

Appendix: Air Quality

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ANNEX 1 - GLOSSARY

Term	Definition
Accuracy	A measure of how well a set of data fits the true value.
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).
Ambient air	Outdoor air in the troposphere, excluding workplace air.
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 2 years, which is useful for pollutants that have higher concentrations during the winter months.
AQMA	Air Quality Management Area.
DEFRA	Department for Environment, Food and Rural Affairs.
Exceedance	A period of time where the concentrations of a pollutant is greater than, or equal to, the appropriate air quality standard.
Fugitive emissions	Emissions arising from the passage of vehicles that do not arise from the exhaust system.
LAQM	Local Air Quality Management.
NO	Nitrogen monoxide, a.k.a. nitric oxide.
NO₂	Nitrogen dioxide.
NO_x	Nitrogen oxides.
O₃	Ozone.
Percentile	The percentage of results below a given value.
PM₁₀	Particulate matter with an aerodynamic diameter of less than 10 micrometres.
ppb parts per billion	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppb means that for every billion (10 ⁹) units of air, there is one unit of pollutant present.
ppm parts per million	The concentration of a pollutant in the air in terms of volume ratio. A concentration of 1 ppm means that for every billion (10 ⁶) units of air, there is one unit of pollutant present.
Ratification (Monitoring)	Involves a critical review of all information relating to a data set, in order to amend or reject the data. When the data have been ratified they represent the final data to be used (see also validation).
µg/m³ micrograms per cubic metre	A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m ³ means that one cubic metre of air contains one microgram (millionth of a gram) of pollutant.
UKAS	United Kingdom Accreditation Service.
Uncertainty	A measure, associated with the result of a measurement, which characterizes the range of values within which the true value is expected to lie. Uncertainty is usually expressed as the range within which the true value is expected to lie with a 95% probability, where standard statistical and other procedures have been used to evaluate this figure. Uncertainty is more clearly defined than the closely related parameter 'accuracy', and has replaced it on recent European legislation.
Validation (modelling)	Refers to the general comparison of modelled results against monitoring data carried out by model developers.
Validation (monitoring)	Screening monitoring data by visual examination to check for spurious and unusual measurements (see also ratification).



Term	Definition
Verification (modelling)	Comparison of modelled results versus any local monitoring data at relevant locations.

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ANNEX 2 - TRAFFIC DATA

Table 2.1: Baseline Traffic Data (2019)

Road Link	AADT	HGV	Speed (kph)	
			Freeflow	Congestion/ Junction
Abbott Road (East of Underpass)	8466	0.5%	35	20
Abbott Road (East of Oban Street)	7527	0.8%	30	20
Leven Road	1398	2.4%	26	20
Oban Street	987	0.5%	24	20
Bromley Hall Road	1254	2.4%	32	20
Lochnagar Street	3079	5.9%	32	20
Zetland Street	3086	7.6%	32	20
Abbott Road Underpass (One-Way)	2767	6.0%	32	20
A1206 Preston's Road	20739	7.7%	32	20
A12 (Between Lochnagar Street and A13)	82024	4.8%	64	30
A12 (North of Lochnagar Street)	79039	5.6%	64	30
A12 On-slip from A13 (St. Leonards Road)	18462	6.1%	48	30
Trafalgar Way	2994	5.6%	32	20
Upper Bank Street	9412	12.0%	48	30
Poplar High Street	6228	3.9%	32	20
Saltwell Street	6308	3.9%	32	20
A1206 Cotton Street	30047	11.1%	32	20
A1261 Aspen Way (West of A12)	105909	15.2%	64	30
Blackwall Tunnell	71397	4.8%	48	30
Upper North Street (A13 to Cordelia Street)	5710	1.6%	32	20
Upper North Street (Cordelia Street to B140 St. Paul's Way)	6631	0.9%	32	20
B140-St. Paul's Way	11158	7.0%	32	20
Cordelia Street	2522	0.6%	32	20
Devons Road	9842	2.9%	32	20
Devas Street W of Purdy Street	9399	7.6%	32	20
Chrisp Street (South of Burcham Street)	8358	1.6%	32	20



