



Appendix 6.2 – ADMS-Roads Inputs

Crown Street Phase 3 and Plot D

Renaker Build Limited

CRM.779.003.AQ.R.001



Contact Details:

Enzygo Ltd. (Manchester Office)
Ducie House,
Ducie Street,
Manchester
M1 2JW

tel: 0161 413 6444
email: josh.davies@enzygo.com
www: enzygo.com

Road Traffic Impact Assessment Inputs

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Author:	Josh Davies
Reviewer:	Conal Kearney

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Registered Office: Gresham House, 5-7 St. Pauls Street, Leeds, England, LS1 2JG

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Appendix 6.2 - Road Traffic Impact Assessment Inputs

ASSESSMENT INPUTS

Dispersion modelling was undertaken using the ADMS-Roads dispersion model (version 5.0) which is developed by Cambridge Environmental Research Consultants (CERC) and is routinely used throughout the UK for the prediction of pollutant dispersion from road sources. The Environment Agency and DEFRA also widely accept modelling predictions from this software package.

The model requires input data that details the following parameters:

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

Traffic Flow Data

Baseline traffic data for the 2019 scenario were provided by the appointed Transport Consultant, Curtins. Data was provided for the major arterial routes and minor roads surrounding the Site. For roads where baseline data was not provided, traffic flows were obtained from the Department for Transport (DfT) database.

Vehicle speeds were estimated based on the free flow potential of each link and local speed limits. Assumptions account for speed reductions at junctions and peak hour congestion in line with Section 7.260 of LAQM.TG22. Road widths and heights were estimated from aerial photography and 3D modelling provided by Google Earth Pro.

A summary of the traffic data used to inform each operation scenario is presented Table A6.2.1.

Table A6.2.1: Modelled Traffic Flows and Parameters

Road Link		Baseline Data Source	Road Width (m)	Speed (km/hr)	Verification Scenario 2019		DM Scenario		DS Construction Phase		DS Operational Scenario		Trip Generation (24hr AADT)
					AADT	HGV%	AADT	HGV%	AADT	HGV%	AADT	HGV%	
L1	A56 (Chester Road West)	TC Link 9	12.0	40	43,970	2.8	44,673	3.2	44,693	3.3	45,395	3.1	722
L2	A56 (Chester Road West) - WB from Deansgate Interchange	TC Link 9	7.0	25	21,985	2.8	22,336	3.2	22,346	3.3	22,698	3.1	361
L3	A56 (Chester Road West) - EB to Deansgate Interchange	TC Link 9	9.0	15	21,985	2.8	22,336	3.2	22,346	3.3	22,698	3.1	361
L4	Deansgate Interchange - North Section Over to A57(M)	TC Link I	10.0	20	12,781	2.1	13,296	2.6	13,316	3.2	13,710	2.6	413
L5	A57 (Edgerton Street SB) - A6042 to A56	TC Link 11	11.0	55	43,489	2.9	44,308	2.9	44,318	3.0	45,417	2.8	1109
L6	A57(M) (Mancunian Way SB) - South of A56 Off-Slip	Estimated	7.5	40	34,353	3.2	34,537	3.2	34,557	3.4	35,509	3.1	972
L7	A57 (Edgerton Street NB) - A56 to A6042	TC Link 11	10.5	55	43,489	2.9	44,308	2.9	44,318	3.0	45,417	2.8	1109
L8	A57(M) (Mancunian Way NB) - North of A56 Off-Slip to Deansgate Interchange	Estimated	7.3	40	31,007	3.2	31,762	3.1	31,782	3.3	31,762	3.1	0
L9	A57(M) (Mancunian Way NB) On-Slip	TC Link 10	5.0	32	12,483	2.2	12,546	2.4	12,566	3.0	13,984	2.2	1438
L10	A57(M) (Mancunian Way SB) Off-Slip	TC Link 12	7.0	20	9,136	1.6	9,771	1.8	9,791	2.5	9,908	1.8	137
L11	Deansgate Interchange - A57(M) to A56	TC Link A	15.5	20	18,281	1.8	19,404	2.2	19,424	2.6	19,954	2.1	551
L12	A56 (Chester Road) - East Across Deansgate Interchange	TC Link J	7.3	20	11,154	1.7	11,371	2.4	11,391	3.0	11,419	2.4	48
L13	A56 (Chester Road) - West Across Deansgate Interchange	TC Link K	7.3	20	12,321	3.3	12,372	3.9	12,392	4.5	12,847	3.8	475
L14	Deansgate Interchange - A57(M) to A56 East	TC Link B	8.5	20	16,238	2.5	16,780	2.5	16,800	3.0	17,194	2.5	413
L15	Deansgate Interchange - A56 to A57(M) South	TC Link C	8.5	20	24,378	2.3	24,905	2.2	24,925	2.5	27,270	2.0	2365
L16	Deansgate Interchange - South Section Over to A57(M)	TC Link D	9.5	20	8,344	2.0	8,361	2.0	8,381	2.8	9,861	1.7	1500
L17	Deansgate Interchange - A57(M) to A5067	TC Link E	13.0	20	21,679	3.1	21,722	3.3	21,742	3.6	23,382	3.0	1660

