

# THIRD WAVE LOCAL AUTHORITIES – TARGETED FEASIBILITY STUDY TO DELIVER NITROGEN DIOXIDE CONCENTRATION COMPLIANCE IN THE SHORTEST POSSIBLE TIME (2019)

Local authorities covered	Kirklees Council
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## Part 1: Understanding the problem

*This section should set out background on the information about the road links projected to have exceedances in the PCM national model, in combination with source apportionment data, to provide a description of the severity of the NO<sub>2</sub> exceedance and its possible sources and causes. It should set out the scale of the problem and the case for change. Maps and local data should be included. **Each road link should be addressed in turn.***

Figure 1a is a map of the only road link (census ID: **56486**) projected to have an exceedance within Kirklees and this road link is on our Northern boundary with Leeds. In 2018, Kirklees Council provided response to projected exceedance at census ID: **74811**, of which **56486** is a continuation.

The link starts at one end of a dumbbell roundabout system, with the primary function to manage traffic navigating between the M62, M621, & A62 road system and continues along the A62 (Gelder Road) through to the junction with the A643 (Leeds Road) in Birstall.

On 25 April 2018 we confirmed the control of the dumbbell roundabout at the north end of the link is the responsibility of Highways England and the plan is for the arrangement to continue is such. Figure 1b illustrates maintenance boundaries of the road links at this location. It is important to note that due to the strategic nature of this area of the highway network Highways England are in control of the UTC at this junction and along the whole road link. The roundabout forms a vital strategic road link connection for parts of Leeds, Bradford and North Kirklees to the M62 and M621.

The remaining link is within the control of Kirklees Council and is a primary access route to Leeds / Bradford and to the M62 / M621.

The results from the 2015 PCM model which used 2008 traffic count data showed that the road link was projected to have the follow annual mean NO<sub>2</sub> concentrations:

- 36 µg/m<sup>3</sup> in 2018;
- 34 µg/m<sup>3</sup> in 2019;
- 33 µg/m<sup>3</sup> in 2020;
- 31 µg/m<sup>3</sup> in 2021.

The results from the 2017 PCM model which used 2016 traffic count data now shows that the road link is projected to have the follow annual mean NO<sub>2</sub> concentrations:

- 43 µg/m<sup>3</sup> in 2019;
- 40 µg/m<sup>3</sup> in 2020;
- 38 µg/m<sup>3</sup> in 2021.

This increase in concentration between the 2015 and 2017 PCM modelling is due to a new manual count of traffic flow on the link carried out in 2016. The previous traffic count which fed into the 2015 projections was carried out in 2008. The new count records far higher traffic flows. The traffic count records the number of vehicles (daily flow) and breakdown by vehicle type. The age of these vehicles (Euro standard) is applied using a national figure across all roads link (so not obtained from the traffic count). The 2017 PCM projections suggest that this link will be compliant in 2020 at 40.49 µg/m<sup>3</sup>.

This feasibility study aims to identify measures which could reduce the concentration of NO<sub>2</sub> on this road link as quickly as possible with the objective of bringing forward compliance in the shortest possible time. This objective could be achieved by reducing the projected NO<sub>2</sub> concentration in 2019 by at least 3 µg/m<sup>3</sup>; if this is not achievable then compliance occurs in 2020.

Kirklees Council currently undertake monitoring at 1 location within this link, which is compliant with Ambient Air Quality Directive requirements (see Local Air Quality Monitoring Checklist in Annex A). The passive monitoring location is on lamp post 276 on Gelderd Road, 1.62m from the carriageway and more than 25m from the nearest major junction (See figures 1.c & 1d). Monitoring at this location began in May 2018 and the diffusion tube is exposed for periods in accordance with national monitoring program.

The tubes are produced and analysed by West Yorkshire Analytical Services (50% TEA in Acetone), which is a lab that participates in the AIR PT quality assurance scheme and provides co-location data to National Diffusion Tube Bias Adjustment Spreadsheet.

In 2018 data was collected for 6 months (75% collection for monitoring period), which is 50% collection for the year. As such annualisation was conducted in accordance with National LAQM Guidance (TG16) using 3 nearby AURN monitoring stations (Leeds Centre, Bradford Mayo & Barnsley Gawber) to derive the annualisation corrections factor (see Table 1.b).

The data in Table 1.a was corrected with the annualisation factor and has also been corrected with the recommended Bias Adjustment factor from the September 2018 & March 2019 National Diffusion Tube Bias Adjustment Spreadsheet.

