

# A30 Chiverton to Carland Cross Environmental Statement

**Volume 6 Document Ref 6.4 ES Appendix 5.5  
Air quality-sites used for verification**

**HA551502-ARP-EAQ-SW-RP-LE-000006**

**C01 | A3**

**22/08/18**

Planning Act 2008  
Infrastructure Planning (Applications: Prescribed Forms and Procedure)  
Regulations 2009 (as amended)  
APFP Regulation 5(2)(a)



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**Document Control**

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**Arup Approvals**

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**Highways England Reviewers (Refer to Cover Sheet)**

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## 5 Appendix 5.5

### 5.5 Sites used for verification

- 5.5.1 Verification has been completed using 29 monitoring sites across the study area. Where appropriate the locations given by Cornwall Council and Highways England of diffusion tubes used in the verification process were updated following the site visit and location reviews.
- 5.5.2 Verification followed the methodology outlined in the Local Air Quality Management Technical Guidance (LAQM TG.16). The following method has been used:
- Comparison of the modelled Road NO<sub>x</sub> versus the monitored Road NO<sub>x</sub>. Road NO<sub>x</sub> measured at the diffusion tube monitoring sites was calculated using the latest Defra NO<sub>x</sub> to NO<sub>2</sub> calculator<sup>1</sup>, available on the LAQM website;
  - A verification factor was calculated based on regression, which was applied to the modelled Road NO<sub>x</sub> concentrations; and
  - The adjusted modelled Road NO<sub>x</sub> contribution was then used to calculate the Road NO<sub>2</sub> component using the Defra NO<sub>x</sub> to NO<sub>2</sub> calculator<sup>1</sup>.
- 5.5.3 The air quality monitoring data collected as part of this assessment was reviewed to determine the suitability of each of the monitoring locations for inclusion in the model verification process. The criteria used to determine the suitability of the monitoring data for inclusion into the verification process is outlined below:
- Monitoring location was required to be within 200m of a road within the study area;
  - Monitoring data in 2016 was required to be ≥75% complete;
  - Monitoring data influenced by major road emissions sources which were missing from the traffic model, and hence could not be included in the dispersion model was excluded; and
  - Monitoring data from sites where the exact location could not be accurately identified or validated was excluded.
- 5.5.4 26 monitoring sites were not used in the verification process, and the reasons are detailed Table 5-1.
- 5.5.5 Table 5-2 provides the verification details and graphs showing the model performance are provided in Figure 5-1 to Figure 5-4.

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<sup>1</sup> Defra, "Defra LAQM website NO<sub>x</sub> to NO<sub>2</sub>," 2017. [Online]. Available: <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html#NOxNO2calc>. [Accessed November 2017]

**Table 5-1 Monitoring sites removed from the verification process**

Site ID	Location	Reason
GRA7	Grampound	Location could not be determined.
NQY8	Newquay	Location could not be determined.
NQY9	Newquay	Location could not be determined.
TRU2	Truro	Set back from road.
TRU3	Truro	Set back from road.
TRU12	Truro	No modelled roads adjacent to monitor
TRU13	Truro	At kerbside.
TRU16	Truro	Location could not be determined.
TRU26	Truro	Location could not be determined.
TRU27	Truro	At kerbside.
TRU28	Truro	At kerbside.
TRU32	Truro	No data available.
TRU42	Truro	No data available.
TRU45	Truro	Location could not be determined.
TRU46	Truro	Location could not be determined.
TRU47	Truro	No modelled roads adjacent to monitor. Monitor is not on ARN.
7	Zelah	Location could not be determined.
8	B3284	Location could not be determined. Monitoring location 3 is close by and provides data for that section of road as an alternative.
9	Carland Cross - Petrol Station	The location is adjacent to a service station, the model does not take into account emissions from the service area.
10	Newlynn Downs	Ecological transect. Not suitable for verification.
11	Newlynn Downs	Ecological transect. Not suitable for verification.
12	Newlynn Downs	Ecological transect. Not suitable for verification.
13	Newlynn Downs	Ecological transect. Not suitable for verification.
14	Carrick Heath	Ecological transect. Not suitable for verification.
15	Carrick Heath	Ecological transect. Not suitable for verification.
16	Carrick Heath	Ecological transect. Not suitable for verification.

