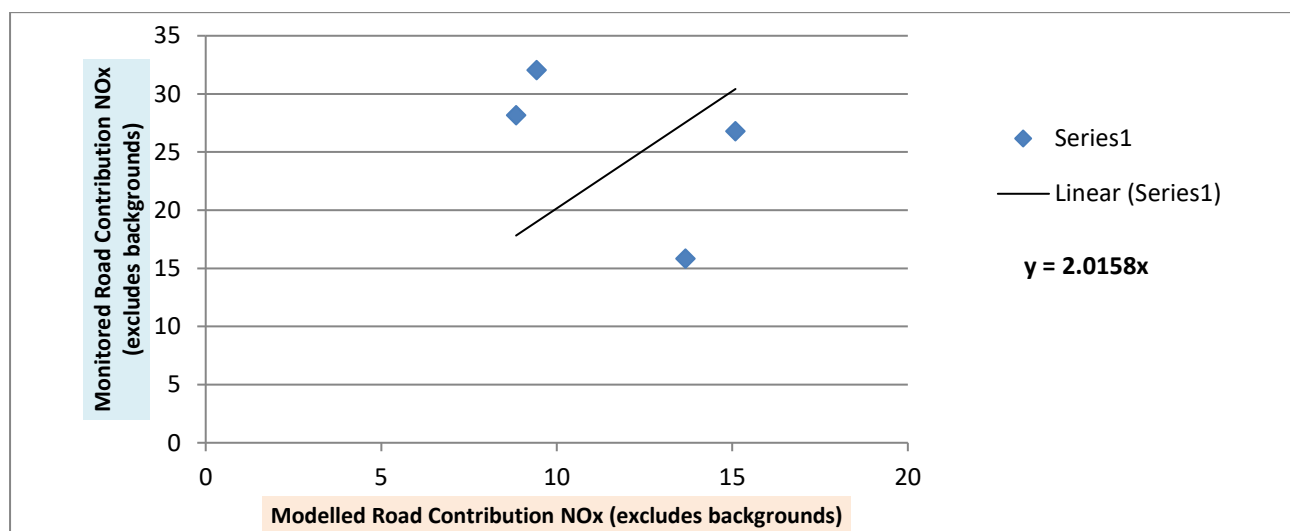


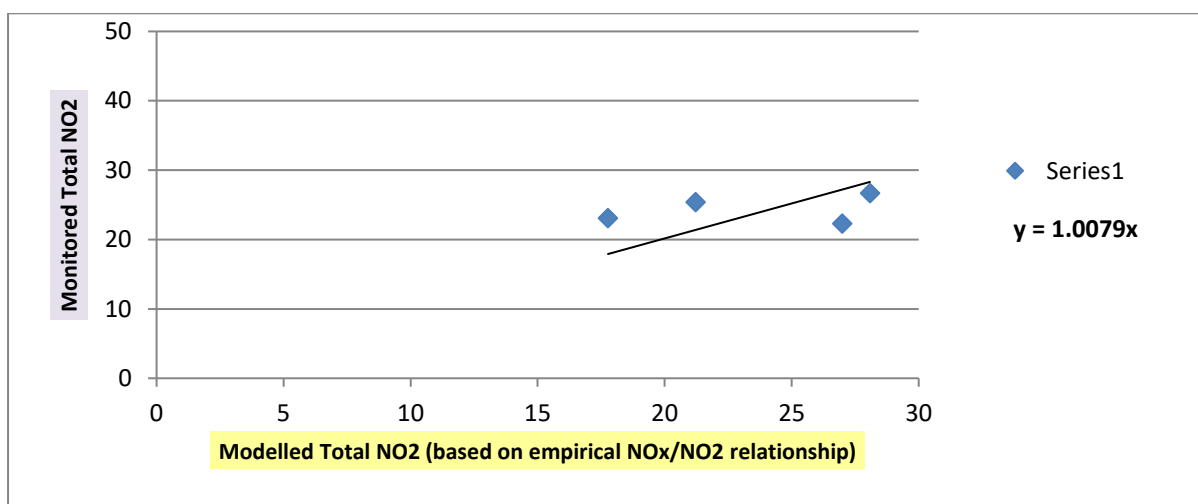
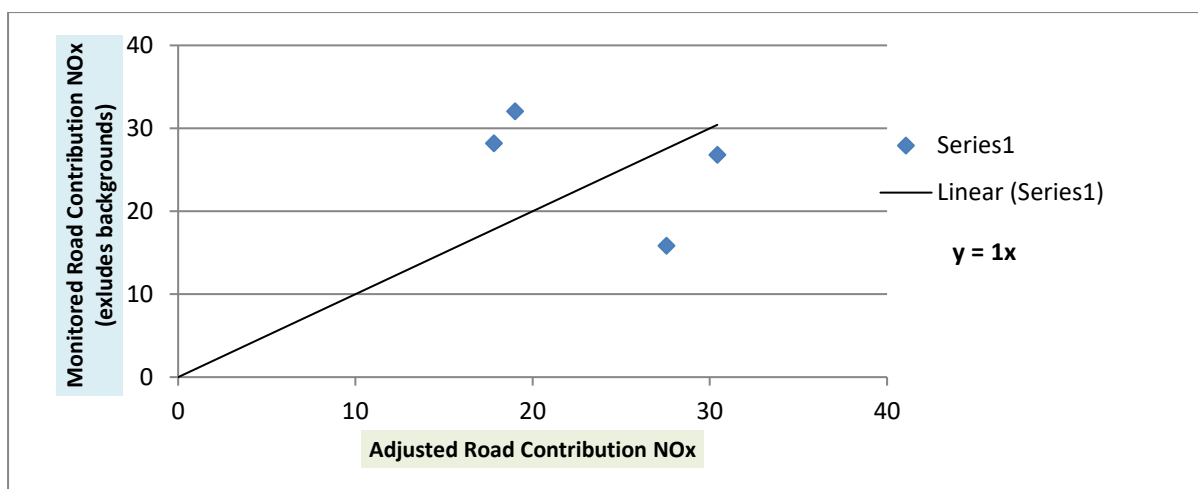
Appendix 6.6: Model Verification Procedure