Chrisp Street (North of Burcham Street)	10018	0.9%	32	20
Campbell Road	9842	2.9%	32	20
Devas Street (West of A12 junction)	9769	9.5%	32	20
Burcham Street/St Leonard Road	4710	3.3%	32	20
A1261 Aspen Way (West of Lower Lea Crossing rbt)	111678	14.9%	64	30
Abbott Road slip to A12	5154	7.4%	32	20
Stephenson Street	6086	7.4%	48	30
A1011 Manor Road (North of A13)	11217	16.8%	48	30
A1011 Manor Road (North of Star Lane)	9277	12.0%	48	30
Cody Road	6189	7.3%	48	30
Star Lane (East of A1011)	8827	5.0%	48	30
A124 (East of Manor Road)	18287	11.2%	48	30
A124 (East of Ordnance Road)	17235	11.0%	48	30
Lower Lea Crossing	37361	15.3%	48	30
A13 (From A12/A13 interchange to Abbott Road)	54401	6.7%	48	30
A13 (West of A12/A13 interchange)	23499	15.0%	48	30
A1020 Leamouth Road	21984	7.3%	48	30
A13 (East of Leamouth Road)	52076	6.0%	48	30
A13 Newham Way (East of Abbott Road)	107775	16.1%	48	30
A1011 Silvertown Way (South of A13)	10506	8.0%	48	30
A12 Off-slip (St. Leonard Road from Blackwall Tunnel)	11714	4.9%	48	30
A102 On-slip (to Blackwall Tunnel)	11389	6.7%	48	30
A102 Off-slip (to A13 east and west)	15270	8.6%	48	30
A102 off-slip (to A13 west)	15989	5.2%	48	30
A102 on-slip (from A13 east)	18561	7.9%	48	30

Table 2.2: Baseline + Committed Developments (2031)

Road Link	AADT	HGV	Speed (kph)	
			Freeflow	Congestion/ Junction
Abbott Road (East of Underpass)	7240	9.6%	35	20
Abbott Road (East of Oban Street)	8965	9.1%	30	20



Leven Road	3744	2.4%	26	20
Oban Street	3333	0.5%	24	20
Bromley Hall Road	1254	2.4%	32	20
Lochnagar Street	2581	7.4%	32	20
Zetland Street	2304	6.7%	32	20
Abbott Road Underpass (One-Way)	5539	8.8%	32	20
A1206 Preston's Road	25156	9.2%	32	20
A12 (Between Lochnagar Street and A13)	88575	9.7%	64	30
A12 (North of Lochnagar Street)	85389	9.1%	64	30
A12 On-slip from A13 (St. Leonards Road)	16237	10.9%	48	30
Trafalgar Way	2343	0.0%	32	20
Upper Bank Street	10250	14.8%	48	30
Poplar High Street	5041	5.3%	32	20
Saltwell Street	4949	4.3%	32	20
A1206 Cotton Street	28339	6.4%	32	20
A1261 Aspen Way (West of A12)	109733	14.4%	64	30
Blackwall Tunnell	100330	10.1%	48	30
Upper North Street (A13 to Cordelia Street)	5898	1.2%	32	20
Upper North Street (Cordelia Street to B140 St. Paul's Way)	7678	0.8%	32	20
B140-St. Paul's Way	11670	6.5%	32	20
Cordelia Street	2327	0.8%	32	20
Devons Road	9536	4.3%	32	20
Devas Street W of Purdy Street	10192	8.2%	32	20
Chrip Street (South of Burcham Street)	11816	3.3%	32	20
Chrip Street (North of Burcham Street)	11649	1.1%	32	20
Campbell Road	10688	1.7%	32	20
Devas Street (West of A12 junction)	4974	14.5%	32	20
Burcham Street/St Leonard Road	4638	3.6%	32	20
A1261 Aspen Way (West of Lower Lea Crossing rbt)	130495	13.4%	64	30
Abbott Road slip to A12	1469	9.2%	32	20
Stephenson Street	5809	8.3%	48	30



