



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 Redcar and Cleveland

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 areas of deprivation^{1,2}.

The mortality burden of air pollution within the UK is equivalent to 29,000 to 343,000 deaths at typical ages³, with a total estimated healthcare cost to the NHS and social care of £157 million in 2017⁴.

Redcar and Cleveland continue to maintain a good standard of air quality across the Borough for 2022 evidenced by the continued monitoring of the following pollutants; nitrogen dioxide (NO₂), ozone (O₃) and particulate matter in two fractions, PM₁₀ and PM_{2.5} using continuous and non-continuous monitoring processes. The pollutants monitored have remained relatively static throughout 2022 in line with data from previous years.

Continued compliance with UK air quality objectives across Redcar and Cleveland means that the declaration of an air quality management area (AQMA) is not necessary and we will be unlikely to require a declaration in the coming years. Redcar and Cleveland Borough Council is proud of this history and seeks to protect the air quality for all residents, businesses and visitors.

The first South Tees Clear Air Strategy is currently progressing through final approval by Redcar and Cleveland Borough Council and Middlesbrough Council who cover the South Tees area that share the same Director of Public Health. A draft copy of the strategy has

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

been submitted to Defra alongside the 2023 ASR submission. The South Tees geographical area is depicted in Appendix D.8.

The Redcar and Cleveland [Greener Future](#) website, developed in response to the Climate Change Emergency Declaration, contains information for residents and businesses to improve their own carbon footprint and links to websites for additional support.

The [Air Quality England](#) website provides current information on air quality, including any appropriate public health notifications, a useful tool for members of the public who have health implications that can be affected by changes in local air quality.

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 Plan⁵ 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 Zero⁶ 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.

The first South Tees Clean Air Strategy, produced in conjunction with Middlesbrough Council, includes a set of performance measures and milestones that aim to improve air quality across the South Tees, while air quality is good there is no room for complacency.

Utilisation of the planning and environmental permitting regimes within Redcar and Cleveland continue to be assessed and enforced to control emissions from industrial activities and new sources of pollution.

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

The air quality monitoring regime is subject to an annual review to ensure that the most appropriate areas of public exposure and pollutant sources are assessed.

Redevelopment of the former steelworks site in Redcar has created [Teesworks](#), the UK's largest Freeport containing diverse, sustainable and low-carbon activities. Redcar and Cleveland are committed to ensure that the redevelopment is undertaken with air quality and environment on the main agenda.

Conclusions and Priorities

Redcar and Cleveland Borough Council has monitored another year of good air quality across the Borough. The pollutants monitored (NO₂, NO_x, O₃, PM₁₀ and PM_{2.5}) have demonstrated compliance with the UK Air Quality Objectives during 2022. Live and historic data for Redcar and Cleveland can be viewed via the [Air Quality England](#) website. Redcar and Cleveland Borough Council have not declared any AQMA's and this situation is unlikely to change in the near future.

Direct monitoring of PM_{2.5} via a continuous analyser since mid-2020 shows a commitment to invest in the monitoring and assessment of the pollutant linked to greatest adverse health implications. The diffusion tube network to monitor NO₂ is subject to an annual review to ensure any new areas of public exposure or pollutant sources are monitored, full details of the review can be found within the main body of the report.

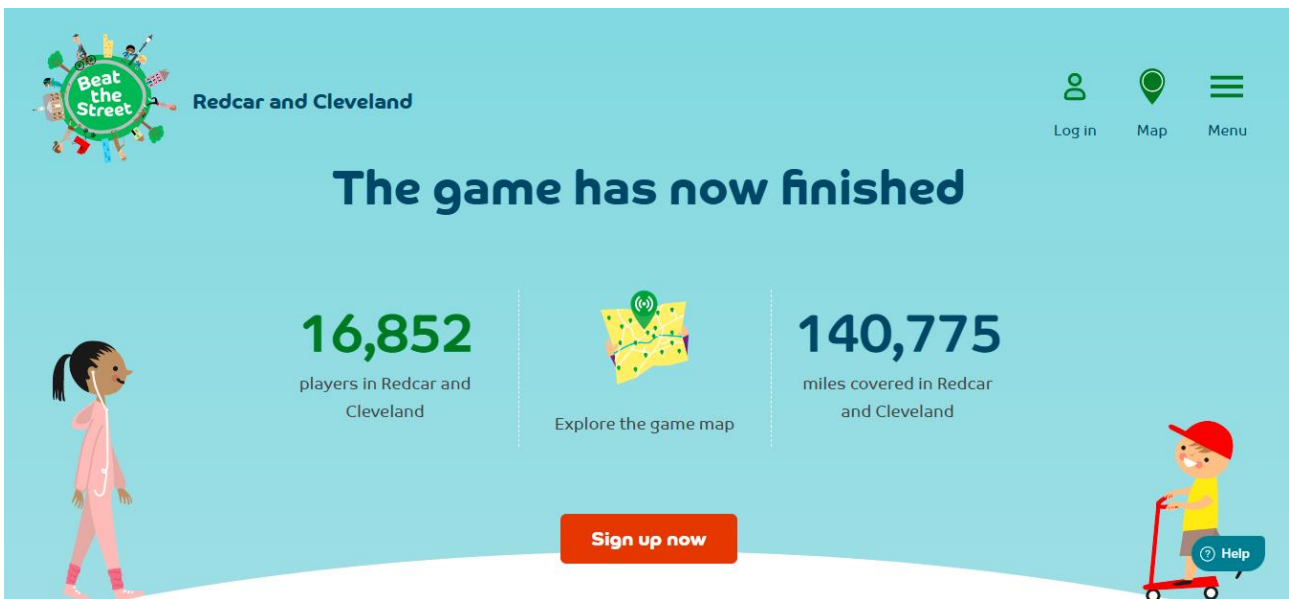
Broadly speaking the pollutants monitored within Redcar and Cleveland have remained relatively static over the last few years, data from 2022 reporting year has again supported this pattern. Annual figures remain considerably below the Air Quality Objectives.