Table 5-2 Model performance

A30		Truro		Grampound		Chacewater	
Adjustment factor –	2.25	Adjustment factor –	3.59	Adjustment factor –	4.05	Adjustment factor –	4.91
Within +10%	2	Within +10%	2	Within +10%	0	Within +10%	1
Within -10%	2	Within -10%	2	Within -10%	1	Within -10%	2
Within +-10%	4	Within +-10%	4	Within +-10%	1	Within +-10%	3
Within +10 to 25%	0	Within +10 to 25%	3	Within +10 to 25%	1	Within +10 to 25%	0
Within -10 to 25%	2	Within -10 to 25%	6	Within -10 to 25%	1	Within -10 to 25%	1
Within +-10 to 25%	2	Within +-10 to 25%	9	Within +-10 to 25%	2	Within +-10 to 25%	1
Over +25%	0	Over +25%	0	Over +25%	1	Over +25%	1
Under -25%	0	Under -25%	0	Under -25%	0	Under -25%	0
Greater +-25%	0	Greater +-25%	0	Greater +-25%	1	Greater +-25%	1
Within +-25%	6	Within +-25%	13	Within +-25%	3	Within +-25%	4
Total	6	Total	13	Total	3	Total	4
<b>Uncertainties Assessment</b>		<b>Uncertainties Assessment</b>		<b>Uncertainties Assessment</b>		<b>Uncertainties Assessment</b>	
Correlation	0.86	Correlation	0.90	Correlation	0.99	Correlation	0.55
RMSE ( $\mu\text{g}/\text{m}^3$ )	9.87	RMSE ( $\mu\text{g}/\text{m}^3$ )	15.28	RMSE ( $\mu\text{g}/\text{m}^3$ )	27.21	RMSE ( $\mu\text{g}/\text{m}^3$ )	15.21
Fractional bias	0.08	Fractional bias	0.04	Fractional bias	-0.01	Fractional bias	0.00

