Locality Report for the former Borough of Harrogate

2023 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995 Local Air Quality Management, as amended by the Environment Act 2021

Date: June 2023

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Executive summary: Air Quality in our area

Air quality in North Yorkshire (Harrogate area)

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas[1,2].

The mortality burden of air pollution within the UK is equivalent to 29,000 to 43,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

From the 1 April 2023 Harrogate Borough Council along with all District/Borough Councils in North Yorkshire and North Yorkshire County Council ceased to exist, and were replaced by a new unitary authority, North Yorkshire Council. Although this report is produced by North Yorkshire Council, it reviews data and information retrospectively collated in the final year of Harrogate Borough Council, and it is this former authority that will be referenced throughout this document. A separate Annual Status Report has therefore been produced for each former Borough/District council locality for clarity, although it is expected that only one report will be produced from next year onwards to reflect the unitary status now in place.

Harrogate Borough Council declared four Air Quality Management Areas (AQMA's) for breaches of the annual mean objective for nitrogen dioxide (NO_2) These were declared at Bond End, Knaresborough and Low and High Skellgate, Ripon in 2010, and York Place, Knaresborough and Wetherby Road, Harrogate in 2017. Monitoring at Knaresborough Bus Station (H30) has been carried out for four years, until this year concentrations have been

[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, January 2023

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

increasing year on year. However due to multiple thefts of the diffusion tube the 2022 monitoring has been annualised, which has led to a lower result than in the previous three years.

In 2022 there were no exceedances of the annual mean objective across the former Harrogate district and the majority of concentrations have decreased from the 2021 monitoring. We propose to revoke two AQMA's at York Place, Knaresborough and Low/High Skellgate, Ripon.

There are no other pollutants of concern across the former district.

We work with colleagues across North Yorkshire Council (NYC) and will continue to do so.

Actions to improve air quality

Whilst air quality has improved significantly in recent decades, there are some areas where local action is needed to protect people and the environment from the effects of air pollution.

The Environmental Improvement Plan[5] sets out actions that will drive continued improvements to air quality and to meet the new national interim and long-term $PM_{2.5}$ targets. The National Air Quality Strategy, due to be published in 2023, will provide more information on local authorities' responsibilities to work towards these new targets and reduce $PM_{2.5}$ in their areas. The Road to Zero[6] details the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

In 2022, Harrogate Borough Council (HBC) carried out education projects with local Primary Schools, in the form of air quality and sustainable theatre productions. Low cost sensors have continued to be trialled, the units were bought as part of a Defra air quality grant.

[5] Defra. Environmental Improvement Plan 2023, January 2023

[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Conclusions and Priorities

In the monitoring year of 2022 there were no exceedances of the annual mean objective for NO_2. Concentrations have decreased at the majority of locations across the Harrogate area, when compared to 2021 monitoring. There are four AQMA's in the area, it is intended to revoke The Ripon AQMA (No1) and The Knaresborough AQMA (No2) due to compliance with the objectives for over 5 years.

The air quality action plan is due to be revised this year.

Local Engagement and How to get Involved

Residents, businesses and other interested parties are encouraged to participate in consultations relating to air quality and further information can be obtained from the air quality pages of North Yorkshire Council's main website at:
Air quality | North Yorkshire Council

Information about how the public can help to improve local air quality is available at:
Air quality in your area | North Yorkshire Council

If you have any queries on the Air Quality Management Areas or Air Quality Action Planning process, please contact us using the details below:

Email: environmental.protect.har@northyorks.gov.uk

Phone: 0300 131 2 131

Write to: Environmental Protection, Regulatory Services (Harrogate Area), PO Box 787, Harrogate, HG1 9RW

Local Responsibilities and Commitment

This ASR was prepared by the Environmental Protection team in North Yorkshire Council (Harrogate Area) with the support of officers from Economy, Environment and Housing.

This ASR has been approved by:

Callum McKeon, Assistant Director of Regulatory Services, Registration, Bereavement, Coroners Service

This ASR has not been signed off by a Director of Public Health.

If you have any comments on this ASR please send them to Harrogate Environmental Protection

Address: Environmental Protection, Regulatory Services (Harrogate Area), PO Box 787, Harrogate, HG1 9RW

Telephone: 0300 131 2 131

Email: environmentalprotect.har@northyorks.gov.uk

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1 Local Air Quality Management

This report provides an overview of air quality in the former Harrogate Borough Council area during 2022. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995), as amended by the Environment Act (2021), and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in order to achieve and maintain the objectives and the dates by which each measure will be carried out. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by local authorities to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to improve air quality

Air quality management areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 18 months. The AQAP should specify how air quality targets will be achieved and maintained and provide dates by which measures will be carried out.

A summary of AQMAs declared by Harrogate Borough Council (now part of NYC) can be found in Table 2.1. The table presents a description of the four AQMAs that are currently designated within NYC (Harrogate Area). Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMAs and also the air quality monitoring locations in relation to the AQMAs. The air quality objectives pertinent to the current AQMA designations are as follows:

- NO_2 annual mean

We propose to revoke The Ripon AQMA No 1 and The Knaresborough AQMA No 2 (see monitoring section for further information).

Table 2.1 – Declared Air Quality Management Areas

AQMA name	Date of declaration	Pollutants and air quality objectives	One line description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of exceedance: declaration	Level of exceedance: current year	Number of years compliant with air quality objective	Name and date of AQAP publication	Web link to AQAP
The Knaresborough AQMA No 1	Declared 26/11/2010	NO2 Annual Mean	The Royal Oak, 1-23 Bond End and 104-138 High Street, Knaresborough	NO	53.6	38.4	3 years	HBC Air Quality Action Plan 2018	Air quality in the Harrogate area | North Yorkshire Council
The Ripon AQMA No 1	Declared 26/11/2010	NO2 Annual Mean	1-6 & 29-36 Low Skellgate, 8A Heaths Court, all properties High Skellgate, and 1-4 & 28-34 Westgate, Ripon	NO	50.6	32.4	6 years	HBC Air Quality Action Plan 2018	Air quality in the Harrogate area | North Yorkshire Council
The Harrogate AQMA No 1	Declared 4/10/2017	NO2 Annual Mean	The Flat above 110 Wetherby Road	NO	46.4	31.8	4 years	HBC Air Quality Action Plan 2018	Air quality in the Harrogate area | North Yorkshire Council

The Knaresborough AQMA No 2	Declared 4/10/2017	NO2 Annual Mean	2-26 York Place, 1-6 Casson Place and 1-6 Tannery Court, Knaresborough	NO	41.2	29.7	6 years	HBC Air Quality Action Plan 2018	Air quality in the Harrogate area | North Yorkshire Council

☒ **North Yorkshire Council (Harrogate Area) confirm the information on UK-Air regarding their AQMA(s) is up to date.**

☒ **North Yorkshire Council (Harrogate Area) confirm that all current AQAPs have been submitted to Defra**

Progress and Impact of Measures to address Air Quality in North Yorkshire (Harrogate Area)

Defra's appraisal of last year's ASR concluded:

The report is well structured, detailed and provides the information specified in the guidance. Defra's comments included:

- **Robust and accurate QA/QC procedures were applied. Calculations for bias adjustment, annualisation and distance-correction factors were outlined in detail. However, although implicit that the national bias adjustment factor was used (with no co-locations allowing for determination of a local factor), it would be useful to provide an explicit justification in future ASRs.**

  This has been included in this year's report.

- **The council states that there are two additional non-automatic monitoring sites in 2021. However, on consultation of the tables in this year's ASR, and last year's ASR, it appears that there is only one additional site. It is recommended that the Council provide more information about the additional site(s) in future ASR's for clarification (for example, the location of the sites(s) and IDs).**

  Information on the new monitoring locations has been provided in section 3.1.3, this consists of location of the sites and site IDs. For completeness the same information has also been provided for those locations where monitoring has been withdrawn.

The former Harrogate Borough Council NYC took forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality. Details of all measures completed, in progress or planned are set out in Table 2.2. Ten measures are included within Table 2.2, with the type of measure and the progress made during the reporting year of 2022 presented. Where there have been, or continue to be, barriers restricting the implementation of the measure, these are also presented within Table 2.2.

More detail on these measures can be found in the Harrogate Borough Council Air Quality Action Plan 2018.

Key completed measures are:

- HBC Ultra-low emissions strategy – work is now ongoing on the implementation of the recommendations from the strategy.
- Bond End junction improvement – concentrations within the AQMA have decreased at all locations, with no locations breaching the objectives.
- Air Quality Guidance for Developers.

NYC's (Harrogate Area) priorities for the coming year are to work with other areas in the newly formed North Yorkshire Council to produce a new Air Quality Action Plan, and to revoke two of the four AQMA's at Low and High Skellgate, Ripon and York Place, Knaresborough.

The principal challenges and barriers to implementation that NYC (Harrogate Area) anticipates facing are a lack of funding for the implementation of measures within air quality action plans, and the cumulative impact of large developments.

Compliance with the objectives has been achieved in all four AQMA's.

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
1	HBC Ultra-Low Emission Vehicles Strategy	Policy Guidance and Development Control	Low Emissions Strategy	2018	2024	Local Authority Environmental Health, Local Authority Transport Dept.	Internally funded Phase 1 funding identified, application also going to the Office for Zero Emission Vehicles	NO	Partially Funded		Implementation		Increase in registered ULEV's across the district to 10,000 by 2023, target of 50% of proposed charge point infrastructure being used at least once a day.	Strategy completed and approved, now implementing contents of report. Electric Pool car purchased for HBC. Work on implementing electric vehicle technology in the HBC fleet, identifying locations for charging points, drawing up a draft specification for charging points and liaising with Northern Powergrid on local capacity. Procurement process starting summer 2021. Car club cars introduced in the district in June 2020. Use of EVCP at HBC Civic Centre increasing year on year. Over 13000 ULEV's registered by the end of Quarter 3, 2021	Lengthy Timescale
2	Bond End junction Improvement	Traffic Management	Other	2018	2018	HBC and NYCC	National Productivity Investment Fund	NO	Funded		Completed	5 -10 µg/m3	Engineering works completed	Scheme Completed	
3	Investigation into an Engineering Solution for Ripon	Traffic Management	Other	2018	2023	HBC and NYCC	Developer	NO	Funded		Completed	Reduced vehicle emissions	Completion of investigation	Junction scheme approved as part of large housing development	
4	Traffic Light Optimisation	Traffic Management	UTC, Congestion management, traffic reduction	2018	2023	HBC and NYCC	HBC and NYCC	NO	Not Funded					None	
5	Air Quality Campaigns and Education	Public Information	Other	2018	2023	HBC & NYCC	HBC /NYCC	NO	Partially Funded		Implementation		Number of campaigns	Company engaged to provide air quality education in the form of theatre to between 18 and 20 schools in Knaresborough, Harrogate, and Ripon - performances undertaken during two weeks in January 2022. A further week of performances took place in July 2022.	
6	Air Quality Guidance for Developers	Policy Guidance and Development Control	Air Quality Planning and Policy Guidance	2018	2021	HBC	HBC	NO	Not Funded		Completed		Number of developments providing AQ assessments	Local Plan Policy being used, common principles document for Yorkshire area agreed. Air Quality SPD went out for consultation at the end of 2020. The air quality SPD was adopted in June 2021. AQ assessment submitted referencing SPD	

Measure No.	Measure	Category	Classification	Year Measure Introduced in AQAP	Estimated / Actual Completion Date	Organisations Involved	Funding Source	Defra AQ Grant Funding	Funding Status	Estimated Cost of Measure	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
7	Improving Cycle Routes and Facilities	Transport Planning and Infrastructure	Cycle network	2018		HBC NYCC	HBC NYCC	NO	Not Funded		Implementation			Cycle route between Bilton and Starbeck resurfaced. Follifoot underpass resurfaced. Phase one of the Otley Road cycle route completed January 2022.	
8	Work with HGV. Bus and Taxi Providers to Improve the Quality of their fleet	Promoting Low Emission Transport	Other	2018	2023	HBC	HBC	NO	Not Funded				% reduction in number of diesel taxis in fleet. % improvement in emissions from HGV and buses	Electric buses operating in Harrogate. Electric and Hybrid Pool Cars now part of fleet.	
9	Work with HGV and Bus Providers to Consider Possible Alternative Routes	Transport Planning and Infrastructure	Other	2018	2023	HBC	HBC	NO	Not Funded			To be identified	% HGV reduction in AQMA's, new bus routes implemented	Environmental Services - new waste collection routes. New bus routes introduced in Ripon.	
10	Investigation into the Provision of "Safer Accessible Routes"	Promoting Travel Alternatives	Other	2018	2025	NYCC Public Health, Sustainable Transport, PROW. HBC Env Health, Countryside Ranger	Public Health Grant Funding, part time officer funded through the Yorkshire Dales Millennium Trust	NO	Funded				Increased usage levels on identified route	Communication company engaged, insight work with local secondary schools commenced. Off road route resurfaced. Part time officer has started in the role.	Delays with carrying out school engagement work, was delayed by Covid-19.

$PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG22 (Chapter 8), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

NYC (Harrogate Area) is taking the following measures to address $PM_{2.5}$:

In line with the Policy Guidance (PG22) HBC opted to identify measures already in place within the existing Harrogate Air Quality Action Plan that will help with reducing levels of $PM_{2.5}$. We consider that all of the measures within the current action plan will have a positive effect on $PM_{2.5}$ concentrations. HBC worked with a number of parties on the actions within the action plan, including Transport Planners, Public Health and Sustainable Transport officers. HBC have been working on education projects, any reductions in car use will reduce particulate concentrations.

The new NYC website provides residents with information on stoves, open fires and seasoned wood, as these have been identified as an increasing source of $PM_{2.5}$ across the country. The former Harrogate district has smoke control areas in Harrogate and Tockwith village, but not in Knaresborough or Ripon.

Continuous $PM_{2.5}$ monitoring that has been carried out by City of York Council and Leeds City Council has shown annual averages for 2022 ranging from 8.22 to 10.33µg/m^3. Out of the four monitoring sites three are in the 8-9 µg/m^3 range. It would not be unrealistic to predict that concentrations would be a similar level in the former Harrogate district. The Defra background maps estimate 2022 background concentrations of $PM_{2.5}$ between 5.17 and 8.25µg/m^3.

The Public Health Outcomes Framework (PHOF), a department of Health data tool for England intended to focus public health action on increasing health life expectancy and reducing differences in life expectancy between communities, uses indicators to assess improvements. Due to the significant impact that poor air quality can have on health, the PHOF includes an indicator relating to $PM_{2.5}$. The indicator is PHOF indicator D01 Fraction of mortality attributable to particulate air pollution (new method).

Estimates of mortality in England (2021 data) range from 3.5% (Isles of Scilly) to 7.2% (City of London). In the Harrogate area of North Yorkshire, the indicator value is 4.14%, which is the fifth lowest in the Yorkshire and Humber region. The value for North Yorkshire is 4.1% and the value for the whole region is 5.0%.

Discussions are likely to take place with the other areas of North Yorkshire to agree the future countywide approach to reducing $PM_{2.5}$.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2022 by the former Harrogate Borough Council (now part of North Yorkshire Council) and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2018 and 2022 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

HBC did not undertake any automatic (continuous) monitoring.

NB. Local authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

3.1.2 Non-Automatic Monitoring Sites

HBC undertook non-automatic (for instance, passive) monitoring of NO_2 at 57 sites during 2022. Table A.1 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (for example, annualisation and/or distance correction), are included in Appendix C.

Individual Pollutants

The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 25%), and distance correction. Further details on adjustments are provided in Appendix C.

3.1.3 Nitrogen Dioxide (NO_2)

Table A.2 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (for instance, the values are exclusive of any consideration to fall-off with distance adjustment).

For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

The concentrations in The Knaresborough AQMA (No.1) (Bond End) remain below the objective for all monitoring locations. The highest level recorded was at H13 with a concentration of 38.4µg/m^3. Concentrations have increased at 3 locations from 2021 monitoring, however all of these results were lower than 2019 concentrations (the last year before the introduction of Covid restrictions). There are no plans to alter the boundary of the AQMA.

The concentration at all monitoring locations within The Knaresborough AQMA (No.2) (York Place) remain less than 75% of the objective. The concentration has increased at H22, however concentrations at all monitoring locations remain below recorded concentrations in 2019.

This is the sixth year that there have been no exceedances of the NO_2 objective. It is proposed to revoke the AQMA in line with guidance in TG22, that there should not be any declared AQMA's for which compliance with the objective has been achieved for a consecutive five-year period. We will continue to monitor at the same locations.

At the remaining sites within Knaresborough, all concentrations remain below the objective. Concentrations at H30 Knaresborough Bus Station, have reduced to 31.5µg/m^3, however due to the diffusion tubes having been stolen for a number of months the results have been annualised. The diffusion tube has now been moved to a higher level.

In The Ripon AQMA (No.1) (Low and High Skellgate), concentrations in all monitoring locations remain below the objective, and measure equal to or less than 81% of the objective. One location, H55, has increased but remains lower than 2019 monitoring. The highest recorded concentration was 32.4µg/m^3 at the H4/H5/H25 triplicate location. The

concentrations at all other monitoring locations within the Ripon study are less than 59% of the objective

This is the sixth year that there have been no exceedance of the objective, in line with the above we propose to revoke the AQMA.

Concentrations in The Harrogate AQMA (No.1) (Wetherby Road) remained at less than 80% of the objective. This is the fourth year that there have been no exceedances of the annual mean objective for NO_2, however, NYC (Harrogate Area) does not intend to revoke the AQMA at this time.