Road Link		Baseline Data Source	Road Width (m)	Speed (km/hr)	Verification Scenario 2019		DM Scenario		DS Construction Phase		DS Operational Scenario		Trip Generation (24hr AADT)
					AADT	HGV%	AADT	HGV%	AADT	HGV%	AADT	HGV%	
L18	A5067 (Chorlton Road NB) - Deansgate Interchange Junction	TC Link 8	7.0	15	8,251	1.5	8,314	1.7	8,324	2.1	8,343	1.7	28
L19	A5067 (Chorlton Road SB) - Deansgate Interchange Junction	TC Link 8	4.5	25	8,251	1.5	8,314	1.7	8,324	2.1	8,343	1.7	28
L20	Deansgate Interchange - to A57(M) North	TC Link G	11.5	20	23,033	0.9	23,150	1.1	23,170	1.4	24,810	1.0	1660
L21	Deansgate Interchange to A56 West	TC Link G	6.5	20	5,758	0.9	5,788	1.1	5,808	2.3	6,203	1.0	415
L22	A5067 (Chorlton Road SB)	TC Link 8	3.5	40	8,251	1.5	8,314	1.7	8,324	2.1	8,343	1.7	28
L23	A5067 (Chorlton Road NB)	TC Link 8	6.0	40	8,251	1.5	8,314	1.7	8,324	2.1	8,343	1.7	28
L24	A57(M) (Mancunian Way SB) - Melbourne Street to Garwood Street	TC Link 6	10.5	55	47,253	3.0	47,992	3.1	48,002	3.2	48,731	3.1	739
L25	A57(M) (Mancunian Way NB) - Melbourne Street to Garwood Street	TC Link 6	11.5	55	47,253	3.0	47,992	3.1	48,002	3.2	48,731	3.1	739
L26	A57(M) (Mancunian Way SB) - On-slip from Deasgate Interchange	TC Link 5	4.0	32	15,812	1.9	16,323	2.4	16,343	2.8	17,158	2.3	835
L27	A57(M) (Mancunian Way NB) - Off-slip to Deansgate Interchange	TC Link 7	6.5	40	13,334	3.1	13,362	4.1	13,382	4.6	13,521	4.0	159
L28	A57(M) - EB Off-slip to A5103	TC Link 6	6.5	32	9,451	3.0	9,598	3.1	9,618	3.9	9,950	3.0	352
L29	A57(M) - EB On-slip from Medlock Street	TC Link 6	5.5	40	11,813	3.0	11,998	3.1	12,018	3.7	12,076	3.1	78
L30	A57(M) (Mancunian Way EB) - Over A5103 Junction	TC Link 6	7.5	40	47,253	3.0	47,992	3.1	48,012	3.3	48,731	3.1	739
L31	A57(M) (Mancunian Way WB) - Over A5103 Junction	TC Link 6	7.5	40	47,253	3.0	47,992	3.1	48,012	3.3	48,731	3.1	739
L32	A5103 NB to Princess Road Junction	DfT 80941	8.5	25	12,176	2.4	12,366	2.4	12,386	3.0	12,574	2.4	207
L33	A5103 (Princess Road NB)	DfT 80941	6.5	40	20,293	2.4	20,610	2.4	20,630	2.7	21,103	2.3	493
L34	A5103 (Princess Road SB)	DfT 80941	6.5	40	20,293	2.4	20,610	2.4	20,630	2.7	21,157	2.3	547
L35	A57(M) - WB Off-slip to A5103	TC Link 6	6.8	25	14,176	3.0	14,397	3.0	14,417	3.5	14,956	2.9	558
L36	A1503 (Medlock Street) to A57(M)	TC Link 15	8.5	25	8,809	1.2	9,895	2.6	9,915	1.2	10,375	2.5	479