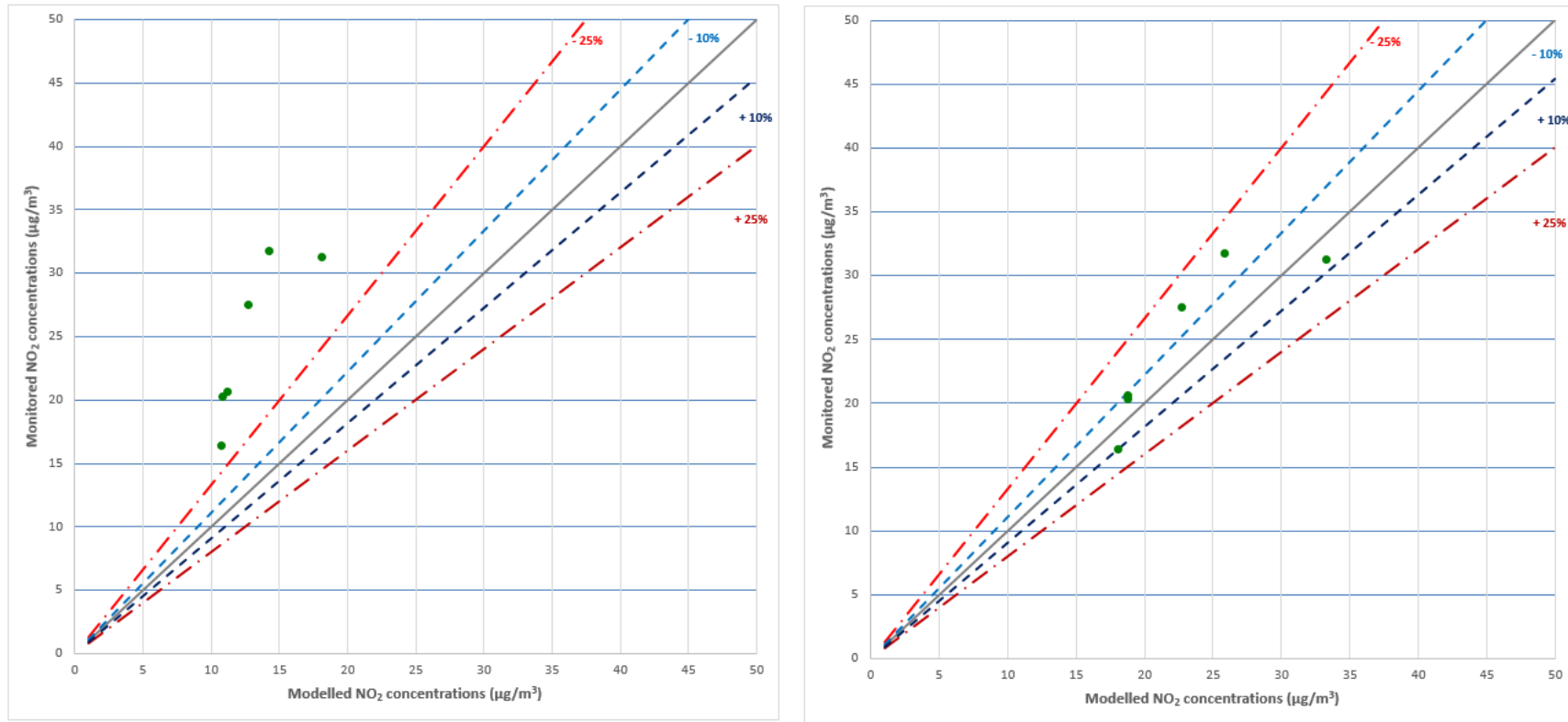


Figure 5-1 A30 model performance



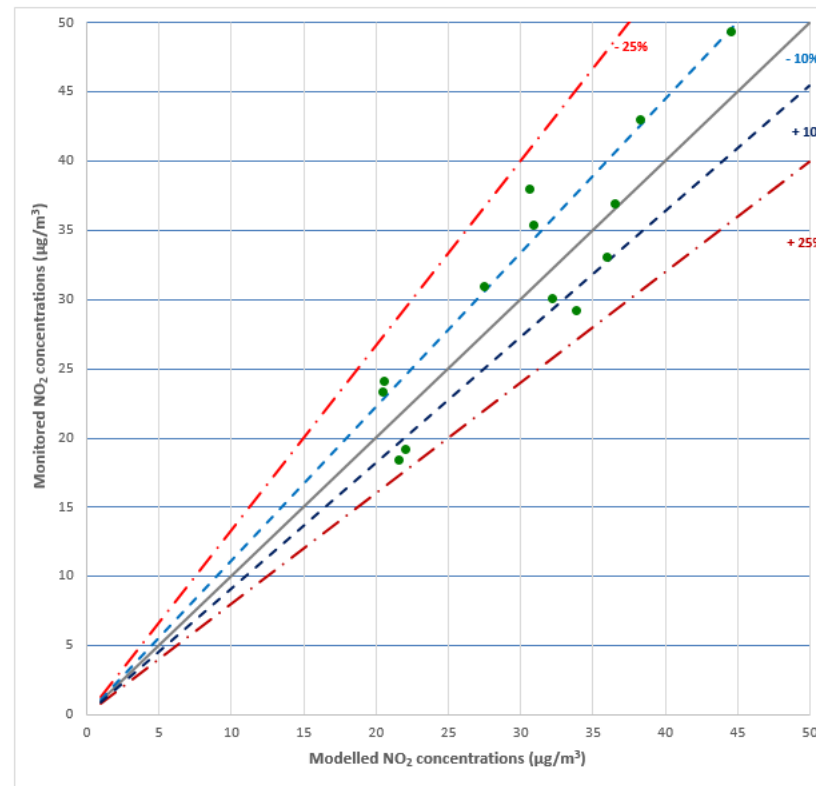
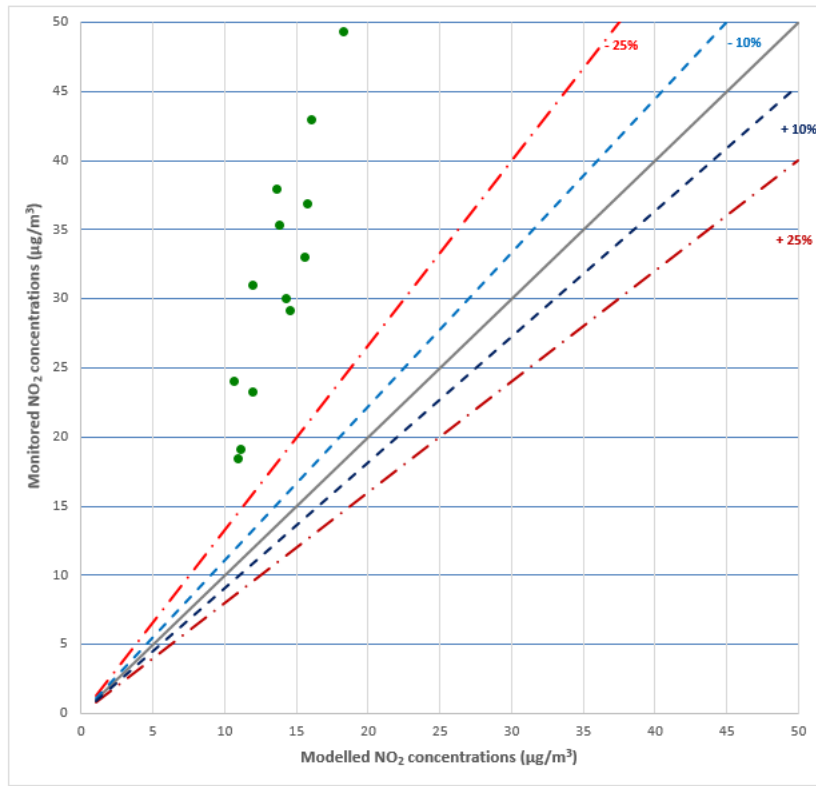