The original monitoring locations around Harrogate Town Centre were installed as indicators for breaches of the hourly mean objective. In 2021, two further monitoring locations were added to monitor the annual mean concentration at residential locations.

Monitoring point H42, which is located at the taxi rank on Station Parade, recorded a concentration of 34.1µg/m^3 less than 85% of the annual mean objective, it is thought that annual mean concentrations of less than 60µg/m^3 are unlikely to have breached the hourly mean. The remaining three locations recorded concentrations of less than 55% of the annual mean objective.

At the end of 2021, the two diffusion tubes located in Pannal (H3, Main Street and H31, Pannal Bank) were removed after two years of monitoring.

Following resident feedback two new monitoring locations were added. These were Leeds Road, Harrogate (H65) and Leadhall Lane, Harrogate (H66). The locations of these diffusion tubes are shown in Appendix D. Due to the concentrations recorded, these diffusion tubes have been moved to new locations for 2023.

Appendix A: Monitoring Results

Table A.1 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
H1	5 Otley Road, Killinghall	Roadside	428594	458666	NO2	No	0.0	2.4	No	1.8
H2	24 Low Skellgate, Ripon	Roadside	431044	471039	NO2	No	0.0	1.6	No	2.0
H6	27 Water Skellgate, Ripon	Roadside	431189	471146	NO2	No	0.0	4.8	No	2.0
H7	1 Low Skellgate, Ripon	Roadside	431110	471124	NO2	Yes (Ripon AQMA No.1)	0.0	2.5	No	2.0
H8	24 High Skellgate, Ripon	Roadside	431155	471216	NO2	Yes (Ripon AQMA No.1)	0.0	1.7	No	2.1
H9	9 High Skellgate, Ripon	Roadside	431135	471186	NO2	Yes (Ripon AQMA No.1)	0.0	1.7	No	2.6
H10	3a Westgate, Ripon	Roadside	431146	471258	NO2	Yes (Ripon AQMA No.1)	0.0	1.8	No	2.0
H12	Vale Court, Knaresborough	Roadside	434706	457380	NO2	No	0.0	8.1	No	1.5
H13	21 Bond End, Knaresborough	Roadside	434716	457369	NO2	Yes (Kboro AQMA No.1)	0.0	1.0	No	2.2
H14	9 Bond End, Knaresborough	Roadside	434759	457375	NO2	Yes (Kboro AQMA No.1)	0.0	1.8	No	2.0
H16	10 Bond End, Knaresborough	Roadside	434763	457388	NO2	Yes (Kboro AQMA No.1)	0.0	2.5	No	1.8

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
H17	16-18 Bond End, Knaresborough	Roadside	434725	457405	NO2	Yes (Kboro AQMA No.1)	0.0	1.5	No	1.9
H18	10 York Place, Knaresborough	Roadside	435210	456918	NO2	Yes (Kboro AQMA No.1)	0.0	3.2	No	1.8
H19	35 High Street, Knaresborough	Roadside	435012	457084	NO2	No	0.0	1.5	No	2.4
H20	24 High Street, Knaresborough	Roadside	435133	457009	NO2	No	0.0	2.3	No	2.5
H21	10 High Street, Knaresborough	Roadside	435158	456992	NO2	No	0.0	1.5	No	2.0
H22	14 York Place, Knaresborough	Roadside	435224	456913	NO2	Yes (Kboro AQMA No.2)	0.0	3.4	No	2.1
H23	34b High Street, Harrogate	Roadside	432918	455959	NO2	No	0.0	3.0	No	2.4
H24	Woodlands Pub, Hookstone Drive	Roadside	432477	454805	NO2	Yes (Hgate AQMA No.1)	0.2	2.0	No	2.5
H4, H5, H25	5 Low Skellgate, Ripon	Roadside	431087	471100	NO2	Yes (Hgate AQMA No.1)	0.0	1.5	No	2.1
H26	Woodlands Pub, Wetherby Road	Roadside	432494	454808	NO2	Yes (Hgate AQMA No.1)	0.0	1.0	No	3.6
H28	77 Harlow Crescent	Urban Background	429313	453820	NO2	No	0.0	5.0	No	1.9
H29	Epsom Court, Harrogate	Kerbside	429534	456882	NO2	No	2.3	0.2	No	2.0
H30	Wintringham House, High Street, Knaresborough	Roadside	435137	456968	NO2	No	0.0	2.3	No	2.3

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
H33	207 Skipton Road, Harrogate	Roadside	430224	456727	NO2	No	0.0	2.0	No	2.1
H34	Woodlands Pub Lamppost, Wetherby Road	Roadside	432525	454792	NO2	Yes (Hgate AQMA No.1)	4.6	1.5	No	1.9
H35	208 Kings Road, Harrogate	Roadside	430513	456467	NO2	No	2.7	2.0	No	1.9
H36	8-10 Westmoreland Street, Harrogate	Roadside	430925	455804	NO2	No	0.0	1.5	No	2.0
H37	87 Skipton Road, Harrogate	Roadside	430573	456436	NO2	No	0.0	8.0	No	2.0
H38	59 Skipton Road, Harrogate	Roadside	430647	456324	NO2	No	0.0	3.0	No	1.7
H39	Devonshire Place, Harrogate	Kerbside	430995	455831	NO2	No	3.0	0.6	No	1.8
H40	Vintage Boutique, Westmoreland Street, Harrogate	Roadside	430935	455826	NO2	No	0.0	1.5	No	2.3
H41	16 York Place, Knaresborough	Roadside	435235	456907	NO2	Yes (Kboro AQMA No.2)	0.0	3.4	No	2.0
H42	Taxi Rank, Station Parade, Harrogate	Urban Centre	430367	455339	NO2	No	0.0	0.1	No	2.1
H43	1 Station Square, Harrogate	Urban Centre	430397	455194	NO2	No	0.0	0.5	No	2.0
H27, H44	The Old Police House, Walshford	Roadside	441851	453686	NO2	No	0.0	12.2	No	2.0

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
H45	15 Devonshire Place, Harrogate	Roadside	430991	455828	NO2	No	0.0	3.7	No	1.7
H46	93 Skipton Road, Harrogate	Roadside	430535	456495	NO2	No	0.0	8.6	No	1.8
H47	43 Woodfield Road, Harrogate	Urban Background	430800	456572	NO2	No	0.0	30.8	No	1.6
H49	29 Bond End, Knaresborough	Roadside	434623	457314	NO2	No	0.0	0.9	No	2.1
H50	55 Bond End, Knaresborough	Roadside	434578	457260	NO2	No	0.0	1.9	No	2.3
H51	The Royal Oak, Knaresborough	Roadside	434796	457393	NO2	Yes (Kboro AQMA No.1)	0.0	1.3	No	2.3
H52	High Street, Knaresborough	Roadside	434835	457329	NO2	Yes (Kboro AQMA No.1)	0.0	2.1	No	2.0
H53	The Old Tannery, York Place, Knaresborough	Roadside	435253	456893	NO2	Yes (Kboro AQMA No.2)	0.0	3.4	No	2.0
H54	30 Low Skellgate, Ripon	Roadside	431075	471077	NO2	Yes (Ripon AQMA No.1)	0.0	1.5	No	2.7
H55	35 Low Skellgate, Ripon	Roadside	431102	471101	NO2	Yes (Ripon AQMA No.1)	0.0	2.0	No	2.1
H56	Crown Court, Ripon	Roadside	431151	471119	NO2	No	0.0	3.8	No	2.1
H57	6 Water Skellgate, Ripon	Roadside	431193	471132	NO2	No	0.0	2.3	No	2.0
H58	17 Water Skellgate, Ripon	Roadside	431242	471135	NO2	No	0.0	2.1	No	2.2

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
H15, H59, H60	117 High Street, Knaresborough	Roadside	434804	457358	NO2	Yes (Kboro AQMA No.1)	0.0	2.6	No	1.9
H61	13 East Parade, Harrogate	Roadside	430478	455297	NO2	No	1.7	2.3	No	2.2
H62	Bilton Lane, Harrogate	Roadside	430420	456798	NO2	No	2.0	2.6	No	2.0
H63	109 Station Parade, Harrogate	Roadside	430549	454842	NO2	No	1.5	2.3	No	2.0
H64	Station View, Knaresborough Road	Roadside	432806	455899	NO2	No	11.5	2.5	No	2.0
H65	Leeds Road, Harrogate	Roadside	430661	453562	NO2	No	6.5	3.2	No	2.1
H66	Leadhall Lane, Harrogate	Roadside	430632	453490	NO2	No	9.3	2.3	No	2.0
H67	Otley Road, Harrogate	Roadside	429503	454275	NO2	No	3.7	2.4	No	1.9

Notes:

(1) 0m if the monitoring site is at a location of exposure (for example, installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.2 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
H1	428594	458666	Roadside		90.4	22.5	19.3	15.6	17.7	19.9
H2	431044	471039	Roadside		100.0	22.8	20.3	17.6	19.9	18.7
H6	431189	471146	Roadside		100.0	21.9	20.1	16.9	17.5	16.9
H7	431110	471124	Roadside		82.7	24.9	24.9	19.2	22.5	19.5
H8	431155	471216	Roadside		100.0	33.3	29.8	23.1	30.1	26.3
H9	431135	471186	Roadside		100.0	33.5	28.7	22.1	27.1	25.6
H10	431146	471258	Roadside		82.7	32.5	27.4	22.4	25.3	23.1
H12	434706	457380	Roadside		100.0	28.5	25.5	19.8	23.3	21.5
H13	434716	457369	Roadside		100.0	**45.5**	**40.5**	30.7	38.3	38.4
H14	434759	457375	Roadside		90.4	**50.4**	38.6	33.8	36.8	38.3
H16	434763	457388	Roadside		100.0	38.3	31.2	25.6	29.5	27.3
H17	434725	457405	Roadside		100.0	29.9	24.3	18.7	21.3	19.9
H18	435210	456918	Roadside		90.4	32.6	26.7	21.4	24.7	23.6
H19	435012	457084	Roadside		100.0	31.3	26.9	22.2	27.1	25.6
H20	435133	457009	Roadside		100.0	31.8	31.3	24.9	31.1	27.3
H21	435158	456992	Roadside		100.0	24.9	23.3	20.4	23.8	22.7
H22	435224	456913	Roadside		82.7	38.6	34.9	27.3	28.9	29.7
H23	432918	455959	Roadside		100.0	22.6	20.4	17.0	18.7	18.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
H24	432477	454805	Roadside		100.0	28.5	25.4	20.8	22.7	23.1
H4, H5, H25	431087	471100	Roadside		100.0	38.9	35.0	28.9	33.3	32.4
H26	432494	454808	Roadside		100.0	**41.4**	35.9	31.3	31.7	31.8
H28	429313	453820	Urban Background		100.0	10.4	9.2	8.8	9.3	8.3
H29	429534	456882	Kerbside		100.0	28.5	24.7	21.4	23.5	25.3
H30	435137	456968	Roadside		50.0		33.8	34.1	37.7	31.5
H33	430224	456727	Roadside		100.0	28.0	25.2	20.1	20.6	23.4
H34	432525	454792	Roadside		92.3	32.9	26.8	22.1	24.0	23.5
H35	430513	456467	Roadside		100.0	25.5	19.7	16.0	19.6	18.0
H36	430925	455804	Roadside		100.0	24.1	20.3	17.3	20.3	19.1
H37	430573	456436	Roadside		100.0	26.1	21.4	17.4	20.9	20.5
H38	430647	456324	Roadside		100.0	21.8	23.3	22.5	21.7	22.4
H39	430995	455831	Kerbside		100.0	**44.4**	38.4	30.7	31.9	33.4
H40	430935	455826	Roadside		100.0	27.5	23.9	18.9	22.2	20.8
H41	435235	456907	Roadside		100.0	32.2	28.3	23.9	27.7	26.3
H42	430367	455339	Urban Centre		92.3	**43.1**	33.6	30.6	34.1	33.9
H43	430397	455194	Urban Centre		100.0	25.8	21.1	16.6	19.4	19.0
H27,H44	441851	453686	Roadside		100.0	27.8	23.5	18.9	21.2	19.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2022 (%) [2]	2018	2019	2020	2021	2022
H45	430991	455828	Roadside		92.3	34.8	26.6	23.8	26.8	25.2
H46	430535	456495	Roadside		100.0	23.9	19.8	17.7	17.6	18.2
H47	430800	456572	Urban Background		100.0	12.1	10.9	10.6	11.3	9.4
H49	434623	457314	Roadside		100.0	32.0	27.6	24.7	29.8	29.1
H50	434578	457260	Roadside		90.4	31.4	28.6	25.6	30.5	28.7
H51	434796	457393	Roadside		100.0	38.2	33.9	32.8	34.7	32.7
H52	434835	457329	Roadside		100.0	**41.7**	37.0	30.9	33.7	33.1
H53	435253	456893	Roadside		100.0	33.0	26.8	23.3	26.1	24.9
H54	431075	471077	Roadside		100.0	28.7	28.2	22.3	27.6	24.9
H55	431102	471101	Roadside		100.0	30.0	28.5	24.0	25.3	26.3
H56	431151	471119	Roadside		100.0	25.2	25.4	19.7	20.9	20.2
H57	431193	471132	Roadside		90.4	29.9	27.4	21.2	24.1	23.5
H58	431242	471135	Roadside		100.0	26.3	22.3	18.3	19.5	19.1
H15,H59, H60	434804	457358	Roadside		92.3	37.6	35.2	29.8	31.6	32.2
H61	430478	455297	Roadside		100.0			21.5	22.3	21.3
H62	430420	456798	Roadside		100.0			16.9	15.6	17.0
H63	430549	454842	Roadside		90.4				21.0	21.7
H64	432806	455899	Roadside		100.0				19.5	19.8
H65	430661	453562	Roadside		92.3					22.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2022 (%) (2)	2018	2019	2020	2021	2022
H66	430632	453490	Roadside		100.0					14.0
H67	429503	454275	Roadside	100	50.0					16.1

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Diffusion tube data has been bias adjusted.**

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), for instance, prior to any fall-off with distance correction.**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

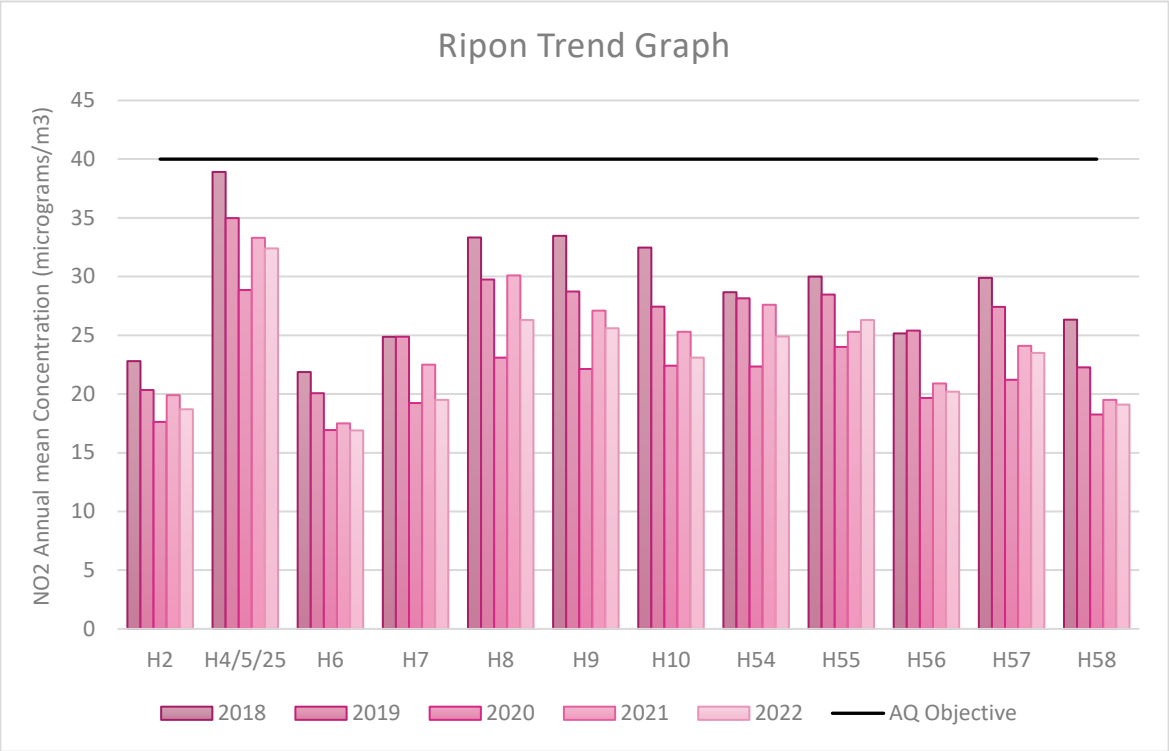
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG22 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