Model Verification (NO_x and NO₂)

Address	2023 Monitored Total NO ₂ (Bias Adjusted)	2023 Monitored Total NO _x	2023 Background NO ₂	2023 Background NO _x	Monitored Road Contribution NO ₂ (total - background)	Monitored Road Contribution NO _x (excludes background)	Modelled Road Contribution NO _x (excludes background)
DT 3 (Havant Road, Hayling Island)	23.10	43.80	9.05	11.74	14.05	32.06	9.43
DT 12 (Xyratex)	22.30	36.77	15.28	20.93	7.02	15.84	13.67
DT 19C (Langstone Road East, Woodbury)	26.70	47.73	15.28	20.93	11.42	26.80	15.09
DT 22 (Park Road South, Bulbeck Junction)	25.40	46.02	13.26	17.84	12.14	28.18	8.84



Address	Ratio of Monitored Road Contribution NO _x / Modelled Road Contribution NO _x	Adjustment Factor for Modelled Road Contribution	Adjusted Modelled Road Contribution NO _x	Adjusted Modelled Total NO _x (including background NO _x)	Modelled Total NO ₂ (based on empirical NO _x / NO ₂ relationship)	Monitored Total NO ₂	% Difference [(modelled - monitored) / monitored] x 100
DT 3 (Havant Road, Hayling Island)	3.40	2.0158	19.01	30.75	17.77	23.10	-23.07
DT 12 (Xyratex)	1.16		27.55	48.48	26.99	22.30	21.03
DT 19C (Langstone Road East, Woodbury)	1.78		30.42	51.35	28.08	26.70	5.17
DT 22 (Park Road South, Bulbeck Junction)	3.19		17.82	35.66	21.22	25.40	-16.46
		2.0158					



This adjustment factor has been applied to the modelled road-contribution NO_x concentrations as described above. The total NO₂ concentrations have been derived by combining the adjusted road-contribution NO_x concentration and background NO₂ concentration, using the Defra NO_x to NO₂ calculator.

A final comparison has been made between the total measured NO₂ concentrations and total modelled NO₂ concentrations, as shown in Table 6.4. Following adjustment, modelled concentrations are within 25% of measured concentrations.

Table 6.4: Comparison Between Monitored and Monitored NO ₂ Concentrations			
Monitoring Location Reference	Monitored Total NO ₂ Concentration (µg/m ³)	Modelled Total NO ₂ Concentration (µg/m ³)	Difference (%)
DT 3 (Havant Road, Hayling Island)	23.10	17.77	-23.07
DT 12 (Xyratex)	22.30	26.99	21.03
DT 19C (Langstone Road East, Woodbury)	26.70	28.08	5.17
DT 22 (Park Road South, Bulbeck Junction)	25.40	21.22	-16.46

A Root Mean Square Error (RMSE) calculation has been undertaken as part of the model verification for NO₂ concentrations. This has been carried out for the monitoring location included within the model verification, in accordance with the guidance detailed in LAQM.TG(22).

The RMSE calculation following adjustment is detailed in Table 6.5.

Table 6.5: RMSE Calculation for Nitrogen Dioxide Concentrations					
Diffusion Tube Location	After Verification				
	Monitored Value	Modelled Value	Difference	RMSE	RMSE as % AQO
DT 3 (Havant Road, Hayling Island)	23.10	17.77	5.33	4.18	10.44
DT 12 (Xyratex)	22.30	26.99	-4.69		
DT 19C (Langstone Road East, Woodbury)	26.70	28.08	-1.38		
DT 22 (Park Road South, Bulbeck Junction)	25.40	21.22	4.18		

LAQM.TG(22) states that “ideally an RMSE value within 10% of the objective would be derived”, although a value of within 25% is considered acceptable. The results of the calculation show that following model verification, the RMSE value is within 25% (i.e. 4µg/m³) of the objective (i.e. 40µg/m³). Therefore, the model is considered to be performing to an acceptable standard.