It is evident from the data corrected with a March 2019 Bias factor contained within Table 1.a that the observed concentration is in line with the modelled concentration from the 2015 PCM.

As such, Kirklees Council are satisfied that the monitoring location meets all the requirements outlined in national guidance and also demonstrates compliance with legal limits for NO<sub>2</sub> along this link in 2018.

*Table 1.a Corrected diffusion tube results*

	Yearly Collection	Period Collection	Annual Mean	Bias Factor	Bias Adjusted	Annualisation Factor	Annualised Data
<i>Sept 2018 Bias Adjustment Factor</i>							
Tube 81	50%	75%	40.5	0.77	31.185	1.13	35.23905
<i>March 2019 Bias Adjustment Factor</i>							
Tube 81	50%	75%	40.5	0.8	32.4	1.13	36.612

*Table 1.b Annualisation data*

Site	Site Type	Annual Mean ( $\mu\text{g}/\text{m}^3$ )	Period Mean ( $\mu\text{g}/\text{m}^3$ )	Ratio
Leeds Centre	Urban Centre	29.73	26.84	1.11
Bradford Mayo	Urban Centre	43.47	38.81	1.12
Barnsley Gawber	Urban Centre	15.59	13.44	1.16
			Average Ratio	1.13

Figure 1a: Road link Exceedance at Census ID: 56486

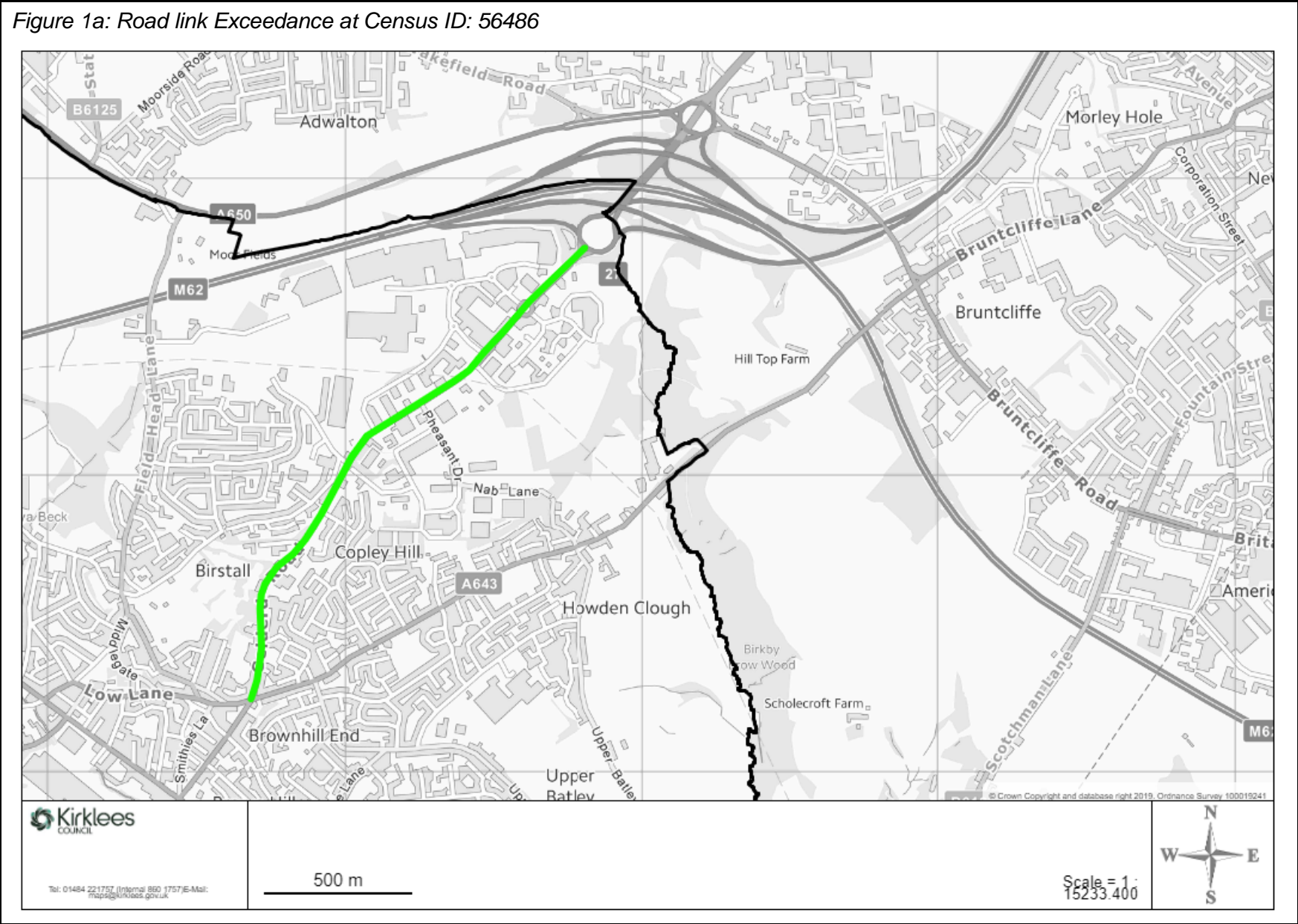


Figure 1b: Road link Control at Census ID: 74811





Figure 1.c Diffusion tube monitoring location

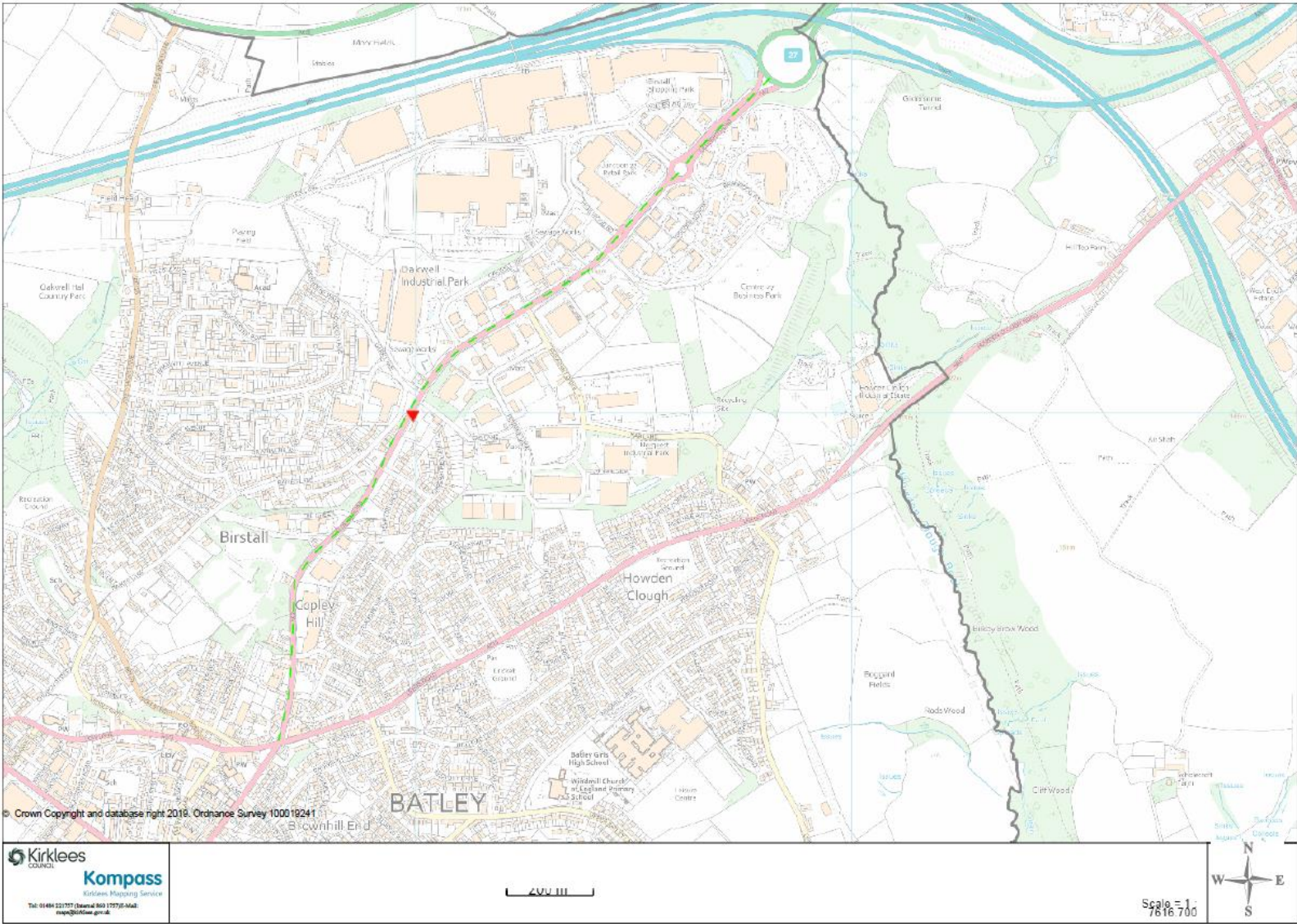


Figure 1.d Diffusion tube location images





## Annex A: Local Air Quality Monitoring Checklist AQ1

Kirklees version: 1.0 24 April 2019