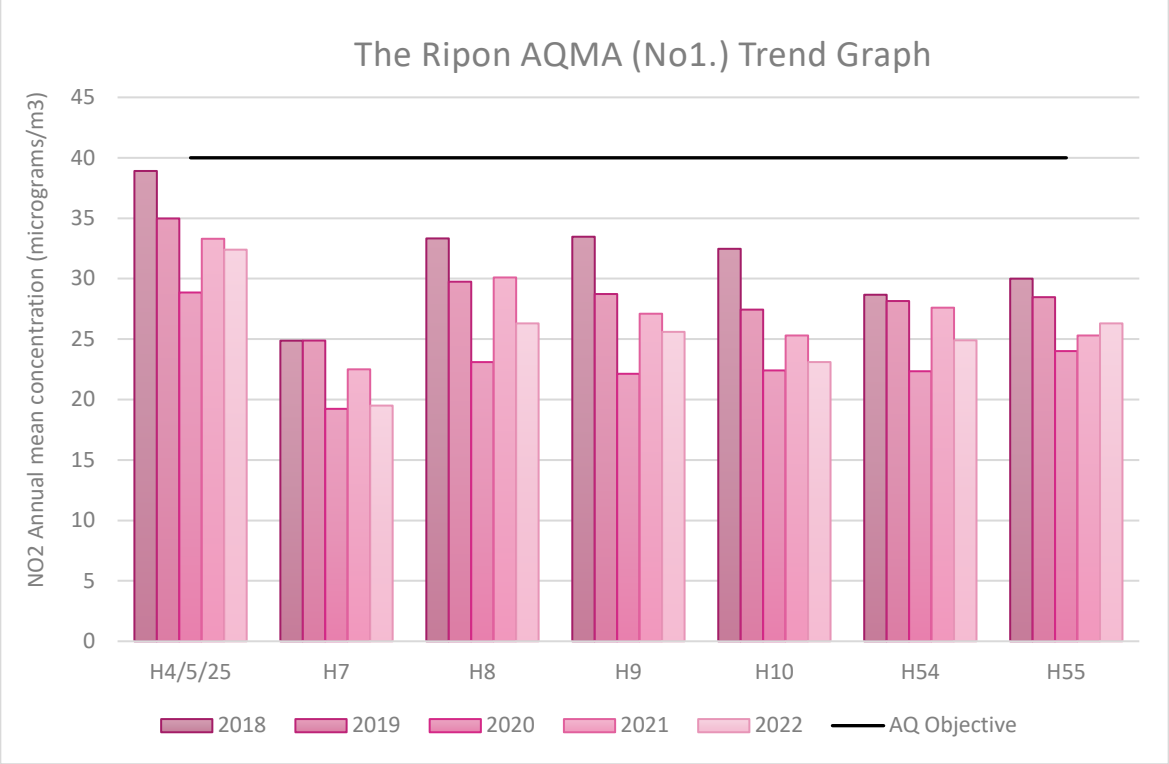
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

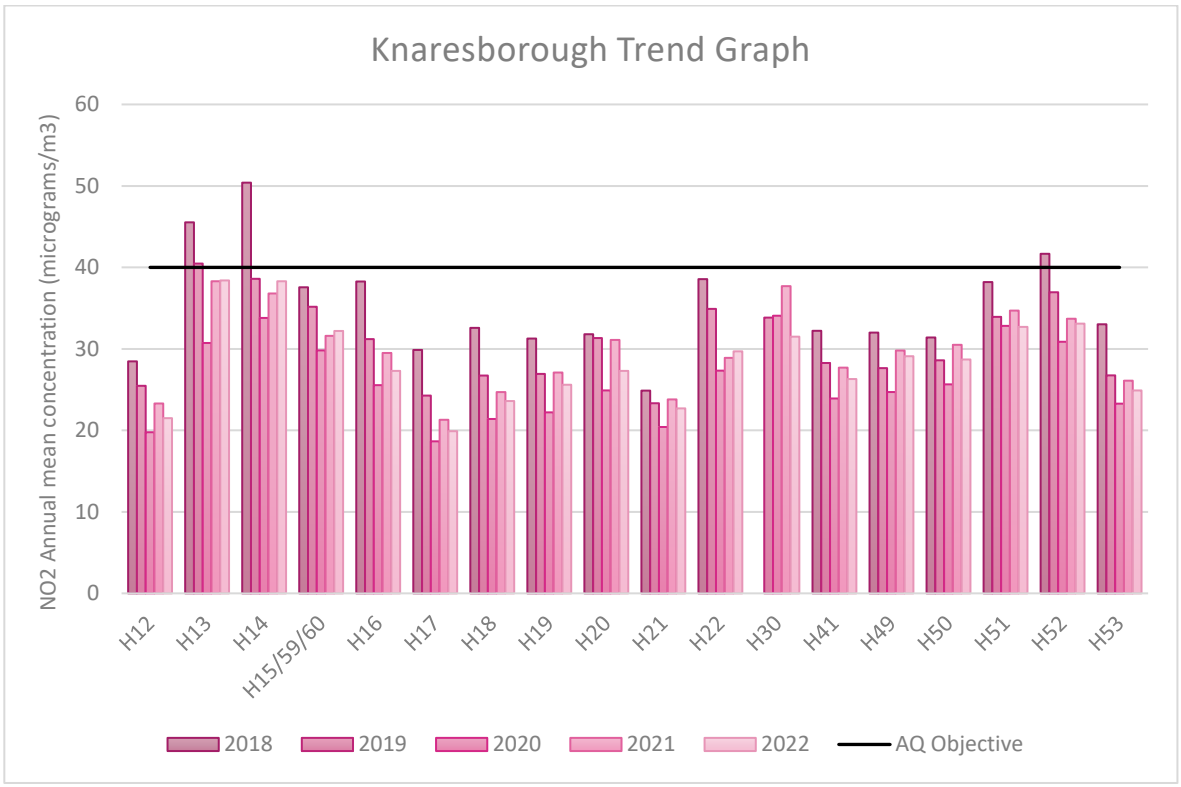
(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

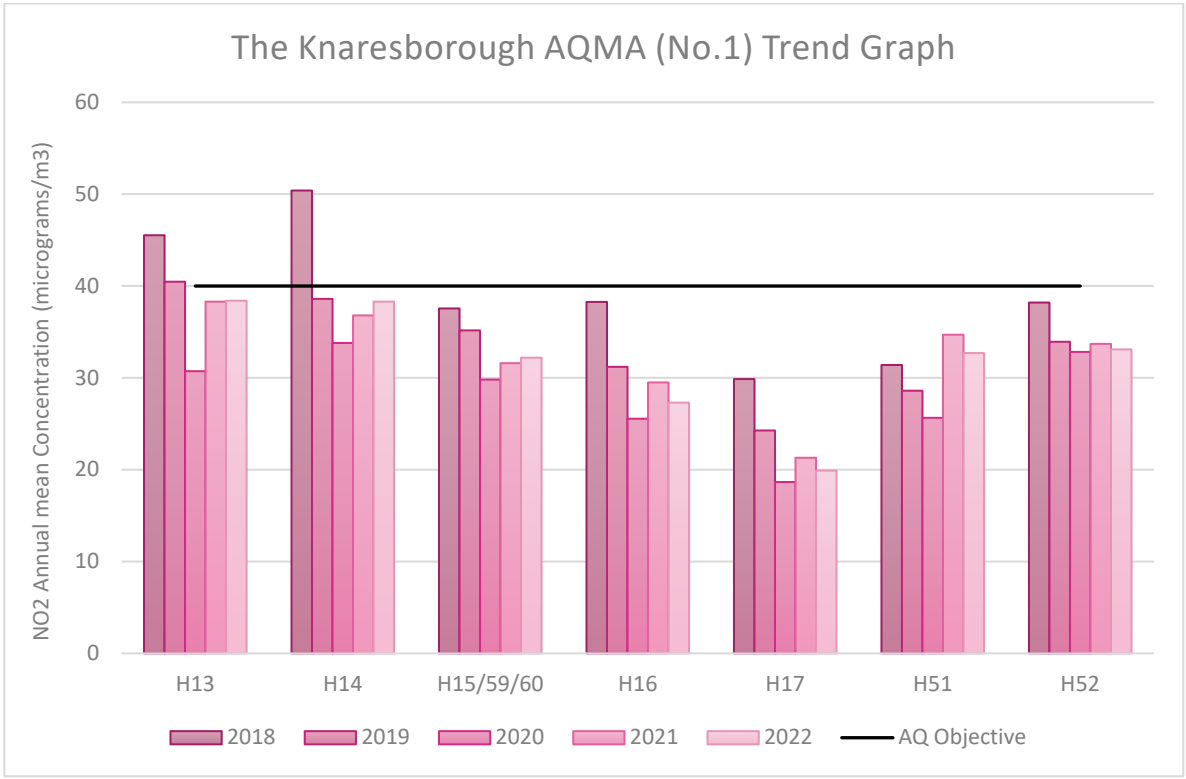
(2) Data capture for the full calendar year (for example, if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%)

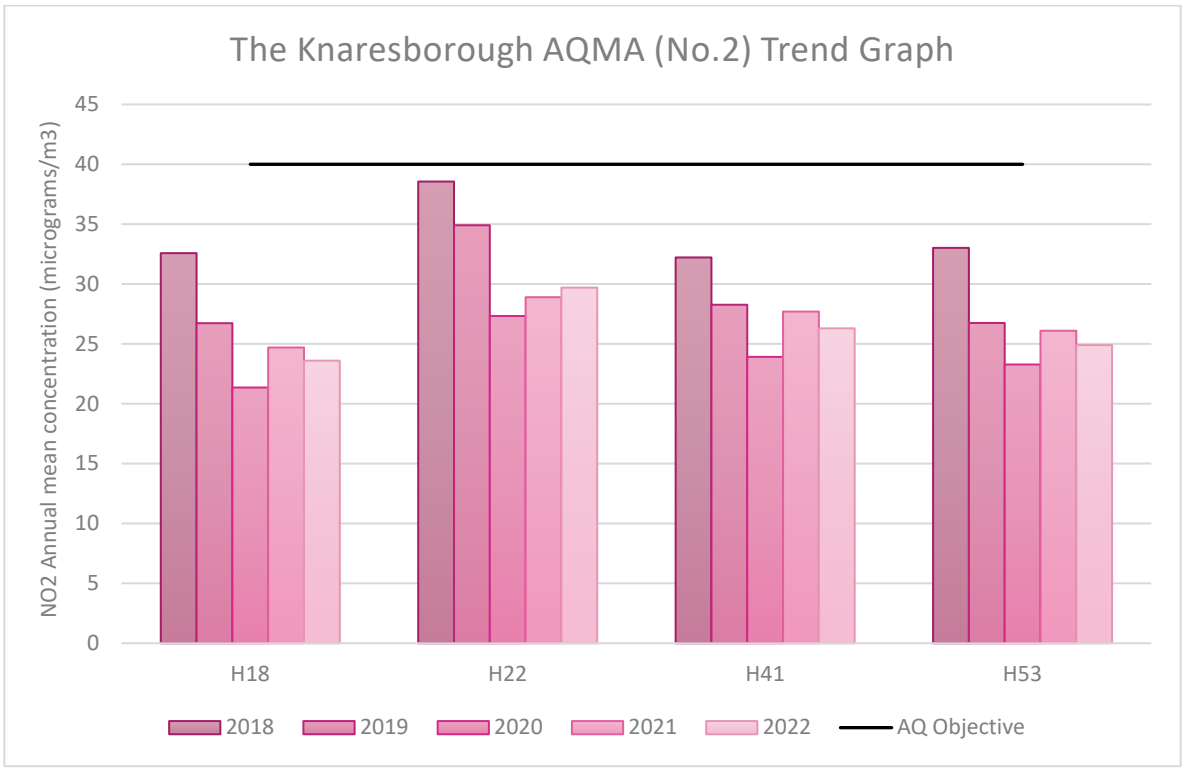
Figure A.1 – Trends in Annual Mean NO_2 Concentrations

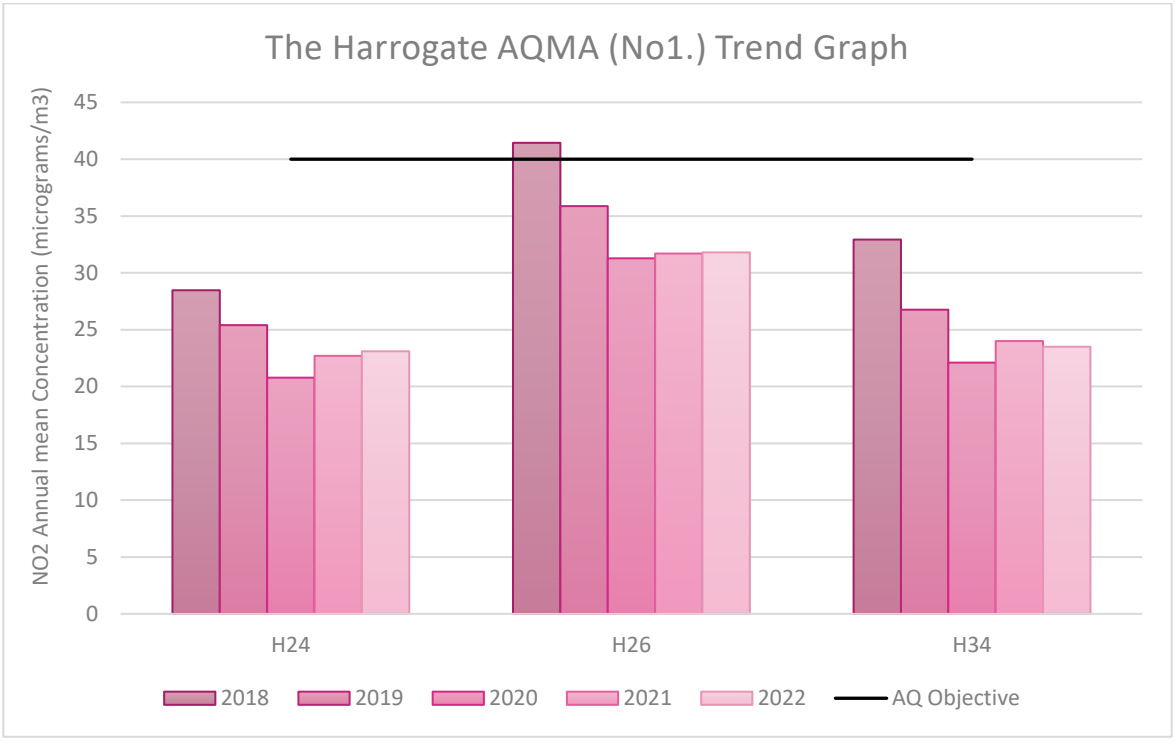


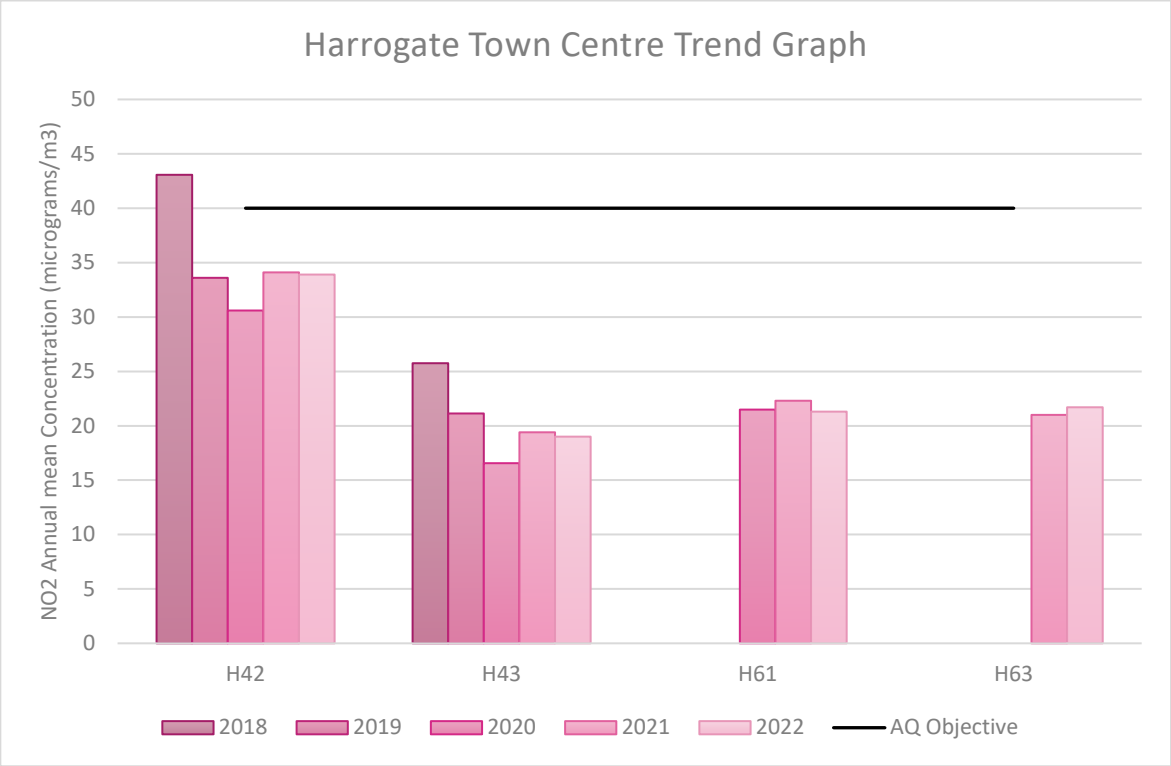


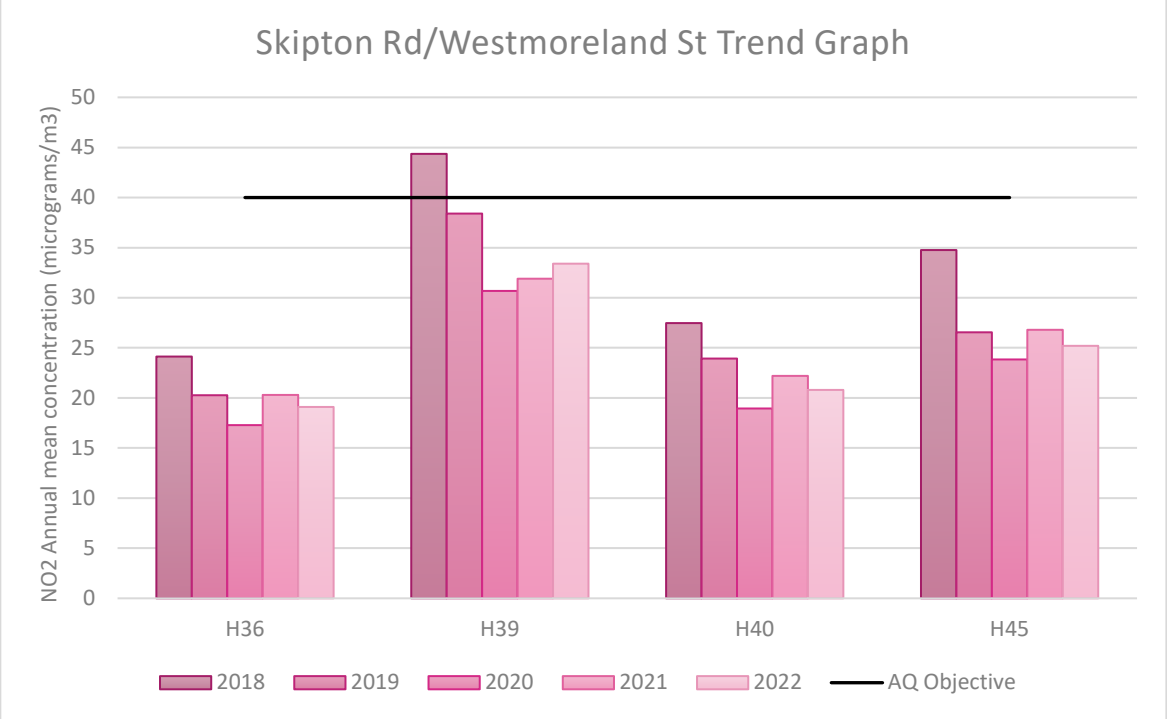

Knaresborough Trend Graph
NO2 Annual mean concentration (micrograms/m3)
60
50
40
30
20
10
0
H12
H13
H14
H15/59/60
H16
H17
H18
H19
H20
H21
H22
H30
H41
H49
H50
H51
H52
H53
2018
2019
2020
2021
2022
AQ Objective