Road Link		Baseline Data Source	Road Width (m)	Speed (km/hr)	Verification Scenario 2019		DM Scenario		DS Construction Phase		DS Operational Scenario		Trip Generation (24hr AADT)
					AADT	HGV%	AADT	HGV%	AADT	HGV%	AADT	HGV%	
L37	A1503 - EB Across Princess Road Junction	Estimated	7.5	25	642	3.1	652	3.1	672	13.4	1,004	2.0	352
L38	A1503 - WB Across Princess Road Junction	Estimated	7.5	25	2,691	1.8	2,733	1.8	2,753	4.4	2,733	1.8	0
L39	A57(M) - Off-slip to A5103 SB	Estimated	7.0	25	11,484	3.3	11,664	3.3	11,684	3.9	11,937	3.2	273
L40	A5103 NB to A57(M) On-slip WB	Estimated	7.0	25	8,117	2.4	8,244	2.4	8,264	3.2	8,441	2.3	197
L41	A1503 Roundabout Section Between EB and WB	Estimated	7.0	25	3,696	4.4	3,754	4.4	3,774	6.3	3,961	4.2	207
L42	A5103 to Medlock Street	TC Link 15	7.5	25	8,809	1.2	9,895	2.6	9,915	1.2	10,375	2.5	479
L43	A1503 Roundabout Section Between EB and WB	TC Link 1	8.0	25	8,809	1.2	8,946	1.2	8,966	2.0	9,220	1.2	273
L44	A5103 - EB On-slip to A57(M)	TC Link 1	7.0	25	2,404	1.7	2,441	1.7	2,461	4.5	2,793	1.5	352
L45	A5103 (Medlock Street) - Roundabout Junction	TC Link 15	14.0	40	17,617	1.2	19,791	2.6	19,811	2.9	20,749	2.5	958
L46	A5103 (Medlock Street) - River Street to Great Jackson Street	TC Link 15	16.5	40	17,617	1.2	19,791	2.6	19,811	2.9	20,749	2.5	958
L47	A5103 (Albion Street) - South of B6469	TC Link 13	11.5	32	18,239	1.1	19,272	2.6	19,292	3.0	19,705	2.6	433
L48	A5103 (Albion Street) - Whitworth Street Junction	TC Link 13	10.0	20	18,239	1.1	19,272	2.6	19,292	3.0	19,705	2.6	433
L49	River Street	126668/2020	8.5	40	1,923	1.0	1,954	1.0	1,974	4.5	1,954	1.0	0
L50	City Road East - A5103 Junction	TC Link 14	7.0	32	3,431	1.5	5,410	0.7	5,430	1.9	6,800	0.5	1391
L51	City Road East Canyon	TC Link 14	18.0	32	3,431	1.5	5,410	0.7	5,430	1.9	6,800	0.5	1391
L52	Great Jackson Street	TC Link 18	8.5	32	3,431	1.5	6,426	0.3	6,446	0.2	8,227	0.2	1801
L53	Great Jackson Street - West of Owen Street	TC Link 18	8.5	32	3,431	1.5	6,426	0.3	6,446	0.2	8,227	0.2	1801
L54	Great Jackson Street - Between Melbourne and Silvercroft Street	TC Link 16	5.5	25	3,431	1.5	6,976	0.2	6,996	0.2	8,789	0.2	1813
L55	Great Jackson Street - North of Silvercroft Street	TC Link 2	9.0	25	3,193	2.1	5,289	0.9	5,309	0.7	7,370	0.7	2081
L56	Great Jackson Street to Bridgewater Viaduct	TC Link 2	4.5	15	1,597	2.1	2,644	0.9	2,654	0.3	3,685	0.7	1041
L57	Bridgewater Viaduct to Great Jackson Street	TC Link 2	5.5	20	1,597	2.1	2,644	0.9	2,654	0.3	3,685	0.7	1041
L58	Garwood Street	126668/2020	8.5	25	1,226	1.0	1,245	1.0	1,265	1.0	1,245	1.0	0