Redcar and Cleveland are committed to collaborative working with neighbouring Middlesbrough Borough Council through the production of the first South Tees Clean Air Strategy to ensure cross boundary developments and initiatives work for the benefit of the wider area.

Local Engagement and How to get Involved

During spring 2022, between 2nd March and 13th April, residents, schools and businesses across Redcar and Cleveland were encouraged to participate in the [Beat the Street](#) game, to encourage a modal shift in transport use specifically during the game timescale, with a hope to make these changes permanent. Participants in the game were given a card to

scan at locations across the Borough, easily accessible on footpaths and cycle routes. At the end of the scheme Redcar and Cleveland had enlisted 16,852 players who covered a total of 140,775 miles.



Officers from the Environmental Protection and Community Development Teams were able to participate in an East Cleveland school's 'Climate Change Day' during May 2022. The event provided an opportunity for a wide range of businesses, charities and artists to come together and increase their understanding of climate change and what actions pupils could take to make their local area better. Pupils and staff were encouraged to make a pledge detailing one activity they could complete that would have a benefit to themselves and the community, such as walking / cycling to school 2 days a week or bringing in their own re-usable water bottle. Pupils were also encouraged to become involved in local litter picks and links to the Clean Air Day on 16th June were presented.





Redcar and Cleveland Borough Council are part of the wider Tees Valley Combined Authority (TVCA) depicted below, residents and businesses can access information on bus, train, car share, cycle and foot routes across the area through the [Let's Go Tees Valley](#) website. Throughout the 2022 summer school holidays local bus companies, Arriva, Stagecoach and Go North East introduced a 'Kids Go Free by Bus' scheme to allow families to plan days out in the local area using local buses as an alternative means of transport. The [Enjoy Redcar / Cleveland](#) website also provides details on cycling routes and maps for residents and visitors.



September 2022 saw Redcar and Cleveland host Stage 4 of the prestigious Tour of Britain Cycle Race, an opportunity for people to witness a world class sporting event and to support the Council's wider ambition to develop the Borough as a place for cycling.

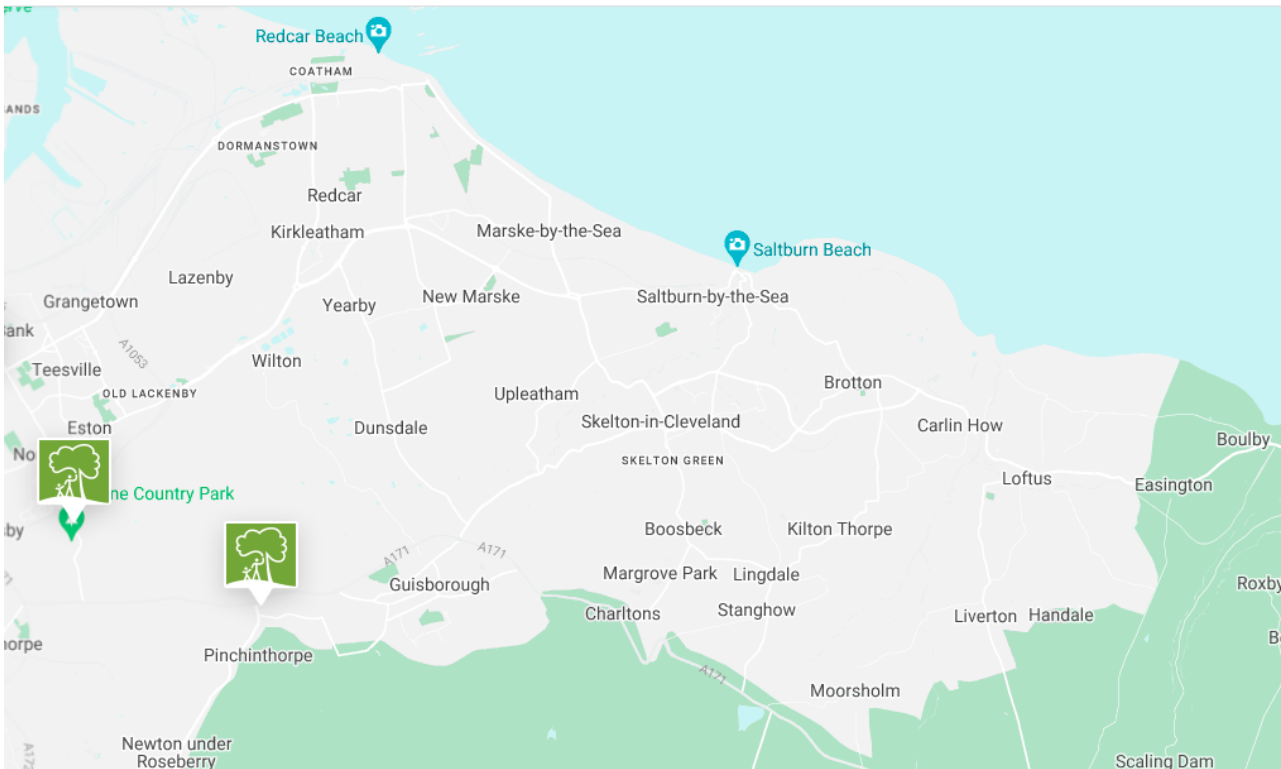
The North York Moors National Park spans the south-east area of Redcar and Cleveland, during May 2022 the National Park Authority produced their 20-year collective vision after substantial consultation with local residents and businesses. The new [Management Vision](#) has since developed six outcomes included within these are commitments to; climate change and nature recovery, a rich biodiverse landscape and support for a diverse and innovative low carbon economy.