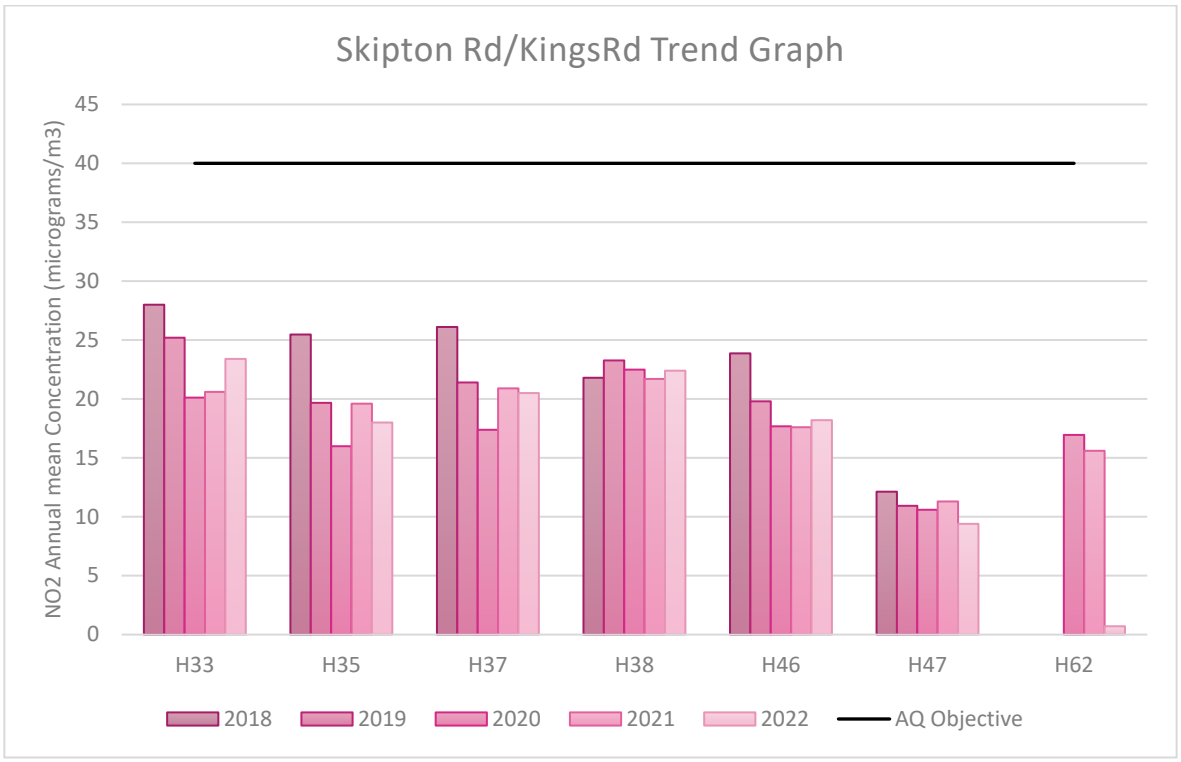

The Knaresborough AQMA (No.1) Trend Graph
NO2 Annual mean Concentration (micrograms/m3)
60
50
40
30
20
10
0
H13
H14
H15/59/60
H16
H17
H51
H52
2018
2019
2020
2021
2022
AQ Objective

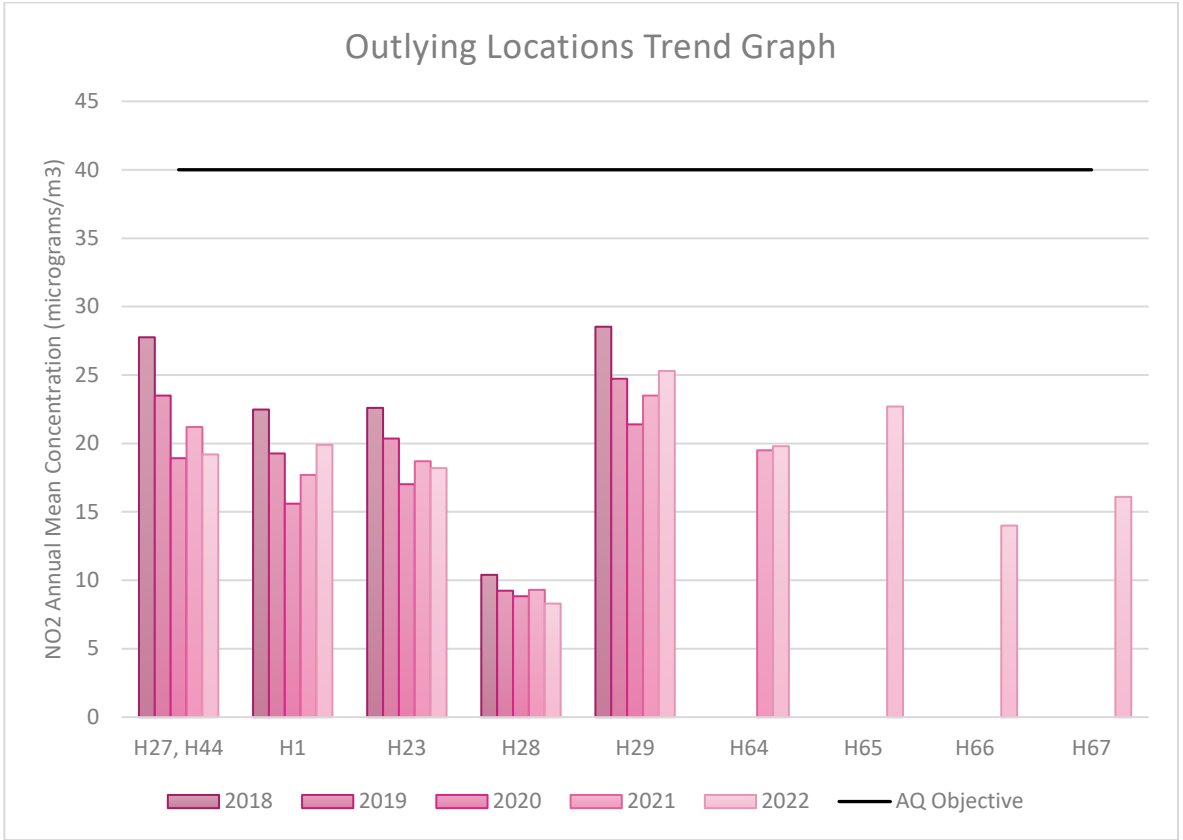

The Knaresborough AQMA (No.2) Trend Graph
NO2 Annual mean concentration (micrograms/m3)
45
40
35
30
25
20
15
10
5
0
H18
H22
H41
H53
2018
2019
2020
2021
2022
AQ Objective


The Harrogate AQMA (No1.) Trend Graph
NO2 Annual mean Concentration (micrograms/m3)
45
40
35
30
25
20
15
10
5
0
H24
H26
H34
2018
2019
2020
2021
2022
AQ Objective


Harrogate Town Centre Trend Graph
NO2 Annual mean Concentration (micrograms/m3)
50
45
40
35
30
25
20
15
10
5
0
H42
H43
H61
H63
2018
2019
2020
2021
2022
AQ Objective


Skipton Rd/Westmoreland St Trend Graph
NO2 Annual mean concentration (micrograms/m3)
50
45
40
35
30
25
20
15
10
5
0
H36
H39
H40
H45
2018
2019
2020
2021
2022
AQ Objective


Skipton Rd/KingsRd Trend Graph
NO2 Annual mean Concentration (micrograms/m3)
45
40
35
30
25
20
15
10
5
0
H33
H35
H37
H38
H46
H47
H62
2018
2019
2020
2021
2022
AQ Objective


Outlying Locations Trend Graph
NO2 Annual Mean Concentration (micrograms/m3)
45
40
35
30
25
20
15
10
5
0
H27, H44
H1
H23
H28
H29
H64
H65
H66
H67
2018
2019
2020
2021
2022
AQ Objective

Appendix B: Full monthly diffusion tube results for 2022

Table B.1 – NO_2 2022 diffusion tube results (µg/m3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
H1	428594	458666	23.1	21.9	37.9	20.3		18.3	22.5	22.0	22.8	30.0	38.5	30.7	26.2	19.9		
H2	431044	471039	33.3	20.1	38.1	24.8	19.9	15.1	19.8	18.9	23.9	24.6	30.2	27.3	24.7	18.7	-	
H4	431087	471100	54.2	39.4	56.2	35.7	38.6	35.9	39.8	37.9	39.5	39.4	48.6	51.1	-	-	-	Triplicate Site with H4, H5 and H25 - Annual data provided for H25 only
H5	431087	471100	52.6	38.8	54.6	40.8	38.6	32.4	40.1	40.0	37.5	40.4	39.9	48.2	-	-	-	Triplicate Site with H4, H5 and H25 - Annual data provided for H25 only
H6	431189	471146	36.7	22.1	27.4	20.6	17.3	16.6	16.5	17.5	19.0	19.7	24.1	28.6	22.2	16.9	-	
H7	431110	471124	29.7	28.1		23.3	21.7	21.1	20.8	24.4	21.8		34.2	32.1	25.7	19.5	-	
H8	431155	471216	44.6	32.1	40.0	35.1	32.4	27.2	29.2	34.3	32.7	34.3	34.2	38.4	34.5	26.3	-	
H9	431135	471186	42.3	31.2	39.6	35.6	31.2	25.5	30.0	33.9	32.6	31.3	33.4	37.5	33.7	25.6	-	
H10	431146	471258	43.6	27.1	43.0		25.2	21.8	26.3	28.0		30.2	22.3	37.0	30.5	23.1	-	
H12	434706	457380	27.3	27.5	35.1	28.4	25.3	22.8	25.0	27.9	27.4	29.5	30.5	32.0	28.2	21.5	-	
H13	434716	457369	62.7	52.4	63.1	44.2	43.0	41.7	45.3	46.1	44.2	53.6	54.7	55.8	50.6	38.4	-	
H14	434759	457375	53.4	46.3	63.1		41.0	42.4	47.7	47.4	45.3	45.7	63.7	57.9	50.4	38.3	-	
H15	434804	457358	56.2	48.7	44.4	31.8	36.7	37.4	38.4		34.1	42.5	57.8	42.3	-	-	-	Triplicate Site with H15, H59 and H60 - Annual data provided for H60 only
H16	434763	457388	42.0	31.3	51.1	42.5	29.5	24.8	30.8	36.0	38.2	34.4	33.7	37.2	36.0	27.3	-	
H17	434725	457405	31.0	24.1	38.4	28.7	20.1	18.0	21.7	24.5	23.8	27.3	27.1	29.8	26.2	19.9	-	
H18	435210	456918	35.5	32.1	40.0	27.1	27.3	27.5	30.6	31.7	26.6	30.8	32.5		31.1	23.6	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
H19	435012	457084	44.3	34.6	44.1	29.7	26.3	25.9	31.9	31.3	28.5	34.7	36.2	36.2	33.6	25.6	-	
H20	435133	457009	36.5	28.0	51.8	39.8	29.5	24.8	31.3	38.4	36.5	33.1	41.1	39.5	35.9	27.3	-	
H21	435158	456992	53.2	36.0	34.5	25.2	20.7	22.4	24.3	24.7	26.8	26.0	30.9	33.5	29.9	22.7	-	
H22	435224	456913	48.9	38.9	49.7	32.5	29.1	34.2		35.9	34.0		44.8	43.0	39.1	29.7	-	
H23	432918	455959	27.8	24.0	37.8	24.1	18.6	16.2	18.8	21.1	20.5	26.5	21.9	29.9	23.9	18.2	-	
H24	432477	454805	30.9	26.9	44.8	29.9	26.4	23.3	28.4	29.6	29.3	27.5	33.7	33.6	30.4	23.1	-	
H25	431087	471100		38.3	55.6	42.8	38.5	34.4	37.2	39.7	38.2	41.4	43.1	52.7	42.7	32.4	-	Triplicate Site with H4, H5 and H25 - Annual data provided for H25 only
H26	432494	454808	50.8	49.0	49.9	35.2	39.5	41.5	42.2	42.0	36.0	40.1	41.6	34.6	41.9	31.8	-	
H27	441851	453686	26.7	25.4	24.6	22.6	22.9	24.4	24.3	25.4	25.2	22.6	27.5	26.8	-	-	-	Duplicate Site with H27 and H44 - Annual data provided for H44 only
H28	429313	453820	12.7	12.6	17.4	8.1	9.0	7.6	8.9	7.7	5.8	10.2	16.7	14.8	11.0	8.3	-	
H29	429534	456882	25.2	27.0	49.6	31.7	30.2	28.2	29.5	31.8	32.6	34.1	40.8	38.4	33.3	25.3	-	
H30	435137	456968	84.6		45.6	35.4				40.1	32.5			45.6	47.3	31.5	-	
H33	430224	456727	37.8	29.9	39.6	23.8	24.9	26.4	27.5	24.4	22.6	31.9	41.5	39.1	30.8	23.4	-	
H34	432525	454792	40.2	29.1	41.7	35.0	24.5	21.7	26.4		31.8	29.5	25.8	34.6	30.9	23.5	-	
H35	430513	456467	27.2	24.2	31.8	14.2	18.5	18.2	20.1	19.4	20.3	24.7	34.6	31.4	23.7	18.0	-	
H36	430925	455804	29.4	24.4	38.4	19.8	21.1	18.6	22.8	22.5	17.3	27.1	29.8	29.6	25.1	19.1	-	
H37	430573	456436	34.4	30.7	30.4	24.8	23.8	24.5	23.3	24.4	21.6	26.0	26.8	32.6	26.9	20.5	-	
H38	430647	456324	36.5	32.0	35.6	25.4	23.9	27.1	26.9	24.4	21.3	30.8	33.4	36.0	29.4	22.4	-	
H39	430995	455831	49.5	36.7	58.5	48.2	37.2	30.7	34.6	43.4	46.5	39.6	44.5	57.2	43.9	33.4	-	