A1011 Manor Road (North of A13)	14419	8.6%	48	30
A1011 Manor Road (North of Star Lane)	10818	7.3%	48	30
Cody Road	8111	5.4%	48	30
Star Lane (East of A1011)	5034	0.4%	48	30
A124 (East of Manor Road)	21195	8.7%	48	30
A124 (East of Ordnance Road)	19977	8.4%	48	30
Lower Lea Crossing	46021	12.1%	48	30
A13 (From A12/A13 interchange to Abbott Road)	58629	14.2%	48	30
A13 (West of A12/A13 interchange)	16830	12.2%	48	30
A1020 Leamouth Road	24481	11.9%	48	30
A13 (East of Leamouth Road)	29261	10.2%	48	30
A13 Newham Way (East of Abbott Road)	124173	15.2%	48	30
A1011 Silvertown Way (South of A13)	20813	7.6%	48	30
A12 Off-slip (St. Leonard Road from Blackwall Tunnel)	10113	20.9%	48	30
A102 On-slip (to Blackwall Tunnel)	8503	8.8%	48	30
A102 Off-slip (to A13 east and west)	13258	15.3%	48	30
A102 off-slip (to A13 west)	9908	8.0%	48	30
A102 on-slip (from A13 east)	13351	11.9%	48	30

Table 2.3: Baseline + Committed Developments + Construction Traffic (2026)

Road Link	AADT	HGV	Speed (kph)	
			Freeflow	Congestion/ Junction
Abbott Road (East of Underpass)	7240	9.6%	35	20
Abbott Road (East of Oban Street)	8965	9.1%	30	20
Leven Road	3744	2.4%	26	20
Oban Street	3333	0.5%	24	20
Bromley Hall Road	1408	11.2%	32	20
Lochnagar Street	2735	11.6%	32	20
Zetland Street	2304	6.7%	32	20
Abbott Road Underpass (One-Way)	5539	8.8%	32	20
A1206 Preston's Road	25156	9.2%	32	20



A12 (Between Lochnagar Street and A13)	88675	9.8%	64	30
A12 (North of Lochnagar Street)	85443	9.2%	64	30
A12 On-slip from A13 (St. Leonards Road)	16291	11.1%	48	30
Trafalgar Way	2343	0.0%	32	20
Upper Bank Street	10250	14.8%	48	30
Poplar High Street	5041	5.3%	32	20
Saltwell Street	4949	4.3%	32	20
A1206 Cotton Street	28339	6.4%	32	20
A1261 Aspen Way (West of A12)	109733	14.4%	64	30
Blackwall Tunnell	100353	10.1%	48	30
Upper North Street (A13 to Cordelia Street)	5898	1.2%	32	20
Upper North Street (Cordelia Street to B140 St. Paul's Way)	7678	0.8%	32	20
B140-St. Paul's Way	11670	6.5%	32	20
Cordelia Street	2327	0.8%	32	20
Devons Road	9536	4.3%	32	20
Devas Street W of Purdy Street	10192	8.2%	32	20
Chrisp Street (South of Burcham Street)	11816	3.3%	32	20
Chrisp Street (North of Burcham Street)	11649	1.1%	32	20
Campbell Road	10688	1.7%	32	20
Devas Street (West of A12 junction)	4974	14.5%	32	20
Burcham Street/St Leonard Road	4638	3.6%	32	20
A1261 Aspen Way (West of Lower Lea Crossing rbt)	130495	13.4%	64	30
Abbott Road slip to A12	1469	9.2%	32	20
Stephenson Street	5809	8.3%	48	30
A1011 Manor Road (North of A13)	14419	8.6%	48	30
A1011 Manor Road (North of Star Lane)	10818	7.3%	48	30
Cody Road	8111	5.4%	48	30
Star Lane (East of A1011)	5034	0.4%	48	30
A124 (East of Manor Road)	21195	8.7%	48	30
A124 (East of Ordnance Road)	19977	8.4%	48	30
Lower Lea Crossing	46033	12.1%	48	30