Northern Gas Networks identified the Coatham ward in Redcar as a proposed location for the supply of hydrogen gas from 2025. Potentially up to 2,000 homes would form the [Redcar Hydrogen Community](#). Redcar was identified as a suitable location due to the potential for Green Hydrogen production in the area, from an alternative development. Residents in the area identified were invited to book in for a house survey by a British Gas Engineer.

Staff within Redcar and Cleveland Borough Council Waste Teams started a new waste recycling promotion scheme during September 2022, to improve understanding of waste streams that can and cannot be recycled by residents boroughwide. The Covid-19 pandemic saw recycling rates across the Borough reduced, a target of increasing recycling

rates from the current 37.5% rate to 50% by 2025 has been introduced. Local residents are able to find additional information on waste and recycling via the [Council website](#).

Residents and visitors to Redcar and Cleveland can enjoy Green Flag Award spaces at Flatts Lane Country Park and Guisborough Forest and Walkway, a recognition of the hard work completed by staff and volunteers to ensure that the public have access to high quality green spaces. Further information on the scheme and locations can be accessed on the [Green Flag Award](#) website and seen on the map below.



Residents and visitors can also enjoy sea and sand open spaces. Seaside Award beaches in 2022 were located at Redcar Lifeboat beach and at Saltburn-by-the-Sea.



To help spread the message of the actions being taken by Redcar and Cleveland Borough Council, staff from the Climate Change & Energy, Waste & Recycling Teams and the PFI apprentice attended the 'All Our Futures' Youth Climate Conference at Redcar and Cleveland College in August 2022. Staff were able to present keynote speeches and two workshops around themes of saving energy and 'reduce, reuse and recycle' to students who attend the College.

The development of electric vehicle charging (EVC) locations has increased, by 53, across Redcar and Cleveland during 2022, up to date locations can be found using the [ZapMap](#) website.

Schools, businesses and community groups who support walking, cycling and other forms of sustainable travel can use the [Model Shift Stars](#) website to assess if they are applicable to join the recognition scheme. The website also has a useful toolkit for those schools and businesses who are looking to improve their current travel plans.

The [Making Every Contact Count](#) (MECC) website, launched in 2022 offers a wealth of information sources regarding physical activity, transport, health and green and blue spaces for residents and visitors in the North East and Cumbria region.

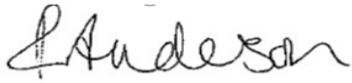
Local Responsibilities and Commitment

This ASR was prepared by the Environmental Protection Team of Redcar and Cleveland Borough Council with the support and agreement of the following officers and departments:

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This ASR is also supported by Mark Adams, Joint Director of Public Health, South Tees.

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1 Local Air Quality Management

This report provides an overview of air quality in Redcar and Cleveland 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 Redcar and Cleveland Borough Council 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

2.1 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.

Redcar and Cleveland Borough Council currently does not have any declared AQMAs. The first South Tees Air Quality Strategy is progressing through final approval by Redcar and Cleveland Borough Council and Middlesbrough Council who cover the South Tees area and shared Director of Public Health. A draft copy of the strategy has been submitted with the 2023 ASR.