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
H40	430935	455826	34.8	27.2	34.0	26.6	23.1	22.4	23.9	23.8	25.6	25.9	27.3	34.4	27.4	20.8	-	
H41	435235	456907	45.1	36.4	43.8	31.8	27.7	31.6	32.5	34.1	30.9	34.0	27.6	39.0	34.5	26.3	-	
H42	430367	455339	61.2	46.9	47.3	38.1	39.5	40.0	43.1	40.7		43.4	46.2	43.9	44.6	33.9	-	
H43	430397	455194	24.1	21.9	38.5	23.6	20.7	17.5	20.8	23.5	21.8	24.7	31.8	30.9	25.0	19.0	-	
H44	441851	453686	31.8	25.7	23.7	22.0	23.8	24.2	23.9	26.0	23.8	26.0	28.6	27.9	25.2	19.2	-	Duplicate Site with H27 and H44 - Annual data provided for H44 only
H45	430991	455828		27.3	45.3	37.7	27.3	22.8	27.4	34.9	37.3	29.5	31.3	43.7	33.1	25.2	-	
H46	430535	456495	32.5	27.4	32.8	20.6	18.0	16.9	18.7	18.3	18.3	24.6	26.3	32.8	23.9	18.2	-	
H47	430800	456572	15.9	14.5	17.9	8.5	8.3	7.6	8.6	8.3	8.0	14.5	16.3	20.1	12.4	9.4	-	
H49	434623	457314	37.1	34.9	49.5	31.7	33.5	31.2	37.8	33.5	33.9	45.3	46.7	44.8	38.3	29.1	-	
H50	434578	457260	37.8	33.0	46.4	32.7		35.6	37.5	36.8	39.1	35.7	44.8	36.5	37.8	28.7	-	
H51	434796	457393	53.8	35.4	58.9	46.7	29.5	27.3	33.4	42.6	48.5	37.4	47.0	55.9	43.0	32.7	-	
H52	434835	457329	40.6	30.4	61.8	46.7	37.8	31.4	40.4	48.1	49.7	42.5	46.8	46.4	43.6	33.1	-	
H53	435253	456893	44.0	36.6	31.8	28.7	27.8	31.1	32.7	33.3	30.6	29.6	32.4	35.0	32.8	24.9	-	
H54	431075	471077	45.6	26.8	45.0	30.7	27.2	22.7	27.8	28.9	29.5	30.7	39.1	39.4	32.8	24.9	-	
H55	431102	471101	44.2	35.1	44.8	28.5	30.2	29.8	27.7	31.2	27.8	34.4	43.3	38.9	34.7	26.3	-	
H56	431151	471119	31.3	27.3	35.2	21.4	21.8	21.8	23.0	23.7	20.3	27.6	31.4	33.6	26.5	20.2	-	
H57	431193	471132	45.6	31.9	36.6	22.5		25.8	25.7	28.5	22.7	30.2	34.6	36.3	30.9	23.5	-	
H58	431242	471135	36.0	29.0	30.3	20.8	21.6	21.1	21.4	22.6	19.2	20.8	27.3	30.7	25.1	19.1	-	
H59	434804	457358	54.6	47.1	41.6	30.7	36.6	41.0	41.8		34.0	42.5	51.1	44.6	-	-	-	Triplicate Site with H15, H59 and H60 - Annual data provided for H60 only

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted (0.76)	Annual Mean: Distance Corrected to Nearest Exposure	Comment
H60	434804	457358	48.0	46.7	41.8	32.3	35.6	41.6	41.3		33.4	46.7	46.6	46.8	42.3	32.2	-	Triplicate Site with H15, H59 and H60 - Annual data provided for H60 only
H61	430478	455297	21.1	27.6	37.8	26.5	23.9	23.9	24.8	26.2	27.0	24.0	36.0	38.0	28.1	21.3	-	
H62	430420	456798	27.2	21.3	28.3	17.7	17.6	17.2	17.9	17.3	17.5	22.9	31.0	32.2	22.3	17.0	-	
H63	430549	454842	28.7	30.4	35.5		23.8	22.8	23.9	24.3	22.2	32.2	33.9	36.0	28.5	21.7	-	
H64	432806	455899	30.9	28.5	37.8	17.9	19.8	19.3	20.3	19.1	19.1	30.1	36.8	32.6	26.0	19.8	-	
H65	430661	453562	36.6		38.6	27.0	25.2	25.9	27.3	23.3	27.0	29.0	35.1	33.5	29.9	22.7	-	
H66	430632	453490	23.0	16.6	29.6	17.7	13.2	12.3	12.9	13.6	14.5	19.1	25.2	23.3	18.4	14.0	-	
H67	429503	454275							18.2	18.8	18.8	21.8	24.9	27.6	21.7	16.1	-	

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**.

☒ **Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22.**

☒ **Local bias adjustment factor used.**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column.**

☒ **North Yorkshire Council (Harrogate) confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New or changed sources identified within the former Harrogate district during 2022

HBC has not identified any new sources relating to air quality within the reporting year of 2022.

Additional air quality works undertaken by North Yorkshire Council (Harrogate area) during 2022

North Yorkshire Council (Harrogate area) has not completed any additional works within the reporting year of 2022.

QA/QC of diffusion tube monitoring

The nitrogen dioxide diffusion tubes are supplied and analysed by Socotec Didcot. The tubes are prepared with 50% TEA in acetone. The samples have been analysed in accordance with Socotec's standard operating procedure ANU/SOP/1015. This method meets the guidelines set out in Defra's 'Diffusion Tubes for Ambient NO2 Monitoring: Practical Guidance.' This analysis of diffusion tube samples to determine the amount of nitrogen dioxide present on tubes is within the scope of the Socotec UKAS schedule.

Socotec have taken part in the Air NO_2 Proficiency Testing Scheme. There were two results for 2022, for both periods (Jan-Feb, May- June) the lab had 100% satisfactory results. Socotec reports state that they have the rank of satisfactory in the scheme.

The results of precision testing show that Socotec had 26 Good and 0 Poor precision results for 2022. Tube precision is separated into two categories, "Good" or "Poor"; tubes are considered to have good precision where the coefficient of variation of duplicate or triplicate diffusion tubes for eight or more periods during the year is less than 20% and the average CV of all monitoring periods is less than 10%.

Diffusion Tube Annualisation

Annualisation has been carried out for two sites, H30 and H67 which both have six months data, equating to 50%. The Diffusion Tube Data Processing Tool has been used to carry out the annualisation for 2022. Automatic monitoring sites at Leeds Centre, Dewsbury Ashworth Grove, Barnsley Gawber and York Bootham have been used.

Table C.1 – Annualisation Summary (concentrations presented in µg/m^3)

Site ID	Annualisation Factor York Bootham	Annualisation Factor Leeds Centre	Annualisation Factor Dewsbury Ashworth Grove	Annualisation Factor Barnsley Gawber	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean
H30	0.8774	0.9359	0.8269	0.8599	0.8750	47.3	41.4
H67	0.9852	0.9778	0.9804	0.9526	0.9740	21.7	21.1

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2023 ASR has been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser. LAQM.TG22 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

NYC (Harrogate Area) have applied a national bias adjustment factor of 0.76 to the 2022 monitoring data. NYC (Harrogate Area) does not undertake automatic monitoring and therefore has not conducted a triplicate co-location study to allow for determination of a local bias factor. A summary of bias adjustment factors used by the former Harrogate district over the past five years is presented in Table C.2.

Table C.2 – Bias Adjustment Factor

Monitoring year	Local or National	If National, version of national spreadsheet	Adjustment factor
2022	National	03/23 (26)	0.76
2021	National	03/22 (23)	0.78
2020	National	03/21 (22)	0.77

2019	National	03/20 (3)	0.8
2018	National	03/19 (8)	0.8

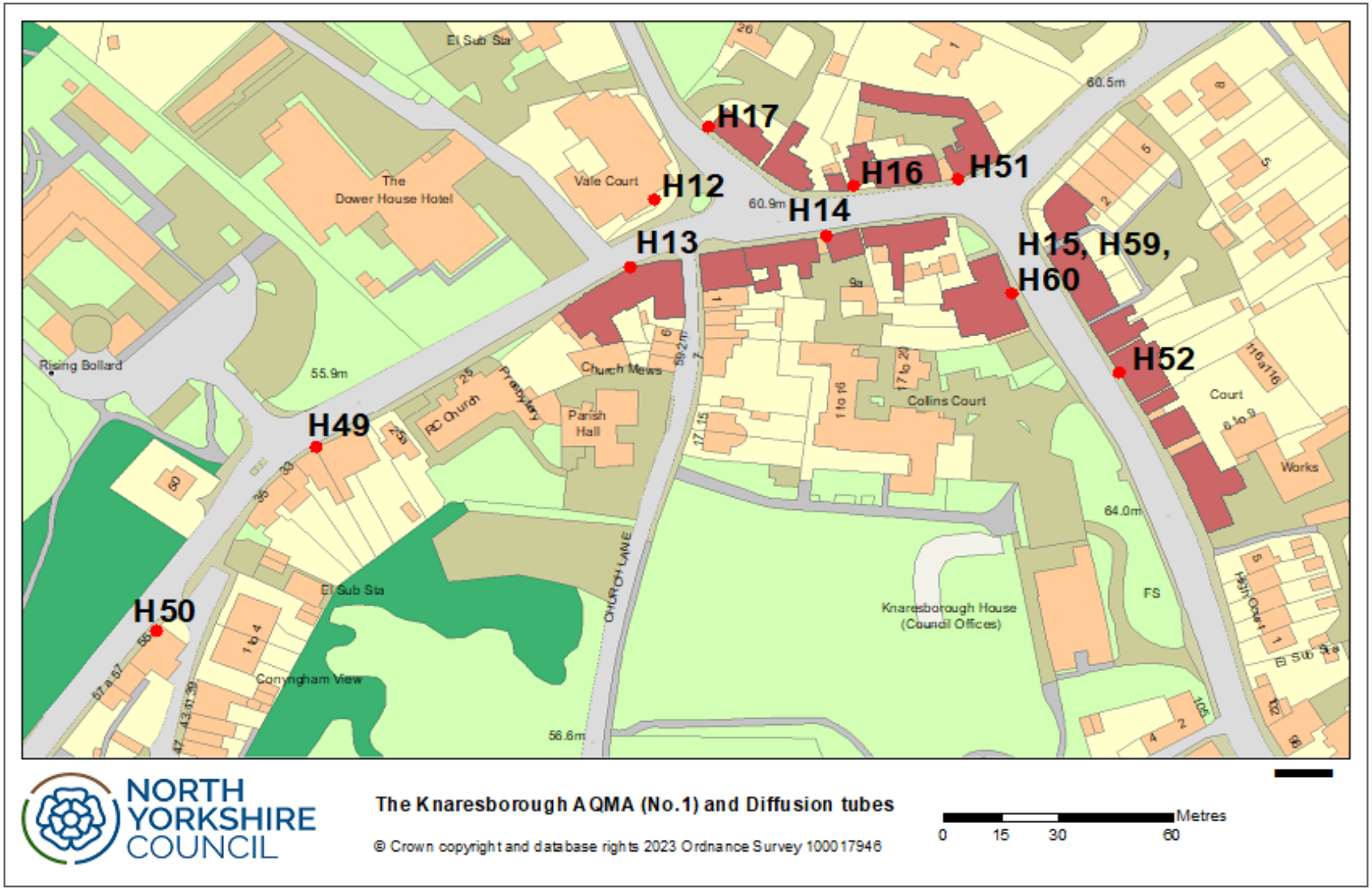
NO_2 Fall-off with distance from the road

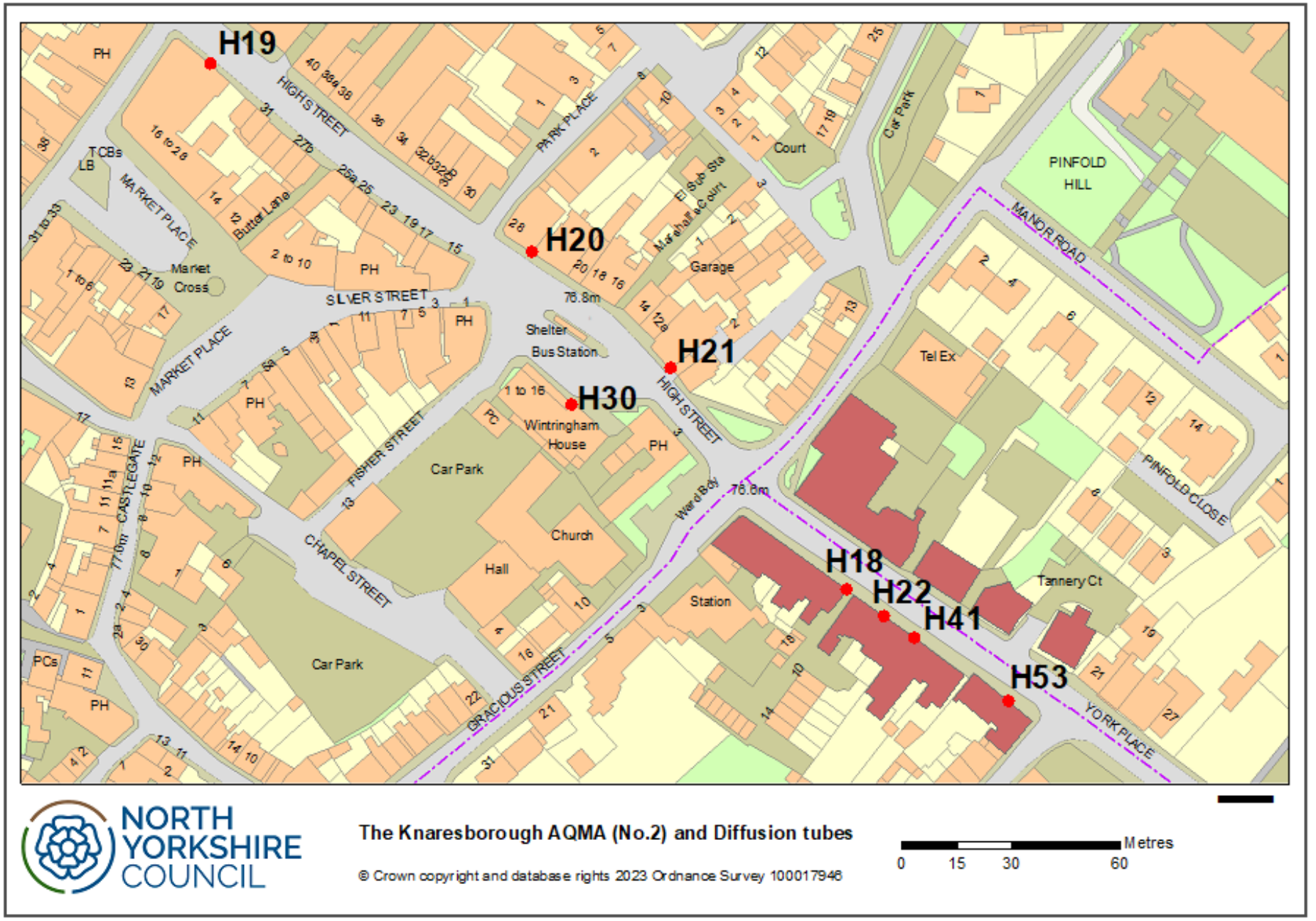
Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO_2 concentrations corrected for distance are presented in Table B.1.

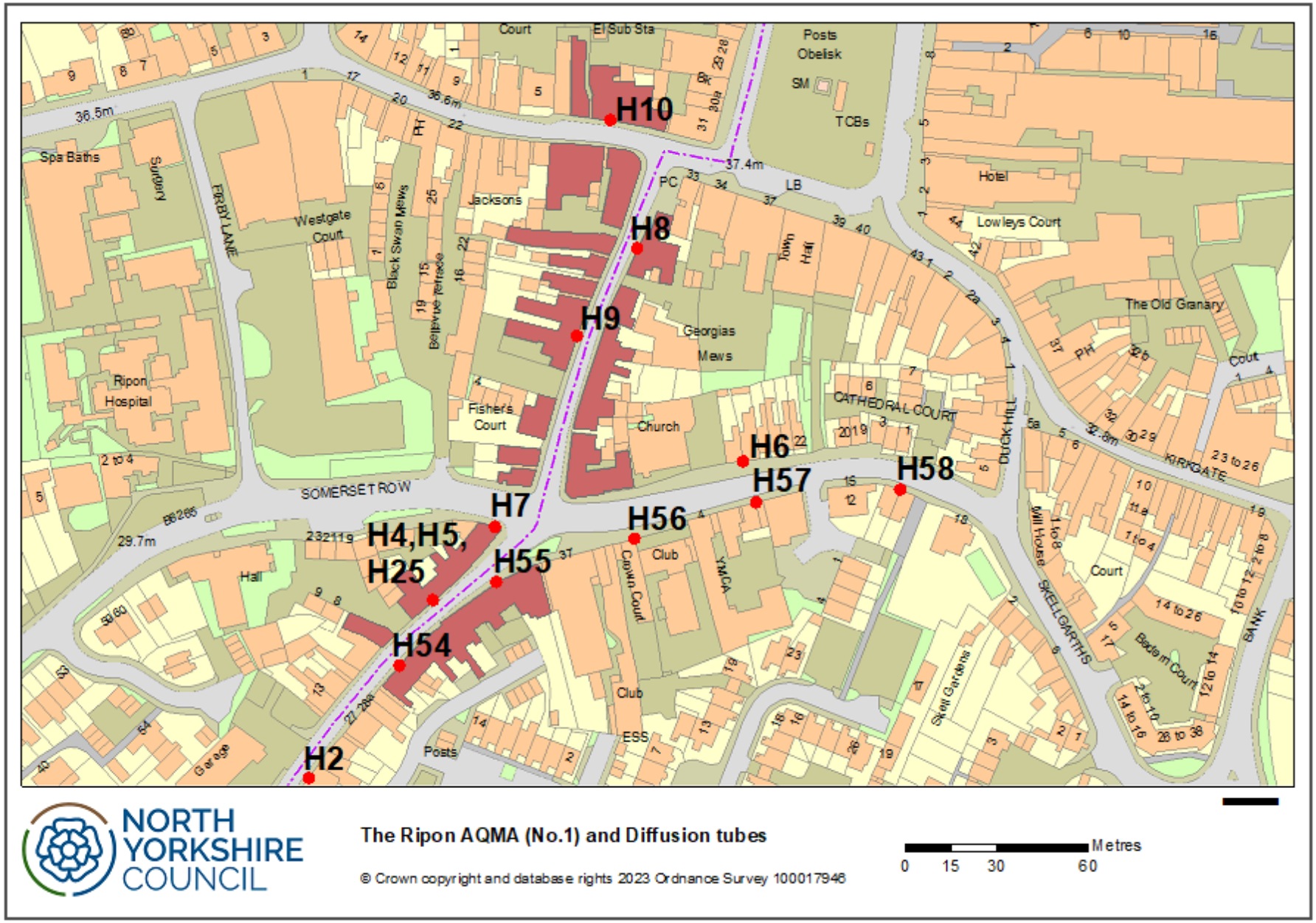
No diffusion tube NO_2 monitoring locations within NYC (Harrogate Area) required distance correction during 2022.