Road Link		Baseline Data Source	Road Width (m)	Speed (km/hr)	Verification Scenario 2019		DM Scenario		DS Construction Phase		DS Operational Scenario		Trip Generation (24hr AADT)
					AADT	HGV%	AADT	HGV%	AADT	HGV%	AADT	HGV%	
L59	Garwood Street - Onslip to A56(M)	126668/2020	5.3	25	613	1.0	622	1.0	642	1.0	622	1.0	0
L60	Garwood Street - Offslip from A56(M)	126668/2020	5.0	15	613	1.0	622	1.0	642	1.1	622	1.0	0
L61	A56 (Chester Road EB) - Deansgate Interchange Junction	TC Link J	7.3	25	11,154	1.7	11,371	2.4	11,391	3.0	11,419	2.4	48
L62	A56 (Chester Road EB) - Eastbound Carriageway	TC Link 4	7.3	40	14,305	1.7	16,027	2.1	16,037	2.3	17,303	1.9	1276
L63	Deansgate Interchange Off-Slip to A56 EB	Estimated	4.5	20	2,044	2.6	4,656	1.4	4,676	2.9	5,884	1.1	1228
L64	A56 (Chester Road EB) - WB Deansgate Interchange Junction	TC Link K	7.3	15	12,321	3.3	12,372	3.9	12,392	4.5	12,847	3.8	475
L65	A56 (Chester Road EB) - Westbound Carriageway to Deansgate Interchange	TC Link 4	10.5	40	14,305	1.7	16,027	2.1	16,037	2.3	17,303	1.9	1276
L66	A56 Off-Slip to Deansgate Interchange	Estimated	7.3	20	1,984	7.0	3,655	1.4	3,675	3.3	4,456	1.1	801
L67	A56 (Chester Road East) - East of Great Jackson Street	TC Link 1	7.3	40	13,602	2.2	14,375	2.1	14,385	2.3	14,808	2.0	433
L68	A56 (Chester Road East) - West of Great Jackson Street	TC Link 1	6.5	40	13,602	2.2	14,375	2.1	14,385	2.3	14,808	2.0	433
L69	A56 (Bridgewater Viaduct)	TC Link 1	10.5	40	27,205	2.2	28,751	2.1	28,771	2.3	29,616	2.0	866
L70	Old Deansgate - A56 Junction	126668/2020	6.3	15	8,084	1.0	8,210	1.0	8,230	1.8	8,210	1.0	0
L71	Old Deansgate	126668/2020	6.3	40	8,084	1.0	8,210	1.0	8,230	1.8	8,210	1.0	0
L72	Little Peter Street	126668/2020	6.0	32	1,716	1.0	1,743	1.0	1,763	5.0	1,743	1.0	0
L73	B6496 (Whitworth Street West) - A5103 Junction	126668/2020	13.0	15	9,747	1.0	9,899	1.0	9,919	1.7	9,899	1.0	0
L74	B6496 (Whitworth Street West)	126668/2020	10.0	40	9,747	1.0	9,899	1.0	9,919	1.7	9,899	1.0	144
L75	B6496 (Whitworth Street East)	126668/2020	10.5	40	12,564	1.0	12,760	1.0	12,780	1.5	12,760	1.0	144
L76	B6496 (Whitworth Street East) - A5103 Junction	126668/2020	15.0	15	12,564	1.0	12,760	1.0	12,780	1.5	12,760	1.0	144
L77	A56 (Deansgate)	126668/2020	12.0	32	18,040	3.0	18,322	3.0	18,342	3.4	18,322	3.0	722
L78	A5103 (Albion Street) - North of B6469	126668/2020	17.0	40	17,070	3.0	17,337	3.0	17,357	3.4	17,337	3.0	0
L79	Hewitt Street	126668/2020	6.0	15	548	1.0	557	1.0	577	13.1	557	1.0	0