Figure 5-2 Truro model performance

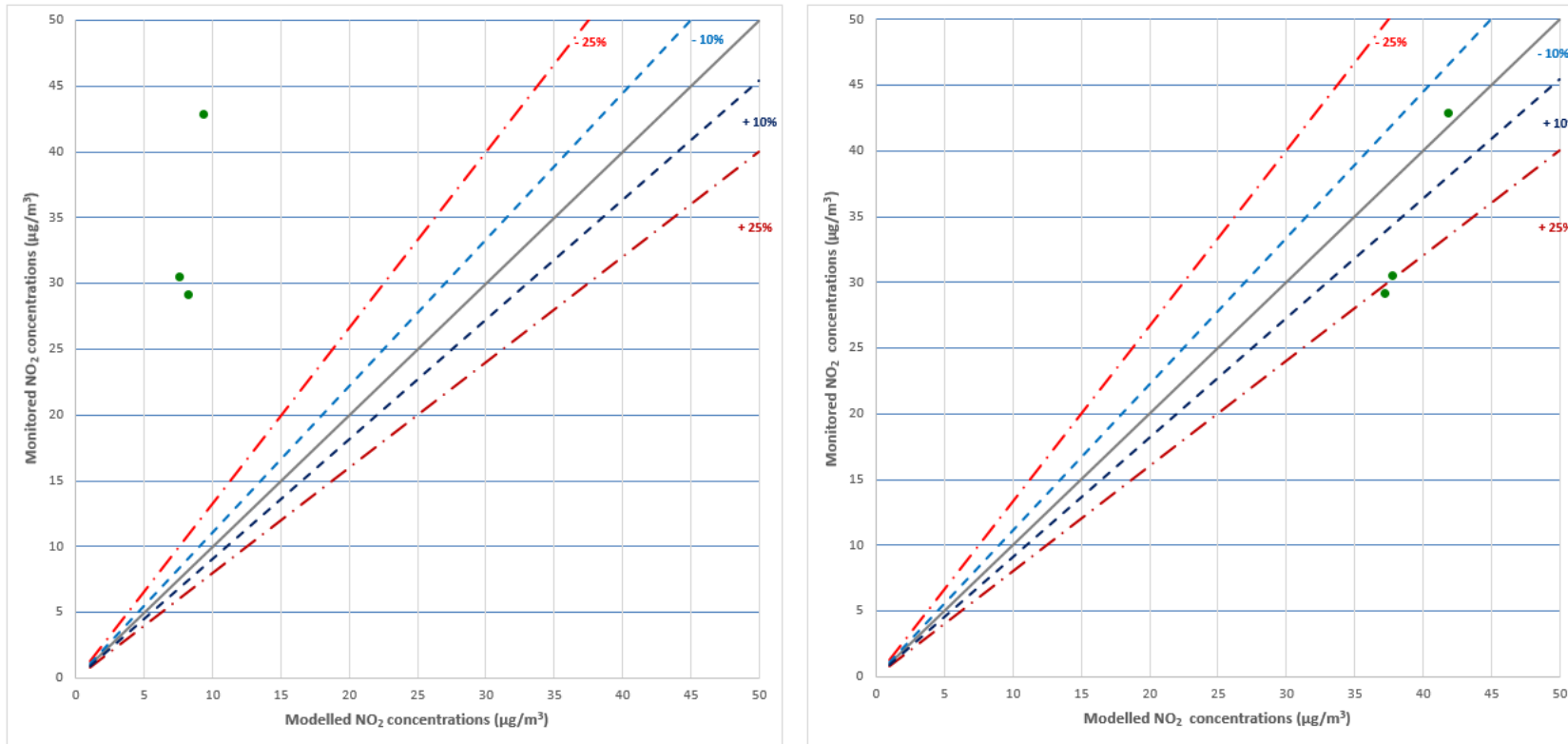


Figure 5-3 Grampound model performance

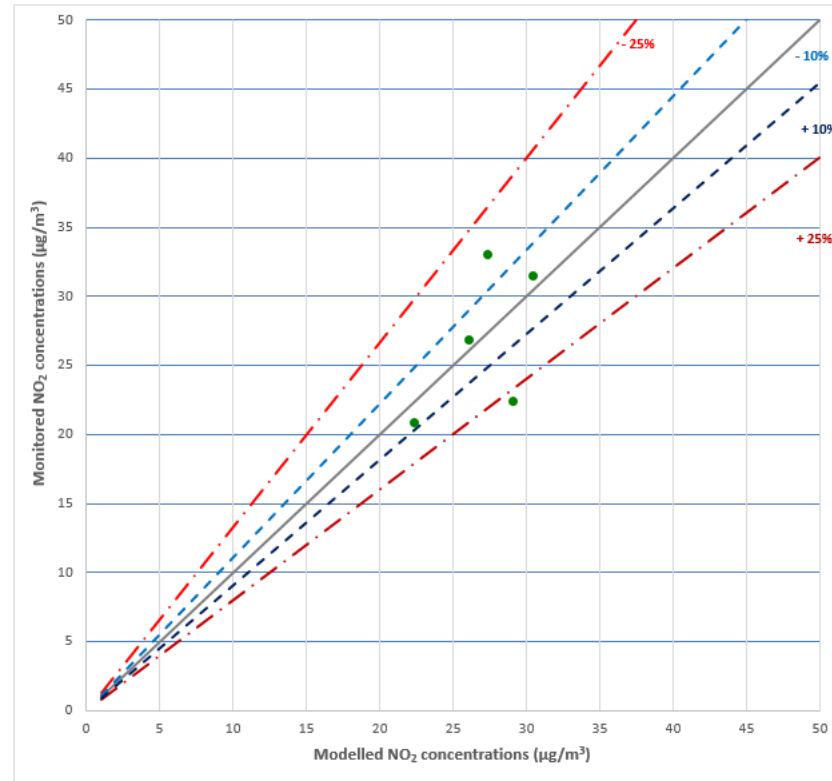