A13 (From A12/A13 interchange to Abbott Road)	58706	14.3%	48	30
A13 (West of A12/A13 interchange)	16830	12.2%	48	30
A1020 Leamouth Road	24504	11.9%	48	30
A13 (East of Leamouth Road)	29361	10.4%	48	30
A13 Newham Way (East of Abbott Road)	124273	15.2%	48	30
A1011 Silvertown Way (South of A13)	20825	7.7%	48	30
A12 Off-slip (St. Leonard Road from Blackwall Tunnel)	10113	20.9%	48	30
A102 On-slip (to Blackwall Tunnel)	8526	9.0%	48	30
A102 Off-slip (to A13 east and west)	13296	15.5%	48	30
A102 off-slip (to A13 west)	9908	8.0%	48	30
A102 on-slip (from A13 east)	13351	11.9%	48	30

Table 2.4: Baseline + Committed Developments + Proposed Development (2031)

Road Link	AADT	HGV	Speed (kph)	
			Freeflow	Congestion/ Junction
Abbott Road (East of Underpass)	491	10.5%	35	20
Abbott Road (East of Oban Street)	6480	7.4%	30	20
Leven Road	4477	2.4%	26	20
Oban Street	4477	0.0%	24	20
Bromley Hall Road	2128	1.7%	32	20
Lochnagar Street	3049	1.8%	32	20
Zetland Street	1919	5.1%	32	20
Abbott Road Underpass (One-Way)	0	0.0%	32	20
A1206 Preston's Road	25391	9.1%	32	20
A12 (Between Lochnagar Street and A13)	90395	10.0%	64	30
A12 (North of Lochnagar Street)	87326	9.1%	64	30
A12 On-slip from A13 (St. Leonards Road)	16287	11.9%	48	30
Trafalgar Way	2257	0.0%	32	20
Upper Bank Street	10228	14.7%	48	30
Poplar High Street	5071	5.2%	32	20



Saltwell Street	4979	4.3%	32	20
A1206 Cotton Street	27281	6.4%	32	20
A1261 Aspen Way (West of A12)	109293	14.5%	64	30
Blackwall Tunnell	101051	10.2%	48	30
Upper North Street (A13 to Cordelia Street)	6029	1.3%	32	20
Upper North Street (Cordelia Street to B140 St. Paul's Way)	7654	0.8%	32	20
B140-St. Paul's Way	11915	6.2%	32	20
Cordelia Street	2234	0.9%	32	20
Devons Road	7791	5.2%	32	20
Devas Street W of Purdy Street	10214	6.9%	32	20
Chrisp Street (South of Burcham Street)	12661	4.0%	32	20
Chrisp Street (North of Burcham Street)	12039	1.7%	32	20
Campbell Road	10158	1.5%	32	20
Devas Street (West of A12 junction)	6870	8.5%	32	20
Burcham Street/St Leonard Road	5538	4.0%	32	20
A1261 Aspen Way (West of Lower Lea Crossing rbt)	127741	13.8%	64	30
Abbott Road slip to A12	1950	8.5%	32	20
Stephenson Street	5698	7.4%	48	30
A1011 Manor Road (North of A13)	14437	9.0%	48	30
A1011 Manor Road (North of Star Lane)	10926	7.4%	48	30
Cody Road	8108	5.4%	48	30
Star Lane (East of A1011)	5001	0.3%	48	30
A124 (East of Manor Road)	20987	8.8%	48	30
A124 (East of Ordnance Road)	19863	8.5%	48	30
Lower Lea Crossing	45615	12.1%	48	30
A13 (From A12/A13 interchange to Abbott Road)	59188	14.4%	48	30
A13 (West of A12/A13 interchange)	17020	11.9%	48	30
A1020 Leamouth Road	25956	12.3%	48	30
A13 (East of Leamouth Road)	29269	10.7%	48	30
A13 Newham Way (East of Abbott Road)	123828	15.4%	48	30
A1011 Silvertown Way (South of A13)	20959	8.3%	48	30



A12 Off-slip (St. Leonard Road from Blackwall Tunnel)	9392	21.1%	48	30
A102 On-slip (to Blackwall Tunnel)	8022	9.1%	48	30
A102 Off-slip (to A13 east and west)	13887	14.8%	48	30
A102 off-slip (to A13 west)	8946	7.9%	48	30
A102 on-slip (from A13 east)	13756	11.9%	48	30

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ANNEX 3 – MODEL VERIFICATION STUDY

NO₂

Most nitrogen dioxide (NO₂) is produced in the atmosphere by reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emissions. Verification of concentrations predicted by the ADMS model has followed the methodology presented in LAQM.TG(16).