Road Link		Baseline Data Source	Road Width (m)	Speed (km/hr)	Verification Scenario 2019		DM Scenario		DS Construction Phase		DS Operational Scenario		Trip Generation (24hr AADT)
					AADT	HGV%	AADT	HGV%	AADT	HGV%	AADT	HGV%	
L80	Hewitt Street	126668/2020	6.0	25	548	1.0	557	1.0	577	13.1	557	1.0	0
L81	Melbourne Street	126668/2020	5.0	25	1,872	1.0	3,217	0.0	3,237	2.2	5,565	0.0	2348
L82	Owen Street	Estimated	5.0	25	754	1.0	766	1.0	786	9.9	766	1.0	0
L83	A57 (Regent Road WB) - West of A6042	DfT 48023	9.3	40	19,641	4.3	19,948	4.3	19,968	4.6	19,948	4.3	0
L84	A57 (Regent Road WB) - B5461 Junction	DfT 48023	9.3	15	19,641	4.3	19,948	4.3	19,968	4.6	19,948	4.3	0
L85	A57 (Regent Road WB) - West of B5461	DfT 48023	7.3	40	19,641	4.3	19,948	4.3	19,968	4.6	19,948	4.3	0
L86	A57 (Regent Road WB) - West of A5066	DfT 36585	7.3	40	20,768	4.1	21,092	4.1	21,112	4.4	21,092	4.1	0
L87	A57 (Regent Road EB) - East of B5461	DfT 48023	8.5	40	19,641	4.3	19,948	4.3	19,968	4.6	19,948	4.3	0
L88	A57 (Regent Road EB) - B5461 Junction	DfT 48023	10.0	15	19,641	4.3	19,948	4.3	19,968	4.6	19,948	4.3	0
L89	A57 (Regent Road EB) - East of A5066	DfT 48023	7.3	40	19,641	4.3	19,948	4.3	19,968	4.6	19,948	4.3	0
L90	A57 (Regent Road EB) - A5066 Junction	DfT 36585	10.5	15	20,768	4.1	21,092	4.1	21,112	4.4	21,092	4.1	0
L91	A57 (Regent Road EB) - East of A5063	DfT 36585	6.5	40	20,768	4.1	21,092	4.1	21,112	4.4	21,092	4.1	0
L92	B5461 (Ordsall Lane North) - A57 Junction	DfT 7692	17.5	15	7,086	2.7	7,197	2.7	7,217	3.6	7,197	2.7	0
L93	B5461 (Ordsall Lane North)	DfT 7692	9.5	32	7,086	2.7	7,197	2.7	7,217	3.6	7,197	2.7	0
L94	B5461 (Ordsall Lane South)	DfT 7692	13.5	32	7,086	2.7	7,197	2.7	7,217	3.6	7,197	2.7	0
L95	B5461 (South) - Ordsall Lane North Junction	DfT 7692	9.3	15	2,362	2.7	2,399	2.7	2,419	5.6	2,399	2.7	0
L96	B5461 (Ordsall Lane South) - A57 West Junction	DfT 7692	5.5	15	2,362	2.7	2,399	2.7	2,419	5.6	2,399	2.7	0
L97	B5461 (Ordsall Lane South) - A57 East Junction	DfT 7692	5.0	15	2,362	2.7	2,399	2.7	2,419	5.6	2,399	2.7	0
L98	A6042 (Trinity Way North)	DfT 93144	7.5	32	11,672	2.4	11,854	2.4	11,874	3.0	11,854	2.4	0
L99	A6042 (Trinity Way South)	DfT 93144	14.5	15	11,672	2.4	11,854	2.4	11,874	3.0	11,854	2.4	0

* 126668/FO/2020 - Land Bound By Silvercroft Street, Crown Street, And The Mancunian Way Manchester - [Planning Portal Link](#)

Street Canyons

Sections of the local road network are elevated or flanked by tall buildings. To model these areas accurately the advanced street canyon modelling option was used for the L51 and elevations accounted for sections of the A57(M). This allows the model to modify the dispersion of pollutants from a road source to account for the presence and the properties of the canyon walls or elevated sections. Modelling parameters are detailed in Table A6.2.2

Table A6.2.2: Street Canyon and Elevated Road Sections

ID	Road	Canyon Width (m)	Canyon or Road Height (m)
L30	A57(M) (Mancunian Way EB) - Over A5103 Junction	0	7.0
L31	A57(M) (Mancunian Way WB) - Over A5103 Junction	0	7.0
L51	City Road East	18	25.0

Emission Factors

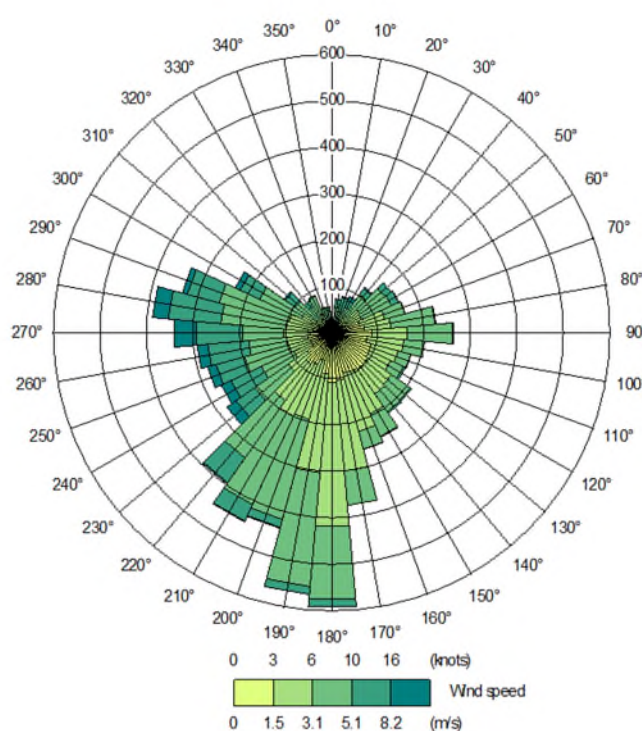
Emission factors for each link were calculated using the relevant traffic flows and the Emissions Factor Toolkit (version 11.0) released in November 2021, which incorporates updated COPERT 5.3 vehicle emissions factors for NO_x and PM and EURO 6 vehicle fleet sub-categories.