2.2 Progress and Impact of Measures to address Air Quality in Redcar and Cleveland

Defra's appraisal of last year's ASR concluded the report was well structured, detailed and provides the information specified in the Guidance. Specific comments and recommendations for the report included:

- Redcar and Cleveland Borough Council have addressed the comments from last year's appraisal as necessary, and it is clear they have been actioned upon in this latest ASR. It is encouraged that this continues in future ASR's.
- The discussion over the justification of the usage of the national bias adjustment factor compared to a local factor is appreciated, particularly the comparison of the different values seen in Table C.2.
- It is appreciated that the Council have discussed the UK Public Health Outcomes Framework, particularly providing the D01 fraction of the administrative area, but also providing those of neighbouring local authorities, which is useful for comparison.
- The Council have not ticked a box under Table A.4 stating that the reported concentrations are prior to any fall-off distance correction, however the Council has stated within the QA/QC section that there is no distance correction. This is likely an error but is something that should've been picked up on. RESPONSE: Redcar and Cleveland will ensure that a complete review of the ASR is undertaken to safeguard that this is not repeated.
- The maps of monitoring locations within Appendix D are generally clear and easy to read, though the first figure D.1 of the non-automatic monitoring site is very busy, with the inclusion of DT's making it difficult to see where the non-automatic monitoring site is. RESPONSE: The mapping scale has been altered to provide a clearer overview of non-automatic monitoring sites.
- Overall, the report is a good concise summary of the Council's commitment to ensuring that air quality is improved and satisfies the criteria of relevant standards. Redcar and Cleveland Borough Council should continue with this good quality of work.

Redcar and Cleveland has taken forward a number of direct measures during the current reporting year of 2022 in pursuit of improving local air quality.

Redcar and Cleveland identified in the 2022 ASR a number of initiatives that would be implemented during the next reporting year. Progress with each of the initiatives has been identified below.

- **Promotion of Redcar and Cleveland Borough Council as one of the seven chosen local authorities to turn the Borough into a giant game via the ‘Beat the Street’ initiative.** The game was promoted to all schools, council employees and local community groups, at the end of the initiative over 10% of the Borough’s population has signed up to compete, resulting in 16,852 players covering 140,775 miles.
- **Publication of the first South Tees Clean Air Strategy.** The first South Tees Clean Air Strategy is progressing through final approval by Redcar and Cleveland Borough Council and Middlesbrough Borough Council. A draft copy has been submitted to Defra with the 2023 ASR.
- **Submission of a joint TVCA bid to the UK Government’s Sustainable Warmth Competition for the Homes Upgrade Grant (HUG).** A consortium bid was made by Redcar and Cleveland Borough Council, Hartlepool Council, Stockton-on-Tees Council and Darlington Council for the additional HUG funding announced during December 2022. The first round of HUG has now been subject to an extension until July 2023. This extension has included a revision to the initial proposal to target 260 homes, reducing this to 236 across the Tees Valley. A reduction in the number of properties to be targeted has been requested due to consultation feedback and a request for more expensive options such as solar panels rather than loft-cavity insulation.
- **Participation in a local primary schools Climate Change Day.** On 19th May 2022 officers from the Council’s Environmental Protection and Community Development Teams attended an East Cleveland Primary School alongside charities and local artists to promote climate change and discuss local actions that can be taken by all. It was a fun day enjoyed by the pupils at the school and their linked academy schools.

In addition to the list above the following measures were also implemented during 2022.

- Increased the EV charging capacity across the Borough by the introduction of an additional 53 chargers in public car parks to ensure there is availability for all residents, including those with no private household connection. This included

£570,000 of funding from TVCA to drastically overhaul parking provisions on Skelton High Street from waste ground to a 27-bay car park with four bays for EV charging from one standard and one faster charger.



- Redcar and Cleveland investment for replacement of a road line painting machine with an electric model.
- Replacement of end-of-life street sweepers with 7 new vehicles that are able to run on hydrotreated vegetable oil (HVO).
- Promotion of the Cycle to Work scheme for employees to take advantage of discounts on bikes, up to 43% reduction, for a modal shift in the way people travel to work.
- Redcar and Cleveland Fleet Team were successful in obtaining the Alternative Fuel Vehicle Champion Award, from Asset Works, due to the use of HVO street sweepers and switch to electric vehicles.

Redcar and Cleveland worked to implement these measures in partnership with the following stakeholders during 2022:

- Tees Valley Combined Authority (TVCA)
- Tees Valley Environmental Protection Group (TVEPG)
- Environment Agency (EA)

2.3 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 detrimental impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

Redcar and Cleveland Borough Council is taking the following measures to address PM_{2.5}:

- Redcar and Cleveland Borough Council is one of five local authorities forming the [Tees Valley Combined Authority](#) (TVCA). Given the impact of PM_{2.5} on health co-operative working between all five local authorities is required to address air quality across the region, including the development of a transport policy to increase the availability of EV charging points and improvements and addition to the cycle / footpath network.
- Commitment to directly monitor PM_{2.5} at the automatic monitoring station in Redcar. Full datasets are now available for the last two years.
- Regulation of industrial processes under the Environmental Permitting Regulations to ensure that emissions to atmosphere are controlled and utilise best practise for the industry sector.
- Pledge to continue to increase the procurement of electric / efficient fleet vehicles across the Borough. Currently the procurement of electric and alternative fuel vehicles in Redcar and Cleveland is almost 20%.
- Utilisation of the planning regime to identify new sources of PM_{2.5} and apply relevant planning conditions to ensure emissions to the air are controlled and minimised. New and changed sources in Redcar and Cleveland identified during 2022 have been detailed in Appendix C.
- Enforcement of excessive smoke emissions from domestic properties, both within and outside of smoke control areas (SCA). Redcar and Cleveland currently has 51 SCA's that cover a large proportion of the Borough, a map of these locations is provided in Appendix D.

