

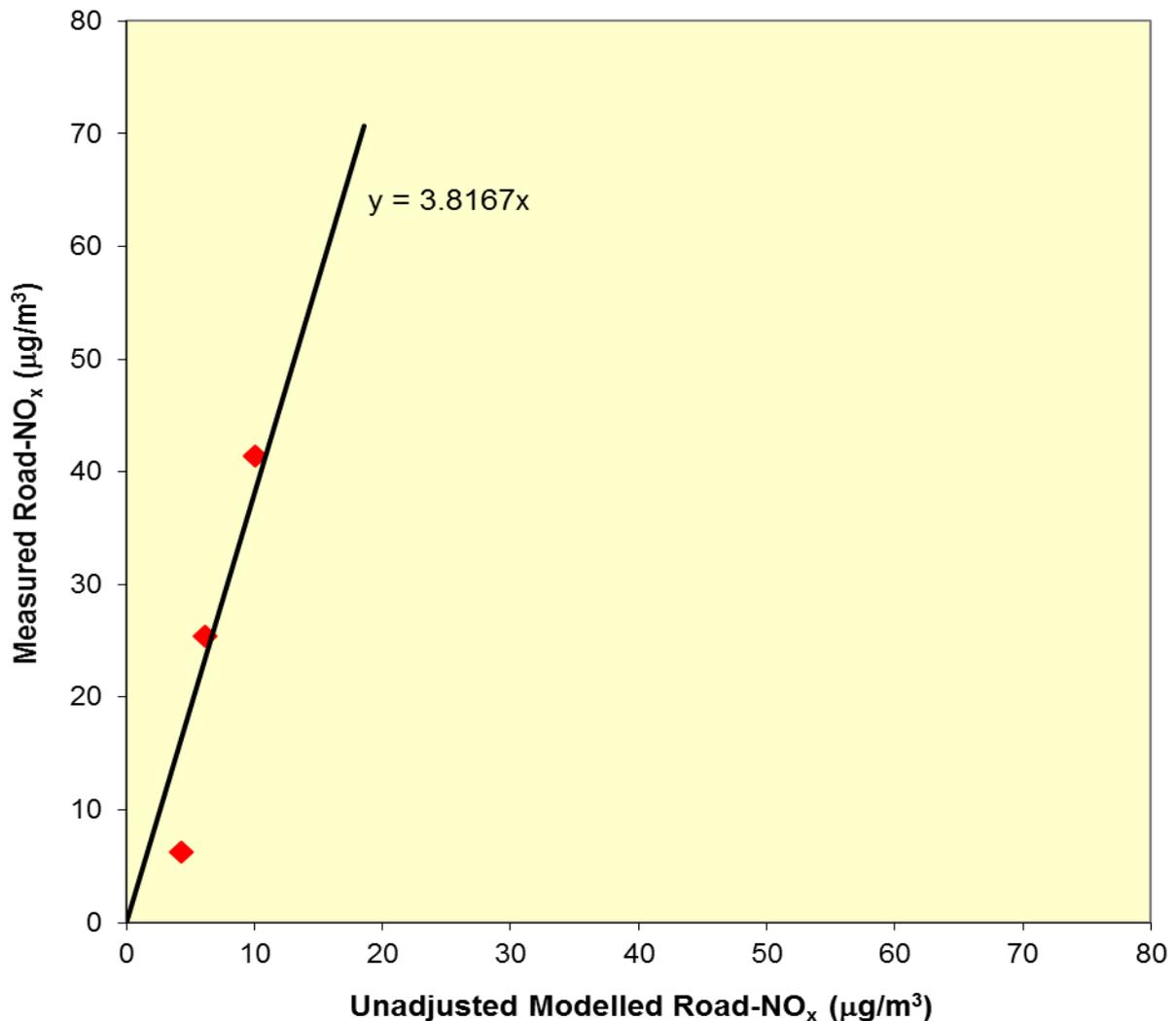
## **Appendix 8.1    Verification**

## Nitrogen Dioxide

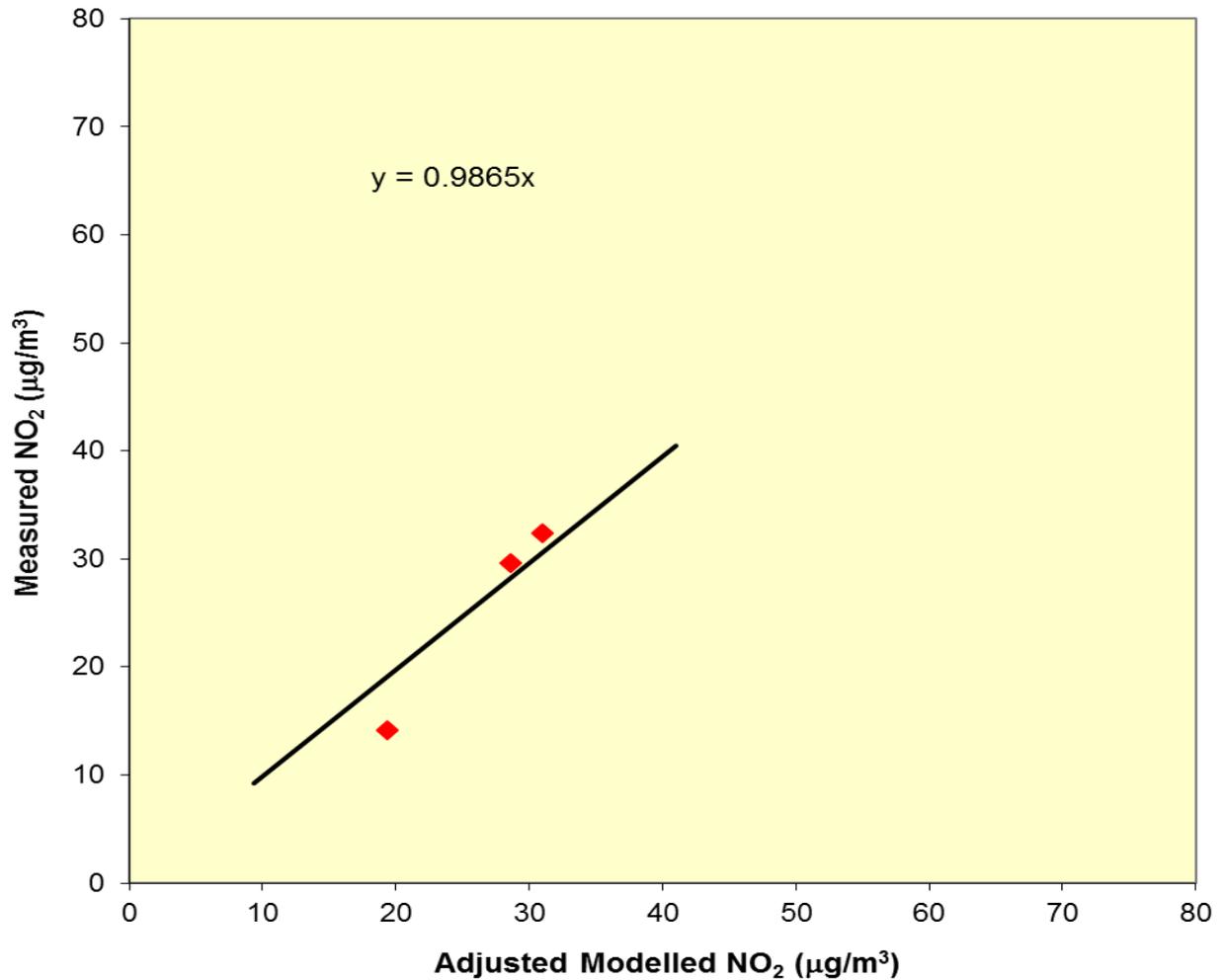
Most nitrogen dioxide is produced in the atmosphere by the reaction of nitric oxide (NO) with ozone. It is therefore most appropriate to verify the model in terms of primary pollutant emission of nitrogen oxides ( $\text{NO}_x = \text{NO} + \text{NO}_2$ ). The model has been run to predict the 2015 annual mean road- $\text{NO}_x$  contribution at three roadside diffusion tubes (identified in [Table 8.11](#)).

The model output of road- $\text{NO}_x$  has been compared with the 'measured' road- $\text{NO}_x$ , which was calculated from the measured  $\text{NO}_2$  concentrations and the adjusted background  $\text{NO}_2$  concentrations within the  $\text{NO}_x$  from  $\text{NO}_2$  calculator.