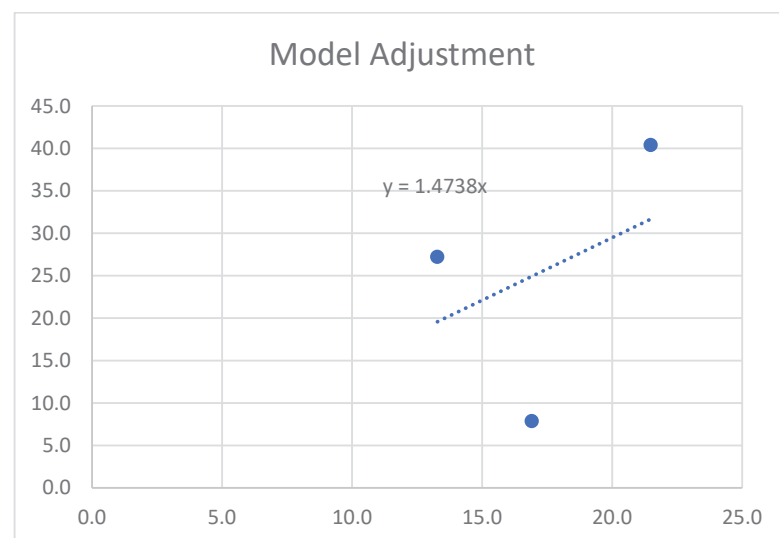
The model has been run to predict annual mean road-NO_x concentrations at three nearby monitoring sites.

The model output of road-NO_x (i.e. the component of total NO_x coming from road traffic) has been compared to the 'measured' road-NO_x (Table 3.1). The 'measured' road NO_x has been calculated from the measured NO₂ concentrations by using the Defra NO_x to NO₂ calculator available on the UK-AIR website.

Table 3.1: Comparison of Modelled and Monitored NO_x concentrations

Monitoring Location	Total Monitored NO ₂	Background NO ₂	Monitored Road NO _x	Modelled Road NO _x	Ratio
Blackwall	47	35.5	27.2	13.3	2.05
84	39	35.5	7.9	16.9	0.46
83	52	35.5	40.4	21.5	1.88

Figure 3.1: Comparison of Modelled and Monitored Road NO_x concentrations



The results in Table 3.1 and Figure 3.1 indicate that the ADMS model under-predicted the road NO_x concentrations at the selected monitoring sites. An adjustment factor was therefore determined as the ratio between the measured road-NO_x contribution and the modelled road-NO_x contribution (1.47). This factor has then been applied to the modelled road-NO_x concentration for each location to provide an adjusted modelled road-NO_x concentration.

The annual mean road-NO₂ concentration was determined using the Defra NO_x:NO₂ spread sheet calculation tool and added to the background NO₂ concentration to produce a total adjusted NO₂ concentration.

Particulate Matter (PM₁₀ and PM_{2.5})

There was insufficient roadside monitoring data available against which the modelling could be verified. Consequently, the verification factor determined above for adjusting the road-NO_x contribution has been applied to the predicted road-PM₁₀ and road-PM_{2.5} contributions, consistent with guidance provided in LAQM.TG(16).

Model Uncertainty

An evaluation of model performance has been undertaken to establish confidence in model results. LAQM.TG(16) identifies a number of statistical procedures that are appropriate to evaluate model performance and assess the uncertainty. These include root mean square error (RMSE); fractional bias (FB) and correlation coefficient (CC). These parameters estimate how the model results agree or diverge from the observations. The simplest parameter to calculate and to interpret is the RMSE, which has therefore been used in this assessment to understand the model uncertainty.

The RMSE value calculated after verification was 4.8. Guidance provided in LAQM.TG(16) indicates that for RMSE values higher than 25% of the objective level, that the model should be revisited. Ideally an RMSE value should be within 10% of the air quality objective level. For annual mean NO₂, which has an objective level of 40µg/m³, this equates to 4µg/m³. The RMSE value calculated for this assessment is therefore considered to fall within the acceptable limits, therefore the final predictions can be considered to be robust.