Across the TVCA area three PM_{2.5} monitoring sites are located that form part of the AURN network, one Middlesbrough and two in Stockton along with the continuous analyser location located in Redcar. Annual means for these sites are reported in Table A.8.

The UK Public Health Outcomes Framework has reported new 2021 data for the D01 – Fraction of mortality attributable to air pollution using a new method. Data for Redcar and Cleveland, TVCA authorities and England have been reported below.

Table 2.3.1 2021 UK Public Health Outcomes Framework, D01 – Fraction of mortality attributable to air pollution

	England	North East	Redcar & Cleveland	Darlington	Hartlepool	Middlesbrough	Stockton-on-Tees
Fraction	4.8	4.8	4.4	4.6	4.5	5.2	4.9

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

This section sets out the monitoring undertaken within 2022 by Redcar and Cleveland Borough 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.

3.1 Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Site

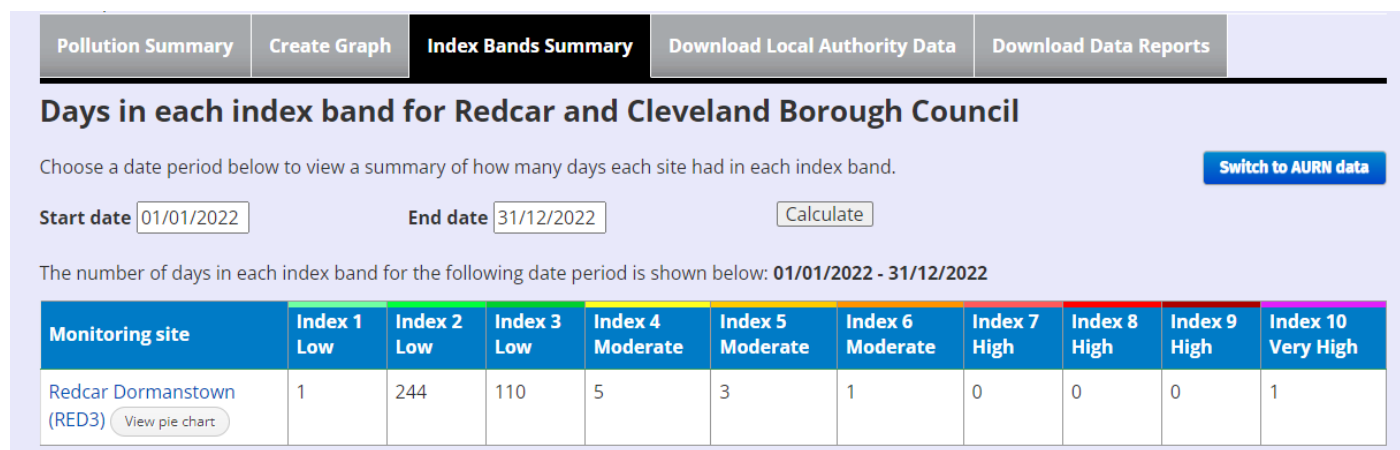
Redcar and Cleveland Borough Council undertook automatic (continuous) monitoring at one site during 2022. Table A.1 in Appendix A shows the details of the automatic monitoring site. The [Air Quality in England \(AQE\)](#) page provides automatic monitoring results for Redcar and Cleveland Borough Council, with automatic monitoring results also available through the [UK-Air](#) website.

A map showing the location of the 2022 monitoring site and historic site is provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

The Dormanstown, automatic monitoring site, has been operational since 2012 in a suburban location within the grounds of a local primary school. The site lies within 4km of the major industrial / chemical complexes of Redcar and Cleveland, Wilton International and the former steelworks, Teesworks that is undergoing significant redevelopment to become a sustainable low carbon site.

Redcar and Cleveland monitor oxides of nitrogen (NO_x), ozone (O₃) and both PM₁₀ and PM_{2.5} from this site. Data from the automatic monitoring site is available via the [Air Quality in England](#) website. This website also provides the Daily Air Quality Index (DAQI), a measure used to provide information regarding air pollution levels and health advice for those that may be susceptible to reduced air quality. During the 2022 reporting year Redcar and Cleveland recorded its first very high episode during March, however the trigger for this episode is unknown as there were no reported industrial releases, large

fires or other factors that could be attributed to this. The majority of 2022 reported low DAQI levels as defined below.



3.1.2 Non-Automatic Monitoring Sites

Redcar and Cleveland Borough Council undertook non-automatic (i.e. passive) monitoring of NO₂ at 14 sites during 2022. Table A.2 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 (e.g. annualisation and/or distance correction), are included in Appendix C.

The diffusion tube network across Redcar and Cleveland has been in operation since 2014 with a focus on areas of high traffic flows, public exposure, standing traffic and schools within the borough. The diffusion tubes are annually reviewed to identify any new areas of exposure, ensuring that each ward within Redcar and Cleveland has received monitoring and to remove locations that show consistently low levels of NO₂ over a minimum period of two years.