A primary adjustment factor was determined as the slope of the best fit line between the 'measured' road contribution and the model derived road contribution, forced through zero ([Figure C.1](#)). This factor was then applied to the modelled road- $\text{NO}_x$  concentration for each monitoring site to provide adjusted modelled road- $\text{NO}_x$  concentrations. The total nitrogen dioxide concentrations were then determined by combining the adjusted modelled road- $\text{NO}_x$  concentrations with the predicted background  $\text{NO}_2$  concentration within the  $\text{NO}_x$  from  $\text{NO}_2$  calculator. A secondary adjustment factor was finally calculated as the slope of the best fit line applied to the adjusted data and forced through zero ([Figure C.2](#)).



**Figure C.1: Comparison of Measured Road-NO<sub>x</sub> with Unadjusted Modelled Road-NO<sub>x</sub> Concentrations**



**Figure C.2: Comparison of Measured NO<sub>2</sub> with Adjusted Modelled NO<sub>2</sub> Concentrations**

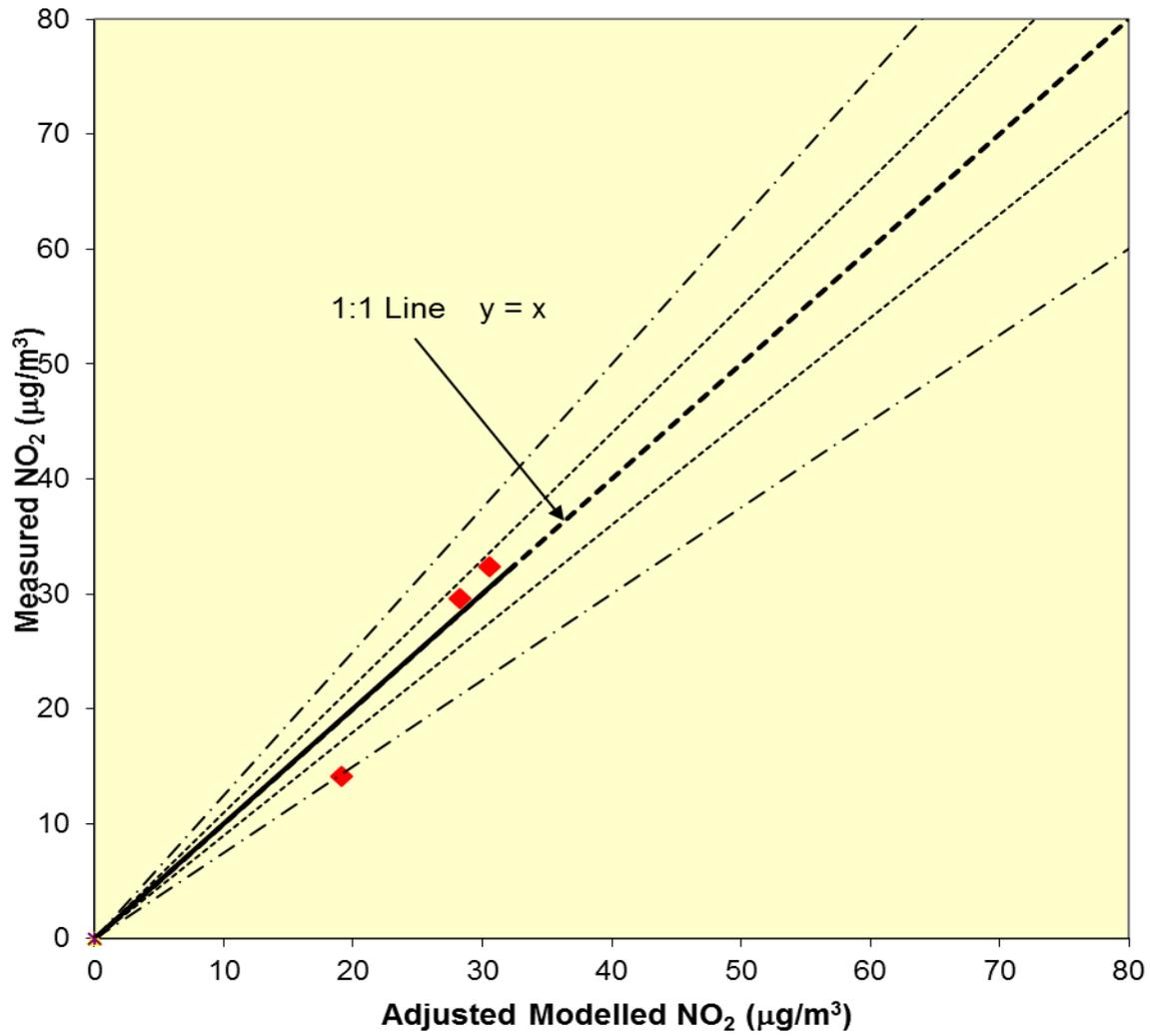
The following primary and secondary adjustment factors have been applied to all modelled nitrogen dioxide data:

Primary adjustment factor: 3.8167

Secondary adjustment factor: 0.9865

The results imply that overall, the model was under-predicting the road-NO<sub>x</sub> contribution. This is a common experience with this and most other models. The final NO<sub>2</sub> adjustment is minor.

**Figure C.3** compares final adjusted modelled total NO<sub>2</sub> at each of the monitoring sites, to measured total NO<sub>2</sub>, and shows the 1:1 relationship, as well as ±10% and ±25% of the 1:1 line.



**Figure C.3: Comparison of Measured NO<sub>2</sub> with Adjusted Modelled NO<sub>2</sub> Concentrations**

### PM<sub>10</sub>

No monitoring of PM<sub>10</sub> is carried out in proximity adjacent to the road network in proximity to the development site. The primary adjustment factor calculated for nitrogen dioxide concentrations has therefore been applied to the modelled road-PM<sub>10</sub> concentrations.

## Appendix 8.2 Traffic Data

Location	2015 Baseline		2021 Baseline		2021 With Development	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
B4030 - West of Banbury Road	3,405	4.2	3,505	4.2	3,508	4.2
A4260 Oxford Road	9,749	3.9	10,066	3.9	10,089	3.9
B4030 Station Road - South of Freehold Street	3,515	4.0	3,903	3.7	4,056	3.6
A4260 Banbury Road	10,072	4.0	10,598	3.9	10,728	3.9
Station Road - Between B4030 and Camp Road	1,750	5.5	2,096	4.7	2,250	4.4
Sormerton Road	1,646	5.3	1,755	5.2	1,777	5.1
Camp Road - West of Kirlington Road	1,984	6.4	2,398	5.5	2,574	5.1
Kirlington Road	358	0.6	388	0.6	398	0.6
Port Way	757	3.6	798	3.5	809	3.5
Camp Road - Between Kirlington Road and Consented Heyford Park Development Access	3,125	4.2	4,691	3.1	5,284	2.8
Camp Road - Between Consented Heyford Park Development Access and Chilgrove Drive	3,125	4.2	4,691	3.1	5,284	2.8
Chilgrove Drive	0	0.0	0	0.0	0	0.0
Minor Road - Between Chilgrove Drive and B430	2,280	5.6	4,565	3.3	5,449	2.8

Location	2015 Baseline		2021 Baseline		2021 With Development	
	AADT	%HDV	AADT	%HDV	AADT	%HDV
B430 - Between Minor Road and Roundabout	8,597	5.5	10,375	4.9	10,974	4.6
M40 Off and On-Slips	14,520	11.4	15,627	11.0	15,887	10.8
A43 - Road above the M40	19,234	10.0	20,616	9.6	20,956	9.5
B430 Ardley Road	6,193	4.2	7,070	3.9	7,355	3.7
B4030 Bicester Road	5,069	4.2	5,484	4.1	5,527	4.1
B430 Oxford Road	7,062	3.6	8,032	3.3	8,388	3.2
B4030 Heyford Road	4,873	3.7	5,358	3.5	5,473	3.4
Minor Road 2 - Between B4030 and Camp Road	2,169	3.2	2,614	3.0	2,729	2.8
B4030 Lower Heyford Road	2,794	4.1	2,873	4.1	2,873	4.1
B4030 - Between Station Road and Port Way	3,114	4.5	3,202	4.5	3,202	4.5

## Appendix 8.3      Figures