NO_x to NO₂ Conversion

Predicted annual mean NO_x concentrations from the dispersion model were converted to NO₂ concentrations using the NO_x to NO₂ Calculator (v.8.1) provided by DEFRA, which is the method detailed within LAQM.(TG22).

Meteorological Data

Hourly sequential data used in this assessment was obtained from Manchester Airport meteorological station. The 2019 meteorological wind rose is provided below.



Roughness Length

The specific roughness length (z_0) values specified with ADMS-5 are summarised in Table A6.2.3.

Table A6.2.3: Roughness Lengths

Area	Roughness Length (m)	ADMS Description
Site Location and Surrounding Area	1.5	Large Urban Areas
Meteorological Station	0.3	Agricultural Area 'Max'

Monin-Obukhov Length

The Monin-Obukhov length values are summarised in Table A6.2.4.

Table A6.2.4: Monin-Obukhov Lengths

Area	Monin-Obukhov Length (m)	ADMS Description
Site Location	30	Cities and Large Towns
Meteorological Station		Mixed urban, industrial

Background Concentrations

Table A6.2.5 presents the predicted background concentrations at monitoring locations used within the verification process and future year predictions.

As all A-road sectors were accounted for within the ADMS-Roads model it was necessary to remove this proportion from the total background component to avoid double counting. A-road "In" sectors were removed using the "NO₂ Adjustment for NO_x Sector Removal Tool" in accordance LAQM.(TG22). Background concentrations for verification sites and sensitive receptors pre and post adjustment are presented in Table A6.2.5

Table A6.2.5: Predicted NO₂ and NO_x Background Concentrations at Monitoring Locations

Monitoring Location	DEFRA Grid Square	Pollutant	2019 Predicted Background Concentration (µg/m ³)	
			Pre Adjustment	Post Adjustment
MAN97, SA60 and SA81	382500, 397500	NO _x	33.65	28.30
		NO ₂	22.79	19.64

Table A6.2.5 presents the predicted background concentrations at monitoring locations used within the verification process and future year predictions.

Table A6.2.6: Predicted NO₂ and NO_x Background Concentrations at Receptor Locations

ID	DEFRA Grid Square	Pollutant	Predicted Background Concentration (µg/m ³)					
			2019		2024		2027	
			Pre	Post	Pre	Post	Pre	Post
HR1 to HR11	382500, 397500	NO _x	33.65	28.30	26.09	22.57	23.45	20.72
		NO ₂	22.79	19.64	18.35	16.15	16.68	14.95
HR12 – HR40	383500, 397500	NO _x	39.95	33.56	31.29	27.09	28.41	25.18
		NO ₂	26.07	22.25	21.29	18.80	19.55	17.62

Table A6.2.7: Predicted PM₁₀ and PM_{2.5} Background Concentrations at Receptor Locations

ID	DEFRA Grid Square	Pollutant	Predicted Background Concentration (µg/m ³)		
			2019	2024	2027
HR1 to HR11	382500, 397500	PM ₁₀	13.16	12.29	12.43
		PM _{2.5}	8.54	7.92	8.02

ID	DEFRA Grid Square	Pollutant	Predicted Background Concentration ($\mu\text{g}/\text{m}^3$)		
			2019	2024	2027
HR12 – HR40	383500, 397500	PM ₁₀	13.47	12.55	12.69
		PM _{2.5}	8.69	8.03	8.13

Background concentrations and emissions factors for each assessment scenario were applied from the same year in accordance with LAQM.TG22.

Verification

The predicted results from a dispersion model may differ from measured concentrations for many 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.

As stated in the main Chapter model verification was undertaken for 2019, using traffic, emission factors, monitoring and meteorological data from this year. DEFRA guidance LAQM.TG22 advises that the initial verification should consider the performance of the model in predicting road sourced NO_x.

MCC and SCC undertakes periodic monitoring of NO₂ concentrations at three diffusion tubes which are representative of the affected road network. Table A6.2.8 presents the initial comparison of monitored and predicted annual mean road NO_x concentrations within the verification area.