An overview of the 2022 diffusion tube network has been identified in the table below.

Table 3.1.2.1: Diffusion Tube Network Review Rationale

Tube ID	Site Name	Retain / Remove	Justification
R17/R18/R19	Dormanstown	Retain	Co-location study at the site of the automatic monitoring station.

R26	Trunk Road	Retain	Long-term location site to monitor emissions from the nearby A66 main arterial through road.
R27	West Lane	Retain	Long-term location site to monitor emissions from the nearby A66 main arterial through road.
R41	Mersey Road	Remove	Site suffered a high proportion of missing tubes during 2021 (5 months), an alternative location for the 2022 monitoring programme (R61) was deployed
R49	High Street, Marske	Remove	2-year monitoring has shown annual mean results average less than 50% of the AQ objective level.
R50	Lauderdale Drive	Remove	2-year monitoring has shown annual mean results average less than 50% of the AQ objective level.
R51	Broadway	Retain	Area of good public exposure and located close to main link road through borough.
R52	West Dyke Road	Retain	Area of good public exposure and in proximity of Redcar central rail station.
R53	High Street, Boosbeck	Remove	2-year monitoring has shown annual mean results average less than 50% of the AQ objective level.
R54	Ormesby Bank	Retain	This site reports the highest annual NO ₂ results for Redcar and Cleveland, monitoring to be supported with an additional diffusion tube location on the same road.
R55	Church Street	Retain	Site in area of good exposure and annual results slightly above 50% of the AQ objective level.

R56	Station Lane	Remove	2-year monitoring has shown annual mean results average less than 50% of the AQ objective level.
R57	Tennyson Avenue	Remove	Site suffered a high proportion of diffusion tube loss during 2021 (6 months) therefore this site was removed from the 2022 monitoring programme.
R58	Fabian Road	Retain	Site monitoring only commenced during 2021, a minimum of 2-years' worth of data required to inform retention.
R59	Redcar Road	Retain	Site monitoring only commenced during 2021, a minimum of 2-years' worth of data required to inform retention.
R60	Flatts Lane	Retain	Site monitoring only commenced during 2021, a minimum of 2-years' worth of data required to inform retention.

Four new diffusion tube locations were chosen for the 2022 non-automatic monitoring programme; R61 St Josephs Court, R62 Stirling Road, R63 Ormesby Bank (2) and R64 Hutton Lane. R62 and R64 are locations near schools, Redcar and Cleveland has made a commitment to monitor around school locations to assess for any impact from the 'school run'. R61 is a replacement location for R41 (Mersey Road) which suffered a high proportion of diffusion tube loss during 2021, this location is 153 meters from the previous site in an area of good exposure. R63 (Ormesby Bank 2) has been chosen as a location to complement the highest Redcar and Cleveland diffusion tube location values at R54 (Ormesby Bank 1).

The diffusion tube network includes the use of a travel blank to provide a quality check for the transportation of tubes. Monthly, non-bias adjusted, results from the travel blank have been provided below and indicate that the travel process has a negligible effect on final diffusion tube results.

Table 3.1.2.2 Travel Blank Diffusion Tube Monthly Results 2022, $\mu\text{g}/\text{m}^3$

ID	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
R00	0.3	0.6	0.6	0.6	0.3	0.2	0.5	0.1	0.3	0.2	0.2	0.2

The diffusion tubes used in the study are 50% trimethylamine (TEA) in acetone and the results have been bias adjusted using the national bias adjustment factor (0.82). Further information relating to bias adjustment selection is provided in Appendix C.

3.2 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.

3.2.1 Nitrogen Dioxide (NO_2)

Table A.3 and Table A.4 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 $40\mu\text{g}/\text{m}^3$. Please 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 (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