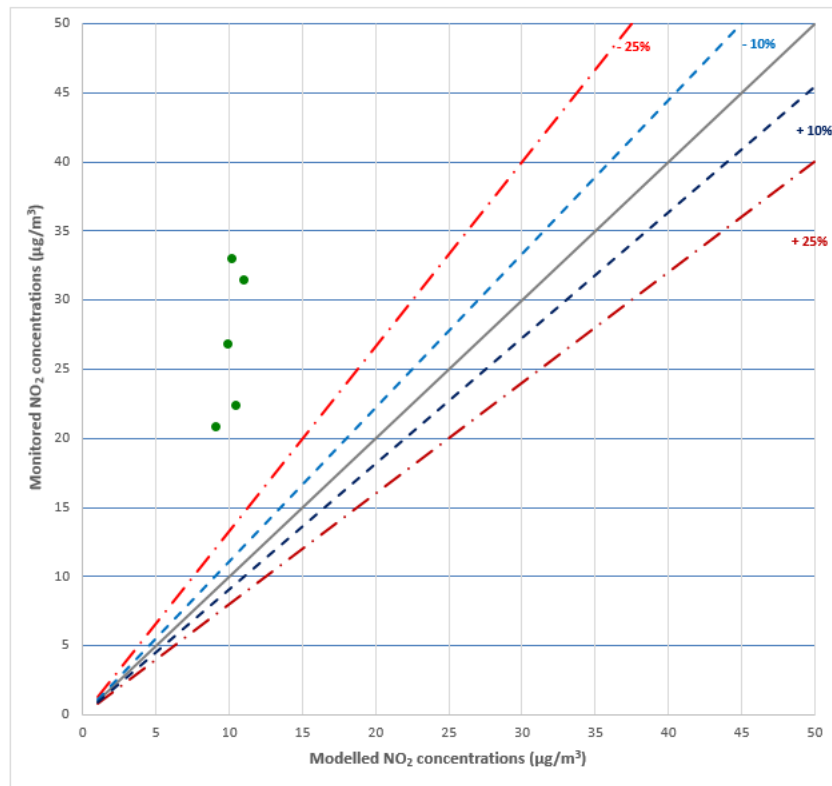


Figure 5-4 Chacewater model performance

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