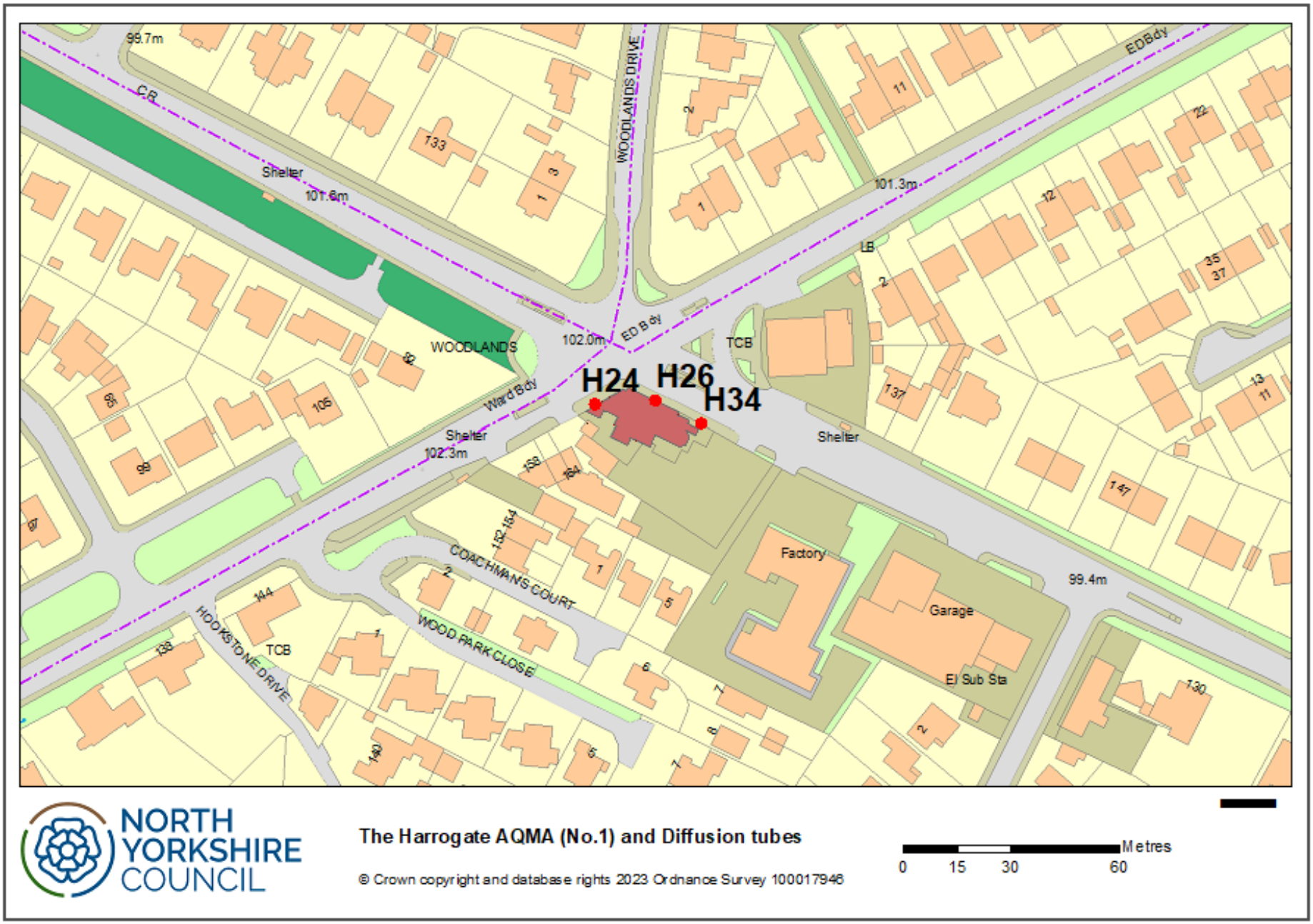
Appendix D: Map(s) of Monitoring Locations and AQMAs

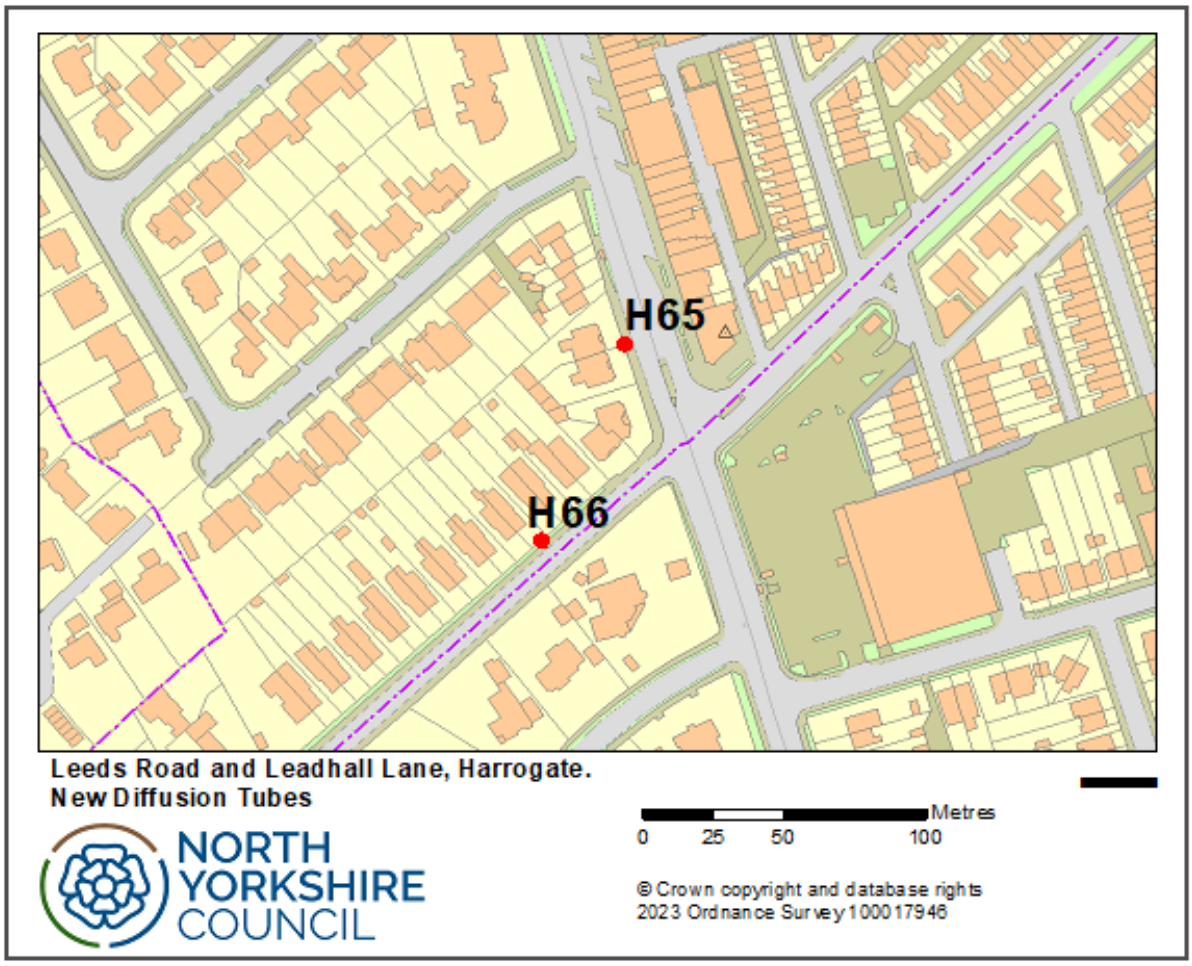
Figure D.1 – Maps of Non-Automatic Monitoring Sites

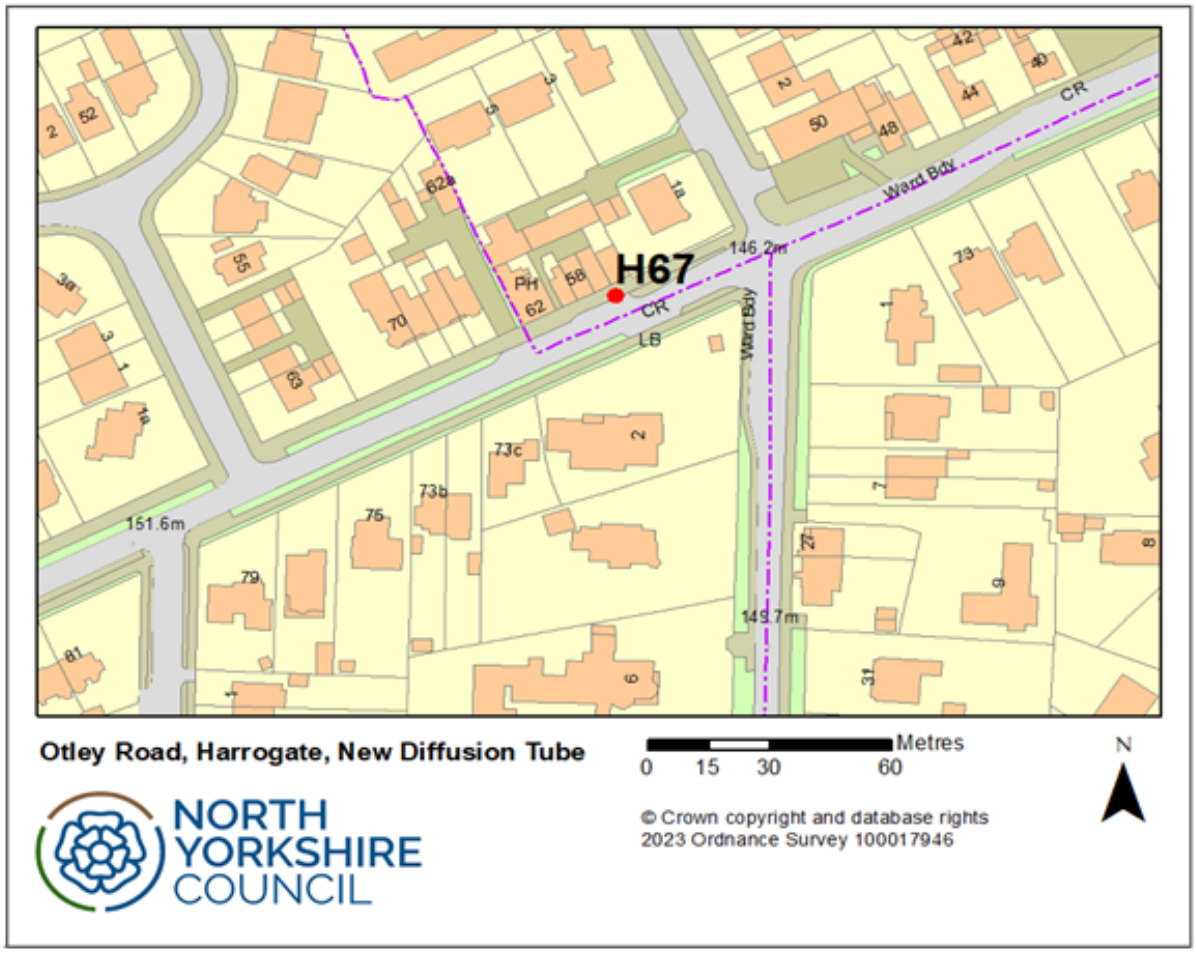



H19
H20
H21
H30
H18
H22
H41
H53
HIGH STREET
PARK PLACE
MARKET PLACE
Market Cross
SILVER STREET
Shelter
Bus Station
Wintringham House
Car Park
FISHER STREET
CHAPEL STREET
Church
Hall
Ward Box
Station
GRACIOUS STREET
YORK PLACE
MANOR ROAD
PINFOLD HILL
PINFOLD CLOSE
Tannery Ct
Tel Ex
Garage
Court
Butter Lane
CASTLEGATE
TCBs
LB
PCs
PC
76.8m
77.0m
The Knaresborough AQMA (No.2) and Diffusion tubes
NORTH YORKSHIRE COUNCIL
© Crown copyright and database rights 2023 Ordnance Survey 100017946
Metres
0
15
30
60


H10
H8
H9
H6
H57
H58
H7
H56
H4,H5,
H25
H55
H54
H2
Court
El Sub Sta
Posts
Obelisk
SM
TCBs
Hotel
Lowleys Court
Spa Baths
Surgery
FRBY LANE
Westgate Court
Black Swan Mews
Jacksons
Bellevue Terrace
Town Hall
Georgias Mews
The Old Granary
Ripon Hospital
Fishers Court
Church
CATHEDRAL COURT
SOMERSET ROW
KIRKGATE
Hall
Crown Court
Club
YMCA
Skell Gardens
Mill House
SKELLGARTHS
Court
Bedern Court
BANK
Garage
Posts
ESS
36.5m
36.6m
37.4m
29.7m
NORTH YORKSHIRE COUNCIL
The Ripon AQMA (No.1) and Diffusion tubes
© Crown copyright and database rights 2023 Ordnance Survey 100017946
Metres
0 15 30 60


99.7m
CR
Shelter
101.6m
WOODLANDS DRIVE
101.3m
EDB dy
LB
WOODLANDS
102.0m
ED B dy
TCB
H24
H26
H34
Ward B dy
Shelter
102.3m
Shelter
COACHMANS COURT
WOOD PARK CLOSE
HOOKSTONE DRIVE
TCB
Factory
Garage
El Sub Sta
99.4m
NORTH YORKSHIRE COUNCIL
The Harrogate AQMA (No.1) and Diffusion tubes
© Crown copyright and database rights 2023 Ordnance Survey 100017946
Metres
0
15
30
60


H65
H66
Leeds Road and Leadhall Lane, Harrogate.
New Diffusion Tubes
NORTH YORKSHIRE COUNCIL
Metres
0 25 50 100
© Crown copyright and database rights
2023 Ordnance Survey 100017946