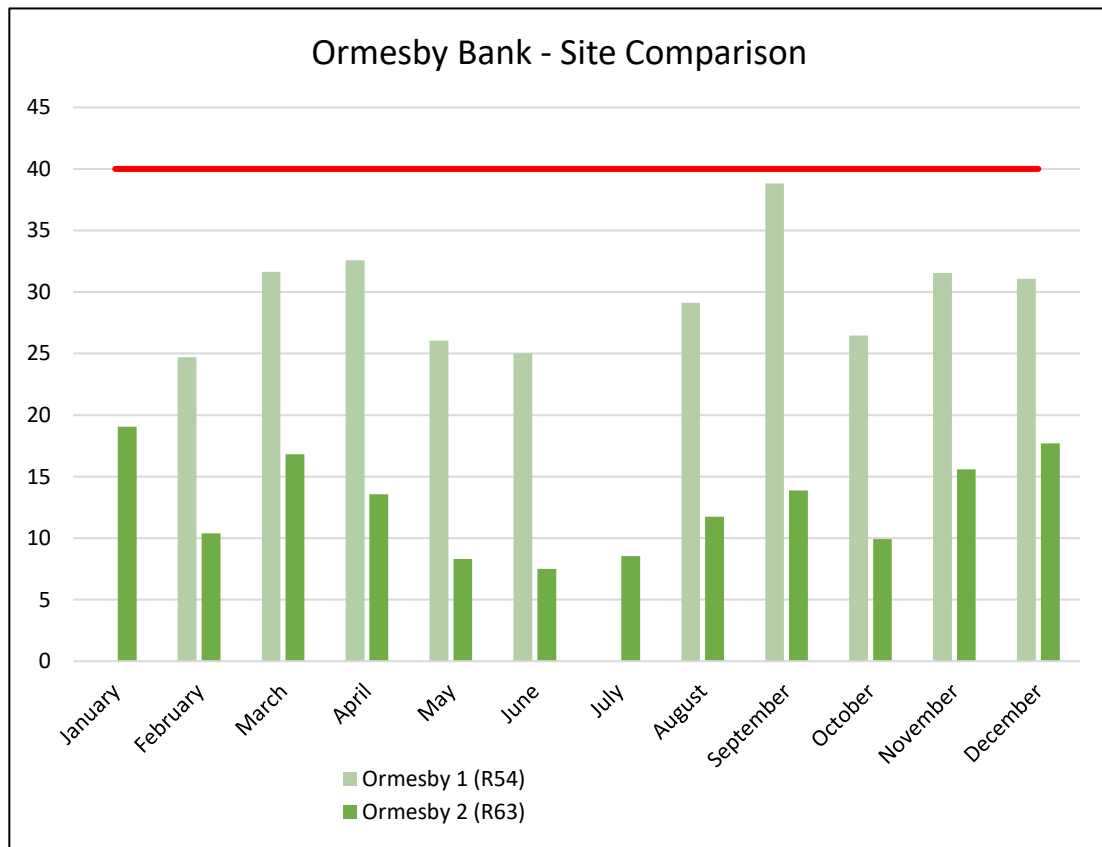
For diffusion tubes, the full 2022 dataset of monthly mean values is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant. Redcar and Cleveland has not been required to distance correct any data.

Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of $200\mu\text{g}/\text{m}^3$, not to be exceeded more than 18 times per year.

During 2022 there have been no exceedances of the annual mean or 1-hour AQ objective of $200\mu\text{g}/\text{m}^3$ for NO_2 at the continuous monitoring site or any of the diffusion tube locations.

The Ormesby Bank (R54) diffusion tube was identified as the highest NO₂ diffusion tube site in 2021, as a result of this an additional diffusion tube was deployed during 2022 at a domestic property around 270m away on the same road (R63), which is used as an arterial route between Guisborough and Middlesbrough. The diffusion tube locations monitor at the top and middle section of the road. The annual mean at each site remains below the AQ objective level, however a noticeable difference in monthly raw data is reported at the two sites, despite their locations being similar in nature. A graph depicting raw monthly data is presented below and these sites will continue to remain as part of the diffusion tube network to obtain longer term trend information.

Figure 3.2.1.1: 2022 Diffusion Tube Monthly Comparison, Ormesby Bank



Trend data available for sites within Redcar and Cleveland have been presented in Figure A.2, depicting that these sites are regularly below the 40µg/m³ objective level. The A66 main through road in the Borough has historically had two diffusion tube locations (R26 and R27) as part of the monitoring regime. Unfortunately, during 2022 the R26 location suffered a full year of diffusion tube loss, despite various efforts to prevent removal of the tube. Given that trend data for this site has been below the objective level a decision has been made to remove this location from the 2023 study as an alternative location could not

be found that would monitor the emissions attributable to the A66. Suitable locations will be considered during the annual diffusion tube review.

3.2.2 Particulate Matter (PM₁₀)

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM₁₀ annual mean concentrations for the past five years with the air quality objective of 40µg/m³.

Table A.7 in Appendix A compares the ratified continuous monitored PM₁₀ daily mean concentrations for the past five years with the air quality objective of 50µg/m³, not to be exceeded more than 35 times per year.

During 2022 the annual mean PM₁₀ value for Redcar and Cleveland has remained the same as 2021 reported levels, 14µg/m³, well below the air quality objective level. Figure A.3 presents trends in PM₁₀ annual mean levels since 1998, incorporating data from the historic Corporation Road automatic monitoring site.

Redcar and Cleveland recorded during 2022 3 exceedances of the 24-hour mean >50µg/m³, the first reported exceedances since 2017, however this figure remains significantly lower than the air quality objective of 35 times per year.

3.2.3 Particulate Matter (PM_{2.5})

Table A.8 in Appendix A presents the ratified and adjusted monitored PM_{2.5} annual mean concentrations for the past five years.

Redcar and Cleveland have a PM_{2.5} continuous analyser in operation at the Dormanstown site. This analyser was acquired in 2020 producing two years of actual monitored data. Prior to this time calculations of PM_{2.5} were based on actual PM₁₀ data using the national correction factor. All reported PM_{2.5} data has been ratified by a third party for quality checking.

The 2022 annual average is the same as measured in 2021, 7µg/m³. Additional PM_{2.5} values for neighbouring authorities within the Tees Valley are reported for information, with Redcar and Cleveland measuring the lowest annual average for the Tees valley area.