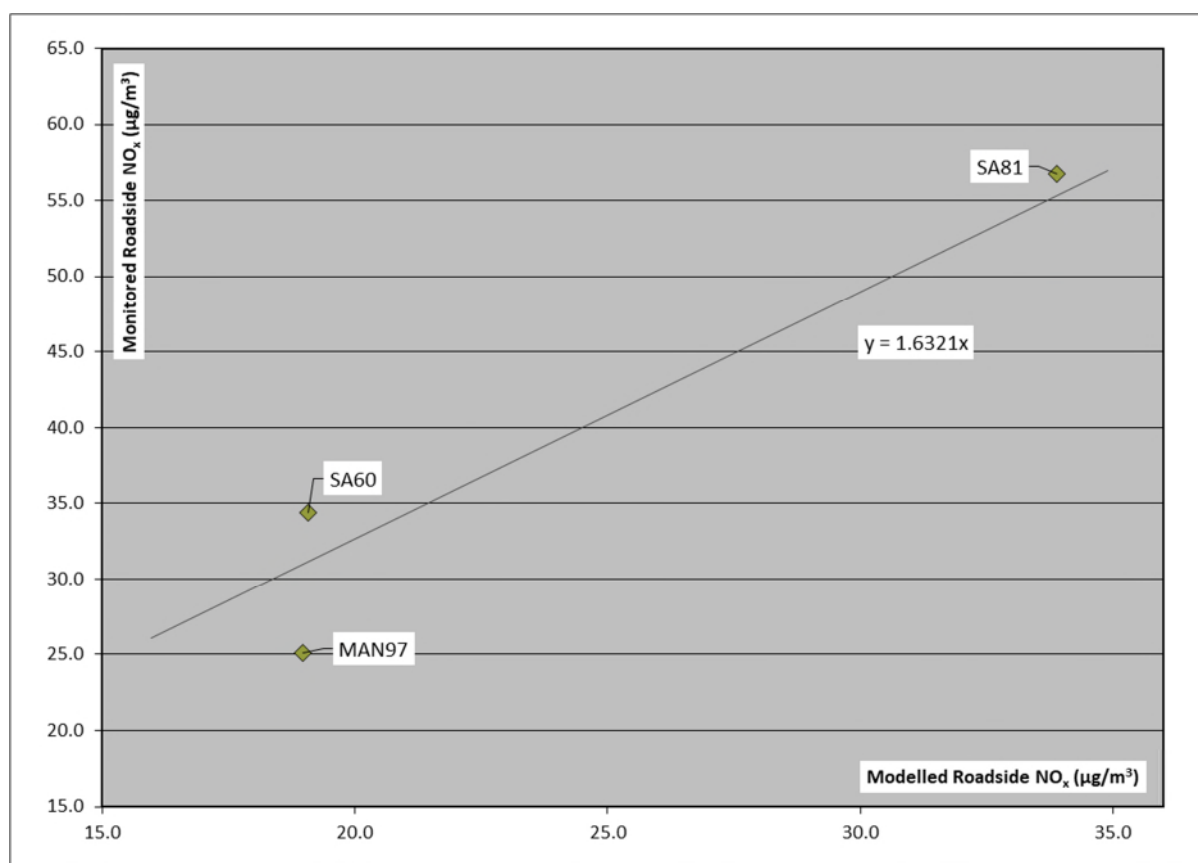
Table A6.2.8: Initial NO_x Results

ID	Monitored Road NO _x Concentration ($\mu\text{g}/\text{m}^3$)	Modelled Road NO _x Concentration ($\mu\text{g}/\text{m}^3$)	% Difference ((Modelled – Monitored)/Monitored) * 100
MAN97	25.07	18.98	-24%
SA81	56.77	33.89	-40%
SA60	34.43	19.08	-45%

The modelled NO_x results show underpredictions which are greater than the 25% threshold specified with LAQM.TG22. Following checks to the modelling inputs 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 was calculated, as shown in Graph 1 below.

This indicated that a verification factor of 1.6321 is to be applied to all receptor locations. Graph A6.2.1 is provided below.