H67
146.2m
151.6m
149.7m
Ward Bdy
CR
LB
PH
Otley Road, Harrogate, New Diffusion Tube
NORTH YORKSHIRE COUNCIL
Metres
0 15 30 60
N
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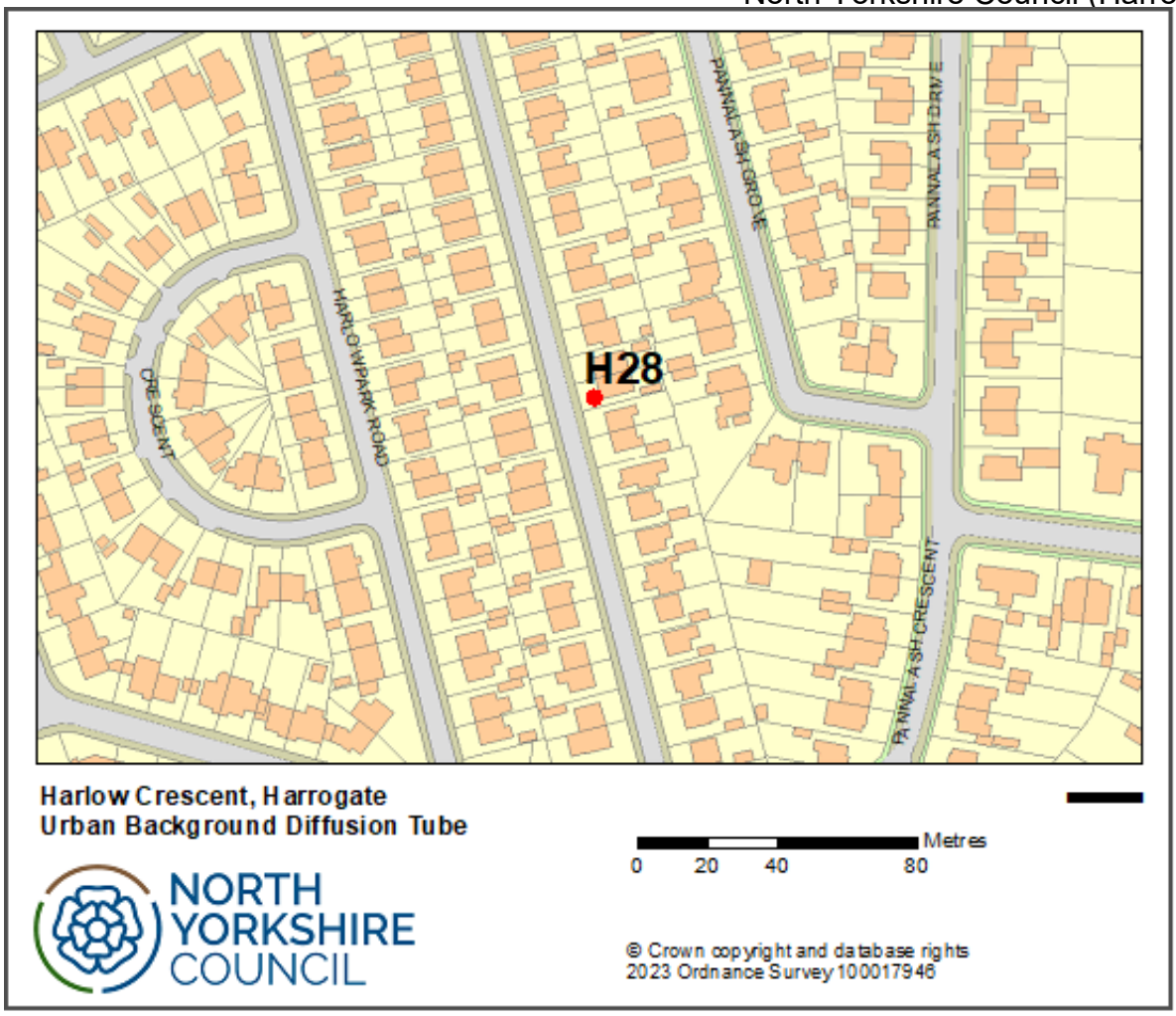
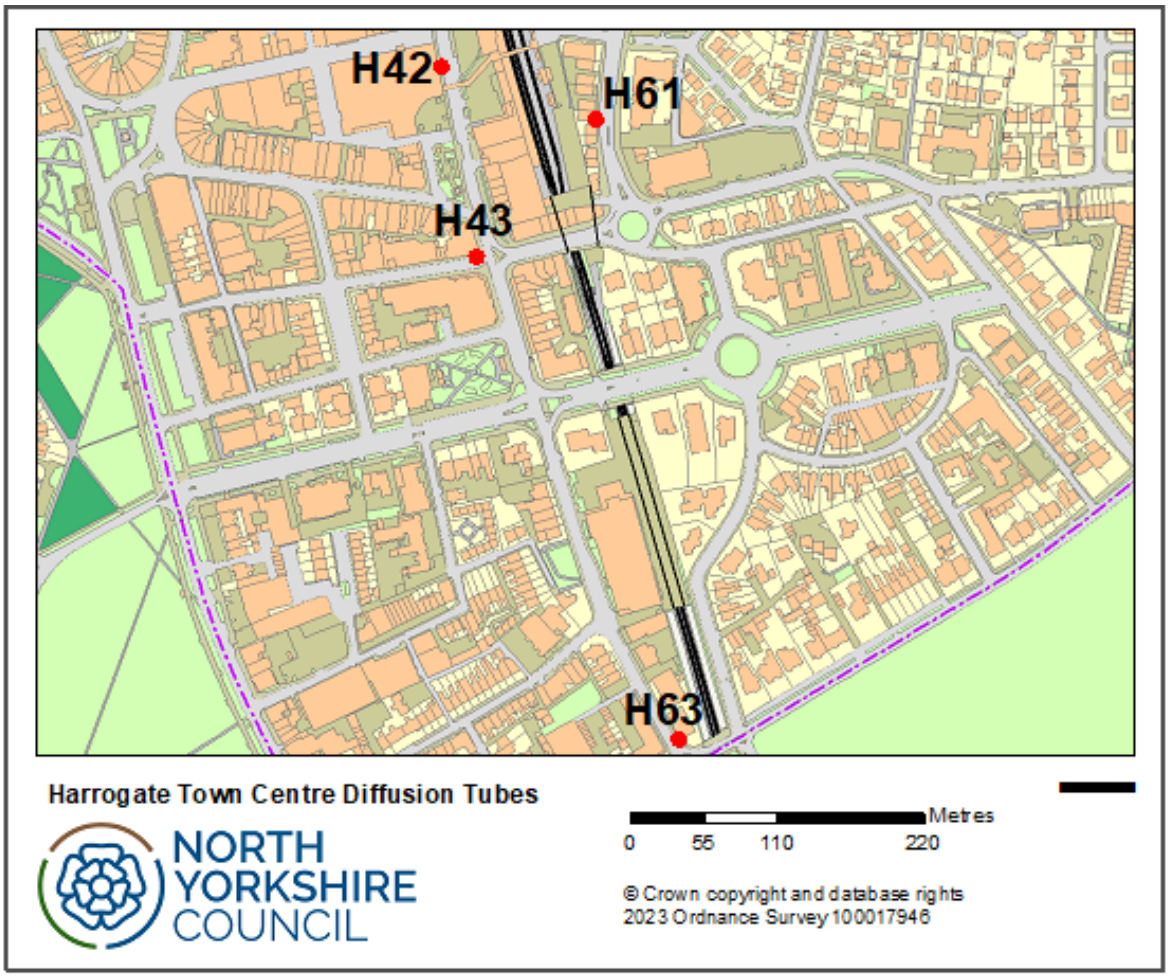
2023 Ordnance Survey 100017946


H28
HARLOW PARK ROAD
CRESCENT
PANNAL ASH GROVE
PANNAL ASH DRIVE
PANNAL ASH CRESCENT
Harlow Crescent, Harrogate
Urban Background Diffusion Tube
Metres
0 20 40 80
NORTH YORKSHIRE COUNCIL
© Crown copyright and database rights 2023 Ordnance Survey 100017946


H42
H61
H43
H63
Harrogate Town Centre Diffusion Tubes
Metres
0 55 110 220
NORTH YORKSHIRE COUNCIL
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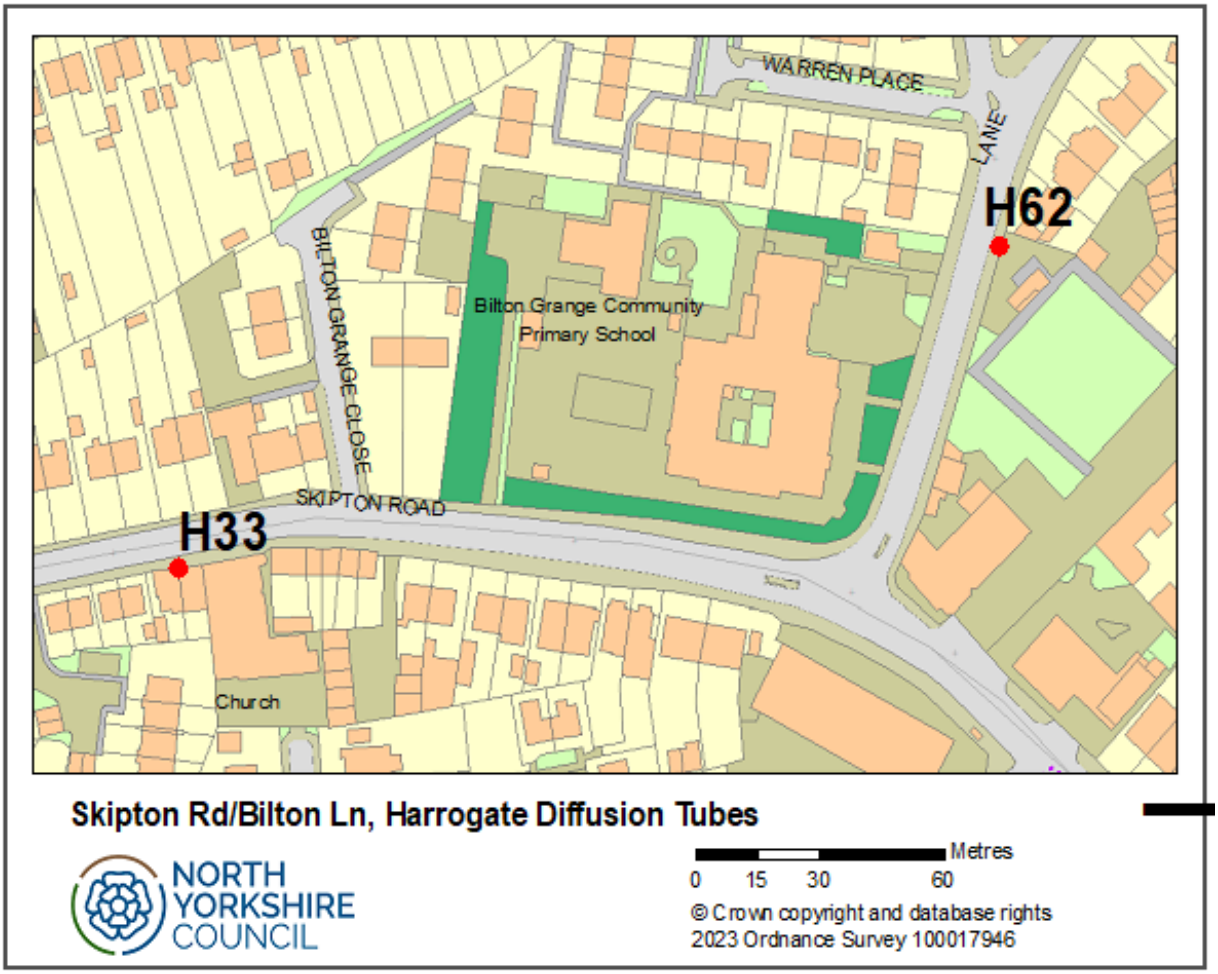
WARREN PLACE
LANE
H62
BILTON GRANGE CLOSE
Bilton Grange Community Primary School
SKIPTON ROAD
H33
Church
Skipton Rd/Bilton Ln, Harrogate Diffusion Tubes
NORTH YORKSHIRE COUNCIL
Metres
0 15 30 60
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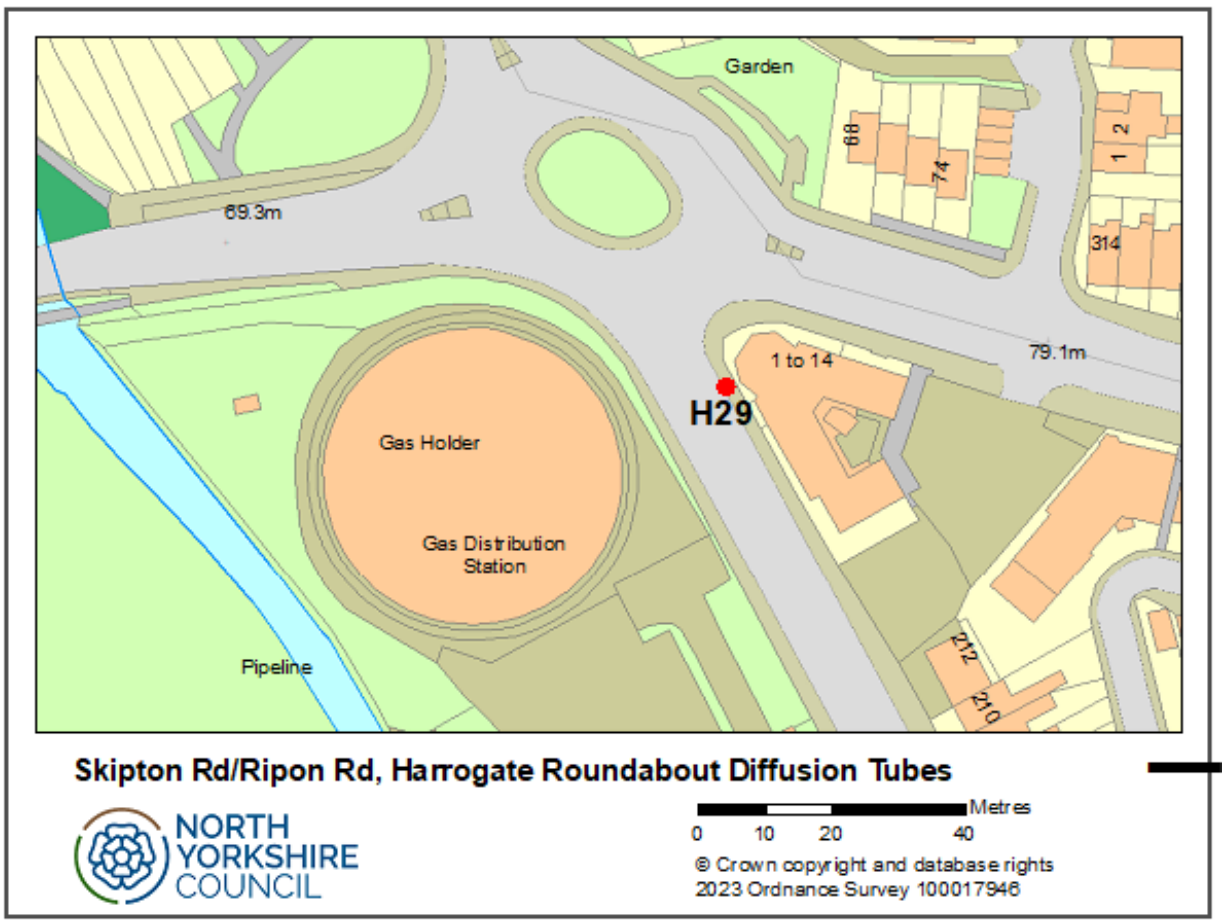
Garden
68
74
1 2
69.3m
314
79.1m
1 to 14
H29
Gas Holder
Gas Distribution Station
Pipeline
212
210
Skipton Rd/Ripon Rd, Harrogate Roundabout Diffusion Tubes
NORTH YORKSHIRE COUNCIL
Metres
0 10 20 40
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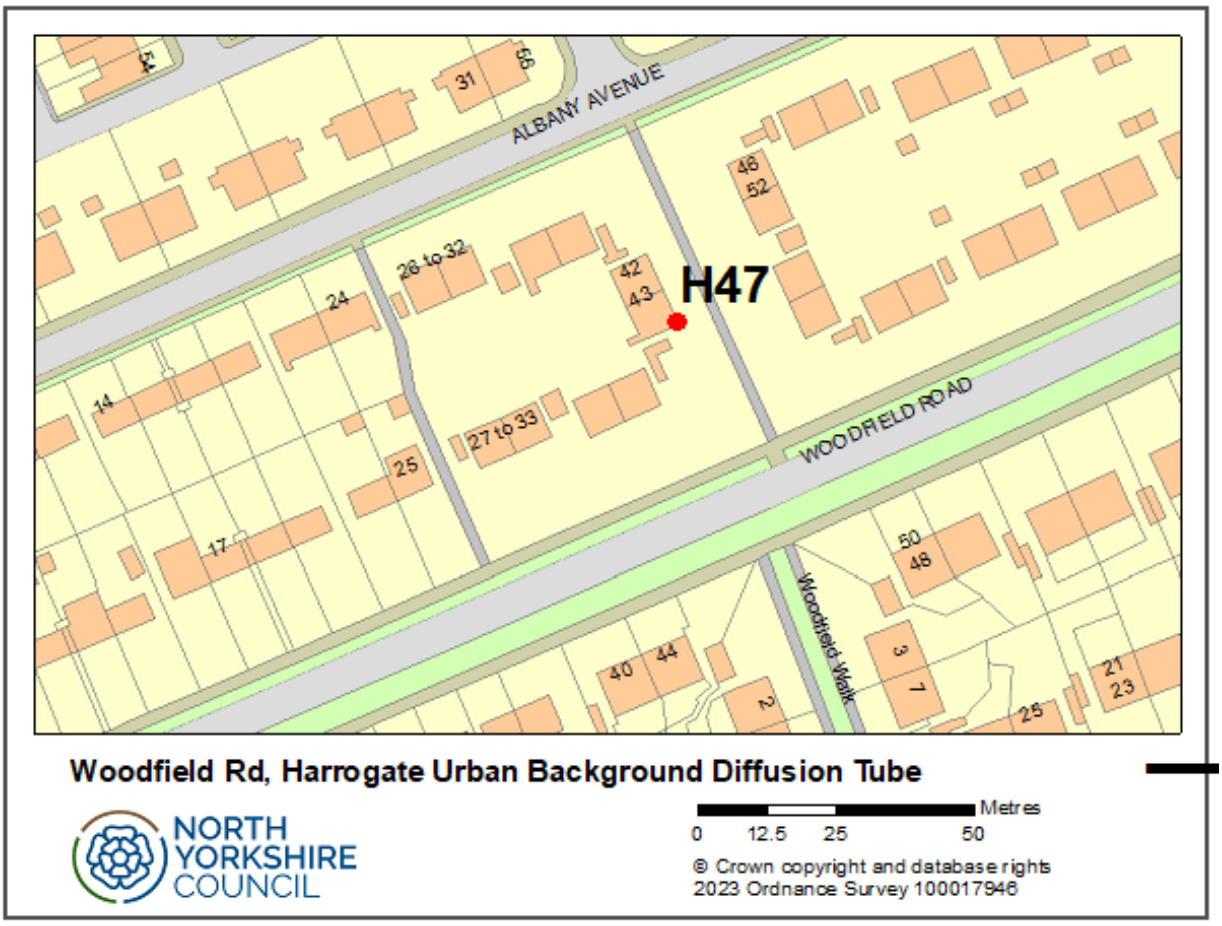
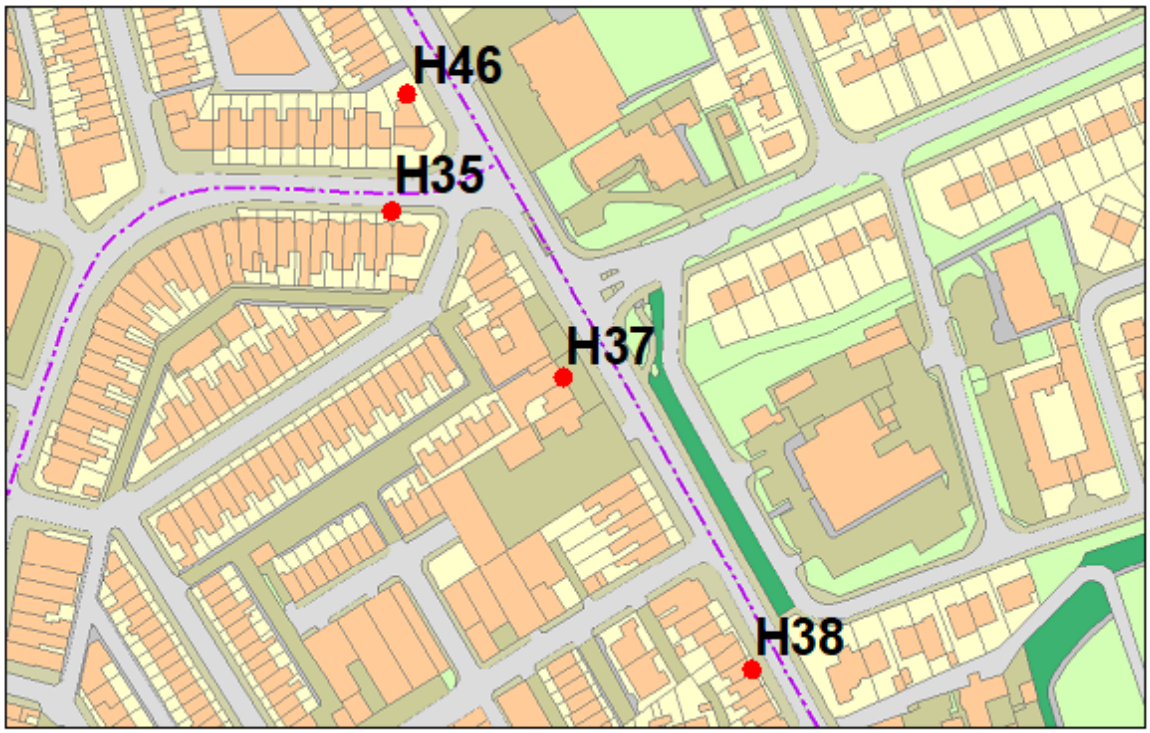


