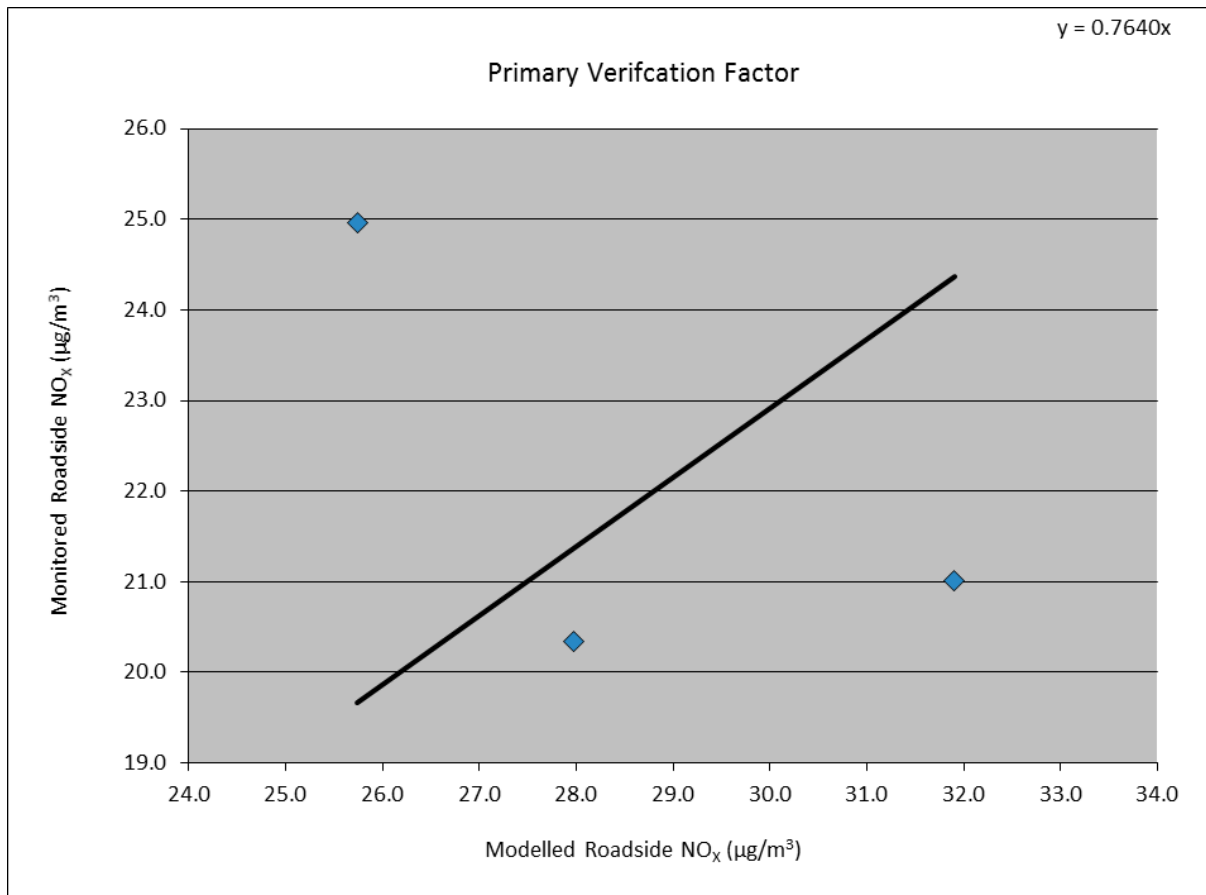
Table AII.5 NO_x Verification Results

NHDC ID	Monitoring Location	Modelled Road NO _x Concentration (µg/m ³)	Monitored Road NO _x Concentration (µg/m ³)
8	London Road (Purbrook)	25.74	24.96
26	Ladybridge Road	31.90	21.01
25 (B)	Stakes Road	27.97	20.34

The monitored and modelled NO_x road contribution concentrations were graphed and the equation of the trend line based on the linear progression through zero calculated, as shown in Graph 1. This indicated that a verification factor of **0.7640** was required to be applied to all NO_x modelling results, showing the model overestimated rather than underestimated, pollutant concentrations throughout the assessment extents. Therefore, in order to provide a robust assessment, a verification factor of **1.0000** was applied to all results in preference to the calculated ratio.



Graph 1 – Primary Verification Adjustment Factor



As PM₁₀ monitoring is not undertaken within the assessment extents, the NO_x adjustment factor of **1.0000** was also utilised to adjust model predictions of PM₁₀ in accordance with the guidance provided within LAQM (TG16)².