Appendix 8.6 – Verification

The comparison of modelled concentrations with local monitored concentrations is a process termed 'verification'. Model verification investigates the discrepancies between modelled and measured concentrations. Discrepancies occur due to model uncertainties, such as:

- Estimates of background pollutant concentrations;
- Meteorological data uncertainties;
- Traffic data uncertainties;
- Model input parameters; and
- Overall limitations of the dispersion model.

NO_2 is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. Therefore, model verification for nitrogen oxides (NO_X = NO + NO_2) the primary pollutant is appropriate. This has been undertaken in accordance Chapter 7 of LAQM.TG(22).

The model has been run to predict the 2019 annual mean road-NO_X contribution at the monitoring locations given below. The model outputs of road-NO_X for each location have been compared with the 2019 'measured' road-NO_X, which was determined utilising the NO_X from NO_2 calculator and the NO_2 concentration data from MCC monitoring.

Details of the data used in the verification process is in the table and figure below.

ID	2019 Monitored Total NO_2 ($\mu g/m^3$)	Background NO_2 ($\mu g/m^3$)	2019 Monitored Road Contribution NO_X ($\mu g/m^3$)	2019 Modelled Road Contribution NO_X ($\mu g/m^3$)	Ratio of monitored NO_X road contribution/modelled road contribution NO_X
MA29ANO	55.4	28.2	59.5	48.4	1.23
MAN1	59.0	28.2	68.5	37.8	1.81
MA82NO/ MA83NO / MA84NO	52.0	28.2	51.2	38.0	1.35

The adjustment factor calculated is 1.4. This indicated that the model was under-predicting. As the model was under-predicting, this factor was applied to adjust the modelled road-NO_X outputs.

For PM_{10} and $PM_{2.5}$ there are no relevant local monitoring data against which the model could be verified. Consequently, the verification factors determined above for adjusting the road-NO_X contribution has been applied to the predicted road-PM_{10} and road-$PM_{2.5}$ contributions, consistent with guidance set out in LAQM.TG(22).