Woodfield Rd, Harrogate Urban Background Diffusion Tube

NORTH YORKSHIRE COUNCIL

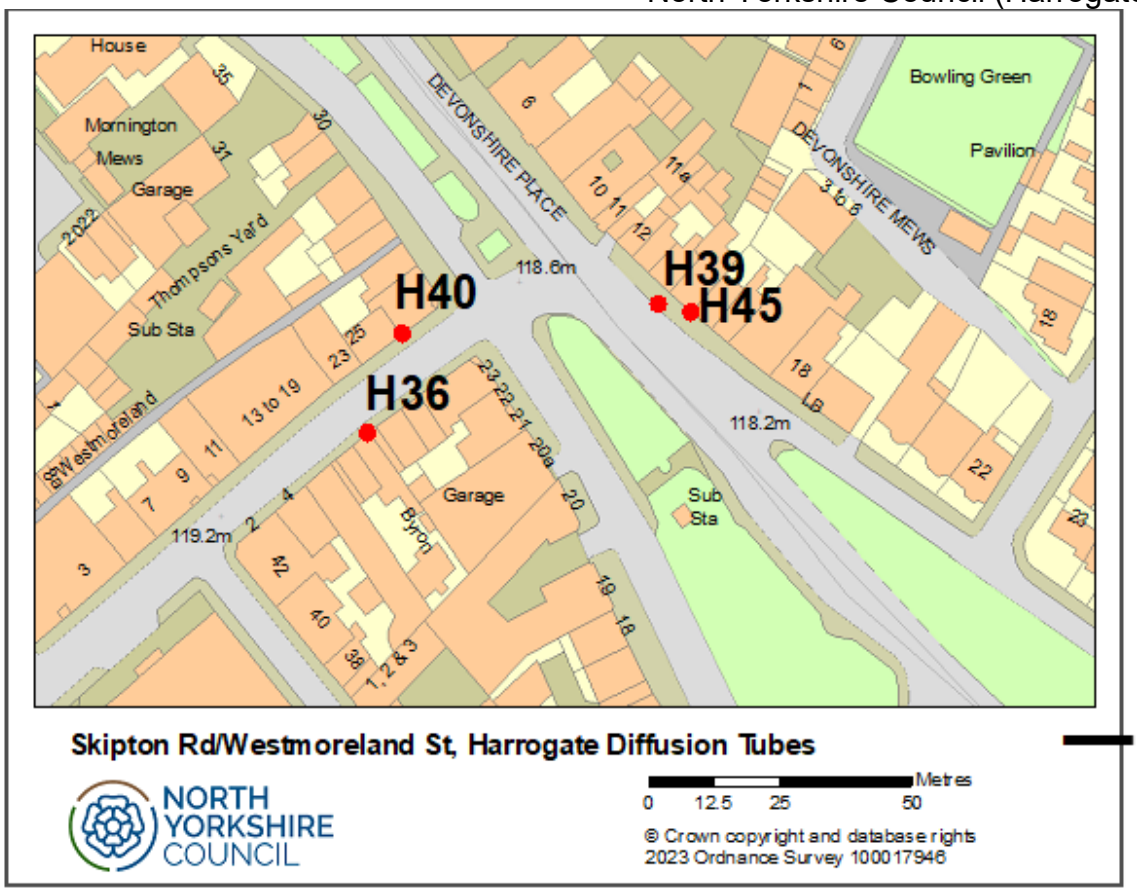
Metres
0 12.5 25 50



Skipton Rd/Kings Rd, Harrogate Diffusion Tubes

NORTH YORKSHIRE COUNCIL

Metres
0 20 40 80


House
Mornington
Mews
Garage
Thompsons Yard
Sub Sta
Westmoreland
DEVONSHIRE PLACE
DEVONSHIRE MEWS
Bowling Green
Pavilion
H40
H36
H39
H45
118.6m
118.2m
119.2m
Garage
Byron
Sub Sta
Skipton Rd/Westmoreland St, Harrogate Diffusion Tubes
NORTH YORKSHIRE COUNCIL
Metres
0 12.5 25 50
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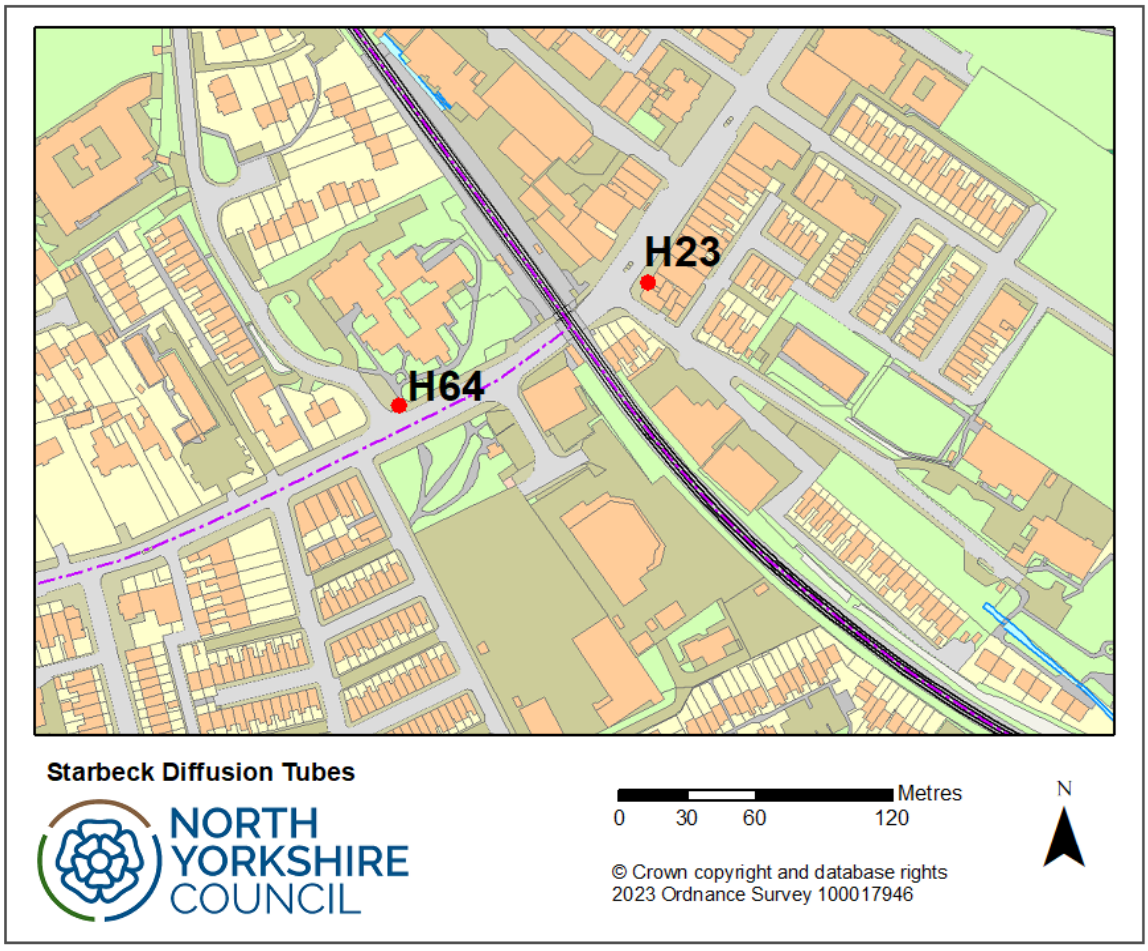
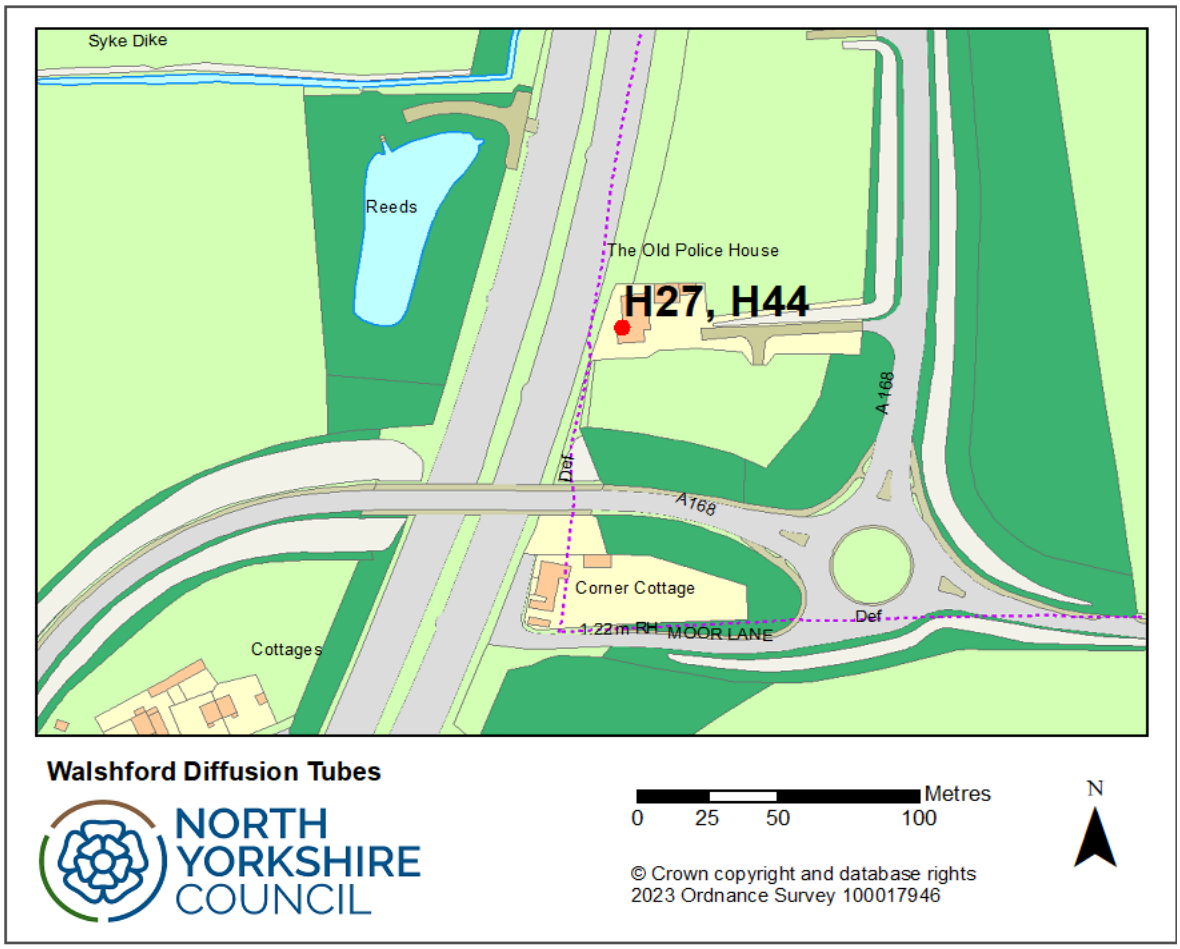

H23
H64
Starbeck Diffusion Tubes
NORTH YORKSHIRE COUNCIL
Metres
0 30 60 120
N
© Crown copyright and database rights 2023 Ordnance Survey 100017946


Syke Dike
Reeds
The Old Police House
H27, H44
A168
Def
A168
Corner Cottage
1.22m RH
MOOR LANE
Def
Cottages
Walshford Diffusion Tubes
NORTH YORKSHIRE COUNCIL
0 25 50 100 Metres
N
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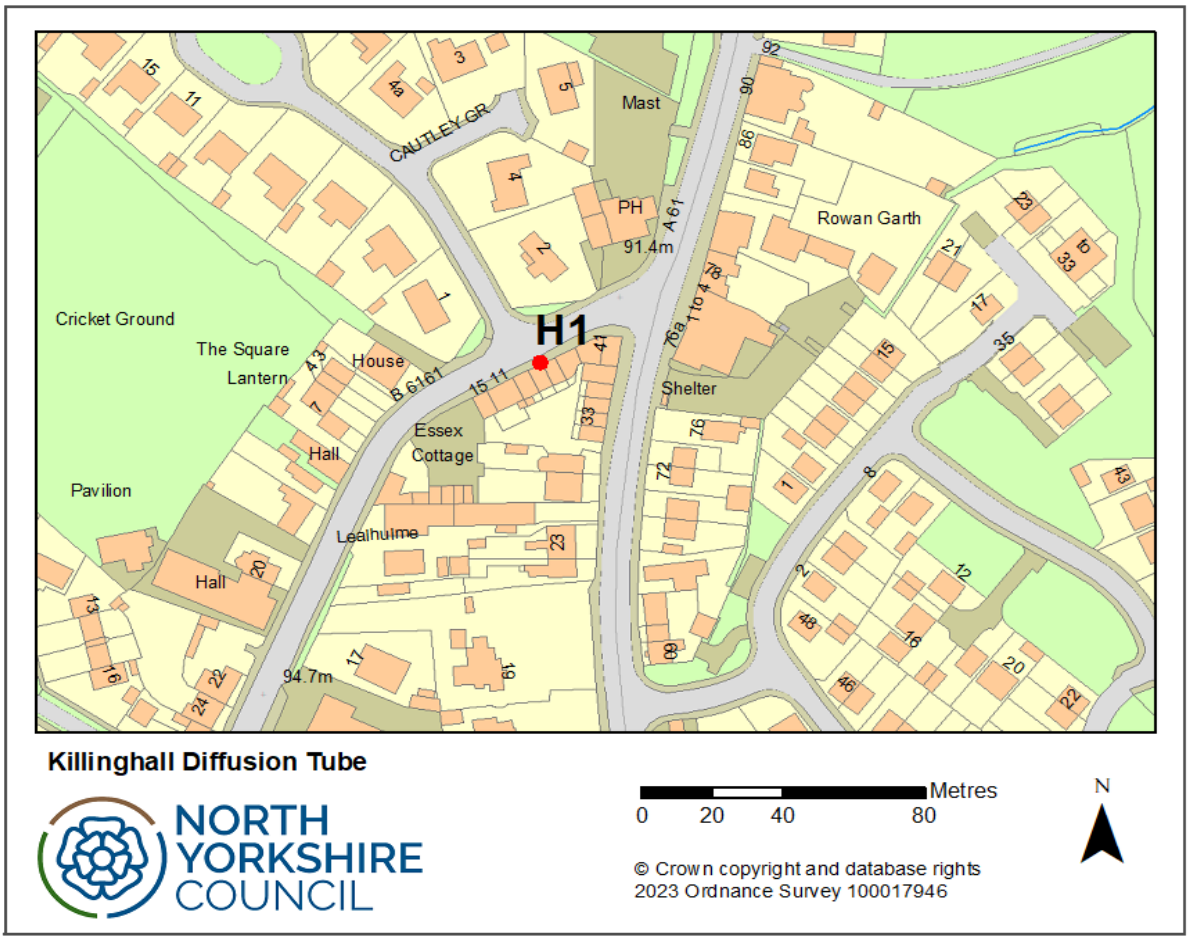
CAUTLEY GR
Mast
PH
91.4m
A 61
Rowan Garth
H1
Cricket Ground
The Square
Lantern
House
B 6161
Shelter
Essex Cottage
Hall
Pavilion
Lealholme
Hall
94.7m
Killinghall Diffusion Tube
NORTH YORKSHIRE COUNCIL
0 20 40 80 Metres
N
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Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[7] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Glossary of terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by National Highways
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG22. August 2022. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- AQMA's Declared by Harrogate Borough Council Local Authority Details - Defra, UK
- Harrogate Borough Council Annual Status Report 2022 Air quality in the Harrogate area | North Yorkshire Council
- Public Health Outcomes Framework Public Health Outcomes Framework - Data - OHID (phe.org.uk)
- Defra Interactive monitoring network map Interactive monitoring networks map - Defra, UK
- The Diffusion Tube Bias Adjustment Factors Spreadsheet National Bias Adjustment Factors | LAQM (defra.gov.uk)
- Defra Precision and Accuracy Precision and Accuracy | LAQM (defra.gov.uk)
- Defra QA/QC Framework QA QC Framework | LAQM (defra.gov.uk)