*Third wave local authorities should enter details of any local NO<sub>2</sub> monitoring data on the relevant census IDs in the table below. A separate checklist should be completed for each monitoring site. **Local authorities submitting data from automatic chemiluminescence analysers should complete sections A and C; Local authorities submitting data from diffusion tubes should complete sections B and C.** Please see accompanying Guidance Note (below) for more information on completing this checklist. Responses should be provided in Column 1 below. Where monitoring is evident but does not conform to the requirement please highlight where deviations to the requirement arise by completing Column 2.*

		COLUMN 1	COLUMN 2
Ref	Requirement	Local authority description (please provide details for each Requirement and enter “NA” if not applicable)	Please highlight where the approach differs from the Requirements
<b>A</b>	<b><u>NO<sub>2</sub> measurements from roadside automatic chemiluminescence analysers</u></b>	NA	
<b>A 1</b>	<b>Date and location details</b>	NA	
A.1.1	Please provide the year(s) and/or month(s) in which the data was collected		
A.1.2	What are the location coordinates (easting, northing) of the monitoring station?		
A.1.3	Please provide the corresponding Census ID (if known) and road name/number on which the site is located		



<b>A.2</b>	<b>Roadside automatic chemiluminescence analyser data quality - LAQM TG16 criteria</b>	NA	
A.2.1	Please provide the following details on the analyser used: <ul style="list-style-type: none"> <li>• Name/Code name</li> <li>• Is it part of any network e.g. AURN?<sup>1</sup></li> <li>• Manufacturer</li> <li>• Model number</li> <li>• Year of manufacture</li> <li>• Serial number</li> </ul>		