Graph A6.2.1 – Modelled and Monitored NO_x Road Contributions



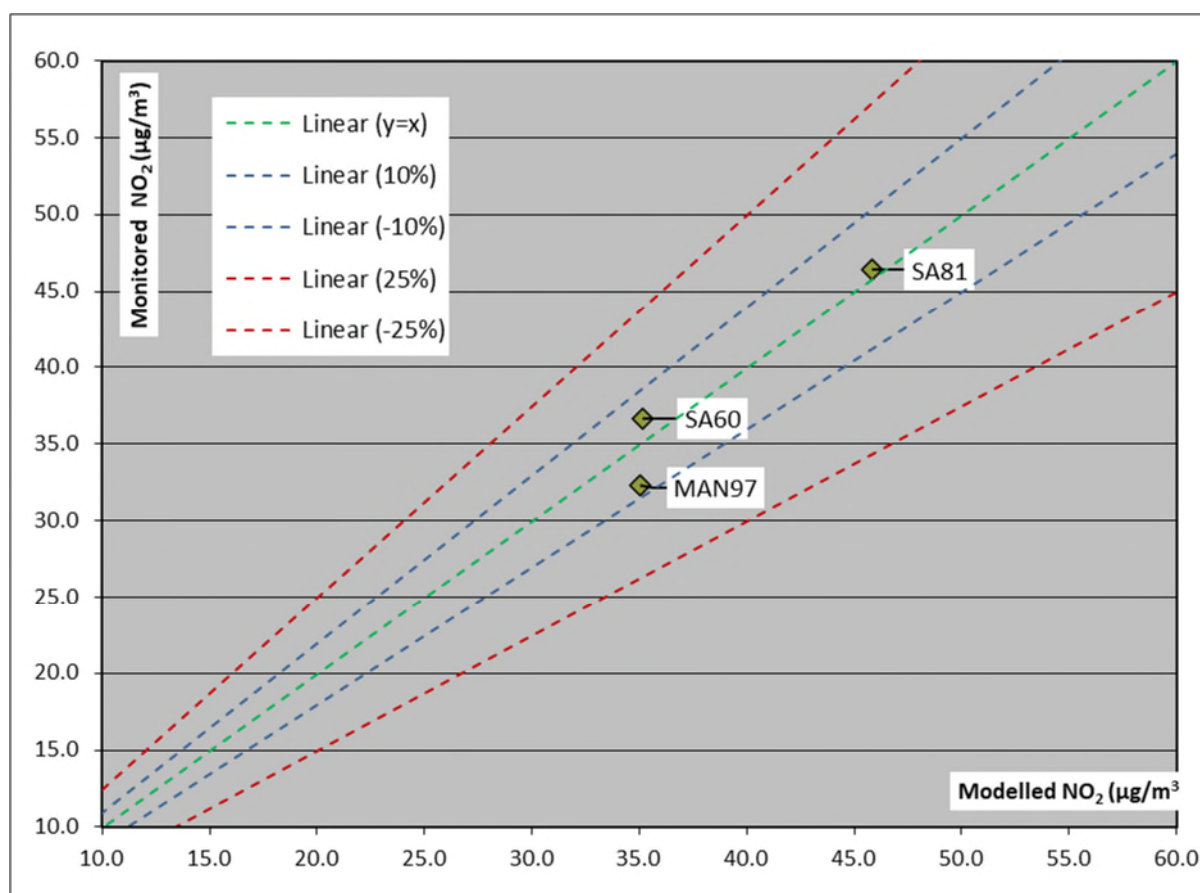
The adjustment factor was applied to the modelled road NO_x contributions with results presented in Table A6.2.9.

Table A6.2.9: Adjusted Modelled and Monitored NO₂ Concentrations

ID	Monitored NO ₂ Concentration (µg/m³)	Adjusted Modelled NO ₂ Concentration (µg/m³)	% Difference ((Modelled – Monitored)/Monitored) * 100
MAN97	32.29	35.06	9%
SA81	46.41	45.80	-1%
SA60	36.66	35.14	-4%

A graphical representation of the adjusted NO₂ concentrations is provided within Graph A7.1.2.

Graph A7.1.2 – Comparison of Monitored and Adjusted Modelled NO₂ Concentrations



As demonstrated in Table A6.2.9 and Graph 7.1.2, the percentage difference between modelled and monitored concentrations following adjustment is less than 10% at all locations. Additional methods for determining model uncertainty are provided in Table A6.2.10 as suggested by Box 7.20 of LAQM.TG22. This includes correlation coefficient; root mean square error and fractional bias.

Table A6.2.10: Modelled Performance

Method	Calculated Value	Ideal Value
Correlation Coefficient	0.96	1.00
Root Mean Square Error	1.86 (4.65%)	0.0 (<25%)
Fractional Bias	-0.01	0.0

The parameters detailed in Table A6.2.10 indicate a good correlation which adhere to the guidance provided in LAQM.TG22 and suggest no further adjustment is unnecessary.

As PM monitoring is not undertaken within the assessment extents, the NO_x adjustment factor was utilised to adjust model predictions of PM in accordance with the guidance provided within LAQM.TG22.



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