A.2.2	Does the monitored data quality meet with the <a href="#">LAQM TG16</a> minimum requirements? <ul style="list-style-type: none"> <li>• Has the local authority attended the monitoring station at least every 2 or 4 weeks (depending on whether the location is experiencing high NO<sub>2</sub> concentrations or not, respectively) to change the filter and check the calibration of the instrument?</li> <li>• Is the instrument checked and maintained by an independent organisation accredited to perform a QA/QC audit to ISO 17025, every 6 months?</li> <li>• Has the instrument been serviced by the manufacturer or an approved service unit, every 6 months (within 3 weeks of the QA/QC audit)?</li> </ul>	NA	
A.2.3	Details of data capture <ul style="list-style-type: none"> <li>• Does it have the minimum data capture of 75% for the year?</li> <li>• If not, was the monitoring data completed for at least 3 months? If so, has the data been annualised?</li> </ul>	NA	

<sup>1</sup> If the site is part of the AURN the local authority should contact JAQU, as it may not be necessary to complete the monitoring checklist.

<b>A2.4</b>	<b>Summary of the data</b>  Please set out the annual mean NO <sub>2</sub> concentrations recorded for each year. If you have data for <i>less than 12 months</i> please provide the monthly mean NO <sub>2</sub> concentrations and the annualised mean NO <sub>2</sub> concentrations:	NA	
	2015		
	2016		
	2017		
	2018		
	<b>Please also complete to siting requirements in part C of this table.</b>		
<b>B</b>	<b><u>NO<sub>2</sub> measurements from roadside diffusion tubes</u></b>		
<b>B.1</b>	<b>Date and location details</b>		
B.1.1	Please provide the year(s) and/or month(s) in which the data was collected	Study period was as follows:  <b>Tube Site 81</b>	

		50% Year 75% Period 2018 May, Jun, Aug, Sept, Oct, Dec	
B.1.2	What are the location coordinates (easting, northing) of the diffusion tube?	<b>Tube Site 81</b> 422992 : 426991	
B.1.3	Please provide the corresponding Census ID (if known) and road name/number on which the site is located	<b>Tube Site 81</b> Gelderd Road A62	
<b>B.2</b>	<b>Roadside diffusion tube data quality - LAQM TG16<sup>2</sup> criteria</b>		
B.2.1	Does the monitored data quality meet with the <a href="#">LAQM TG16</a> minimum requirements?		
	<ul style="list-style-type: none"> <li>Was a local collocation study conducted to validate the diffusion tube data? If so give details of the collocation study including site of the chemiluminescent analyser and the number of tubes at the site forming the collocation study (i.e. triplicate or single tubes). Does the collocation study meet the requirement for the tube and chemiluminescent analyser to sample the same air mass by being within 1 metre distance to each other?</li> </ul>	No – Bias was derived from national database  March 2019 Update	

<sup>2</sup> Local Air Quality Management (LAQM) Technical Guidance 2016 (TG16) can be found at <https://laqm.defra.gov.uk/technical-guidance/>



	<ul style="list-style-type: none"> <li>If a local collocation study has not been undertaken was a national bias adjustment factor applied to the data?</li> </ul>	Yes – West Yorkshire Analytical Services Nation Bias Adjustment Figure	
	<ul style="list-style-type: none"> <li>What bias adjustment factor has been applied to the diffusion tube data? (Please state for each year if reporting multiple years).</li> </ul>	0.80	
	<ul style="list-style-type: none"> <li>What Laboratory was used to analyse the diffusion tubes?</li> </ul>	West Yorkshire Analytical Services	
	<ul style="list-style-type: none"> <li>What preparation method has been used for the diffusion tube (e.g. 20% Triethanolamine in water)?</li> </ul>	50% Triethanolamine in Acetone	
	<ul style="list-style-type: none"> <li>Does the Laboratory participate in the UK-PT scheme, inter-comparison exercises or provision of quality control solutions?<sup>3</sup></li> </ul>	Yes	
B.2.2	Details of data capture		
	<ul style="list-style-type: none"> <li>Was the monitoring data completed for at least 75% of the year (9 months)?</li> </ul>	No	
	<ul style="list-style-type: none"> <li>If not, was the monitoring data completed for at least 3 months? If so, has the data been annualised?</li> </ul>	Yes using the following AURN Sites:  Leeds Centre  Bradford Mayo Lane  Barnsley Gawber	
	<ul style="list-style-type: none"> <li>Have the diffusion tubes been changed on a monthly basis in accordance with the Diffusion Tube Calendar?</li> </ul>	Yes	

<sup>3</sup> More information participating laboratories can be found at <https://laqm.defra.gov.uk/diffusion-tubes/qa-qc-framework.html>

<b>B2.3</b>	<b>Summary of the data</b>  Please set out the annual mean NO <sub>2</sub> concentrations recorded for each year. If you have data for <i>less than 9 months</i> please provide the monthly mean NO <sub>2</sub> concentrations and the annualised mean NO <sub>2</sub> concentrations:		
	2015	NA	
	2016	NA	
	2017	NA	
	2018	<b>Tube 81</b>  36.61  (Bias and Annualise adjusted)	

	<b>Please also complete to siting requirements in part C of this table.</b>		
<b>C</b>	<b><u>Roadside Measurements Siting Criteria – must be completed for both automatic and diffusion tube NO<sub>2</sub> measurements</u></b>		
<b>C.1</b>	<b>Does the monitoring site comply with the macroscale siting requirements set out in Annex III of the AAQD<sup>4</sup>?</b>		
	<ul style="list-style-type: none"> <li>Is the air sampled representative of air quality for a street segment no less than 100 m length?</li> </ul>	Yes	
<b>C.2</b>	<b>Does the monitoring site comply with the microscale siting requirements set out in Annex III of the AAQD?</b>		
	<ul style="list-style-type: none"> <li>Is it at least 25 m from the edge of major junctions?</li> </ul>	Yes - Sites 81 is sited >25m from Major Junctions	
	<ul style="list-style-type: none"> <li>Is it no more than 10 m from the kerbside?</li> </ul>	Yes	
	<ul style="list-style-type: none"> <li>Is the inlet of the sampling station between 1.5 m and 4 m above the ground?</li> </ul>	Yes	
	<ul style="list-style-type: none"> <li>Is the flow around the inlet unrestricted without any obstructions affecting the airflow (e.g. buildings, balconies, trees)?</li> </ul>	Yes	
	<ul style="list-style-type: none"> <li>Is the inlet at least 0.5 m from the nearest building?</li> </ul>	Yes	

<sup>4</sup> The Ambient Air Quality Directive (2008) can be found at <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:02008L0050-20150918>