3.2.4 Ozone (O₃)

Redcar and Cleveland have monitored ozone from the automatic monitoring site in Dormanstown, and the previous Corporation Road site, since 1998. Although it is not a required reporting pollutant for LAQM purposes it is important to consider as ozone is not

produced by one direct source, it is a product of chemical reactions in the atmosphere between NO_x, VOC's and sunlight. Levels of ozone are higher during spring and summer months when the sunlight levels are increased. Ozone travels long distances which can mean high concentrations in areas far from the original source of pollution.

During 2022 Redcar and Cleveland have seen an increase in ozone values from the previous year; the maximum 8-hour ozone has increased to 140µg/m³ and the 8-hour running mean >100µg/m³ recorded 40 exceedances over 6 days. This increase could be attributable to a long summer season of high temperatures and dry conditions.

Concentrations of ozone are typically higher during the summer due to increased sunlight levels.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) ⁽¹⁾	Distance to kerb of nearest road (m) ⁽²⁾	Inlet Height (m)
Redcar Dormanstown	Dormanstown (2012 to present)	Suburban	458379	523486	NO ₂ , PM ₁₀ , PM _{2.5} , O ₃	No	NO ₂ - Chemiluminescent, PM ₁₀ - BAM from 2013, PM _{2.5} - BAM from 2020, O ₃ - UV Absorption	1	150	2.5
Redcar Corporation Road	Corporation Road (1997 to 2011)	Suburban	459900	524600	NO ₂ , PM ₁₀ , SO ₂ , O ₃	No	NO ₂ - Chemiluminescent, PM ₁₀ - TEOM (vcm correction), SO ₂ - UV fluorescence, O ₃ - UV Absorption	1	20	2.5

Notes:

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

(2) N/A if not applicable

Table A.2 – 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)
R17, R18, R19	Dormanstown	Suburban	458379	523486	NO2	No AQMA	0.0	150.0	Yes	2.5
R26	Trunk Road, South Bank	Roadside	453142	520836	NO2	No AQMA	42.0	11.0	No	2.5
R27	West Lane	Roadside	454712	520678	NO2	No AQMA	42.0	1.0	No	2.0
R51	Broadway	Suburban	455379	520543	NO2	No AQMA	0.0	10.0	No	2.0
R52	West Dyke Road	Suburban	460292	524876	NO2	No AQMA	0.0	2.1	No	2.5
R54	Ormesby Bank (1)	Roadside	453831	516212	NO2	No AQMA	8.5	4.4	No	2.5
R55	Church Street	Suburban	461553	516074	NO2	No AQMA	10.9	2.4	No	2.5
R58	Fabian Road	Roadside	455518	519353	NO2	No AQMA	15.6	3.0	No	2.5
R59	Redcar Road	Roadside	460869	523657	NO2	No AQMA	2.1	4.3	No	2.5
R60	Flatts Lane	Roadside	454864	517813	NO2	No AQMA	11.7	2.0	No	2.5
R61	St Josephs Lane	Roadside	459695	524414	NO2	No AQMA	2.5	2.4	No	2.5
R62	Stirling Road	Suburban	461308	523946	NO2	No AQMA	0.0	9.4	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)
R63	Ormesby Bank (2)	Suburban	453462	516420	NO2	No AQMA	0.0	11.8	No	2.0
R64	Hutton Lane	Suburban	460440	515021	NO2	No AQMA	0.0	13.6	No	2.0

Notes:

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

(2) N/A if not applicable.

Table A.3 – Annual Mean NO₂ Monitoring Results: Automatic Monitoring (µg/m³)

Site 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
Redcar Dormanstown	458379	523486	Suburban	99.7	100	10	9	9	11	10

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

Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction.

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

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 (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 – Annual Mean NO₂ Monitoring Results: Non-Automatic Monitoring (µg/m³)

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
R17, R18, R19	458379	523486	Suburban	100	100.0	17.5	15.2	13.2	11.5	11.7
R26	453142	520836	Roadside	100		24.7	19.5	17.7	19.6	-
R27	454712	520678	Roadside	100	100.0	29.8	24.8	21.0	23.1	20.6
R51	455379	520543	Suburban	100	100.0			11.7	12.1	11.8
R52	460292	524876	Suburban	100	75.0			16.3	15.7	14.9
R54	453831	516212	Roadside	100	84.6			27.3	30.5	24.4
R55	461553	516074	Suburban	100	92.3			16.3	18.1	15.5
R58	455518	519353	Roadside	100	82.7				13.8	12.3
R59	460869	523657	Roadside	100	90.4				13.9	14.0
R60	454864	517813	Roadside	100	90.4				16.9	17.7
R61	459695	524414	Roadside	100	84.6					11.7
R62	461308	523946	Suburban	100	100.0					9.3
R63	453462	516420	Suburban	100	100.0					10.5
R64	460440	515021	Suburban	100	100.0					5.8

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), i.e. prior to any fall-off with distance correction.

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 (e.g. 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 NO₂ Concentrations

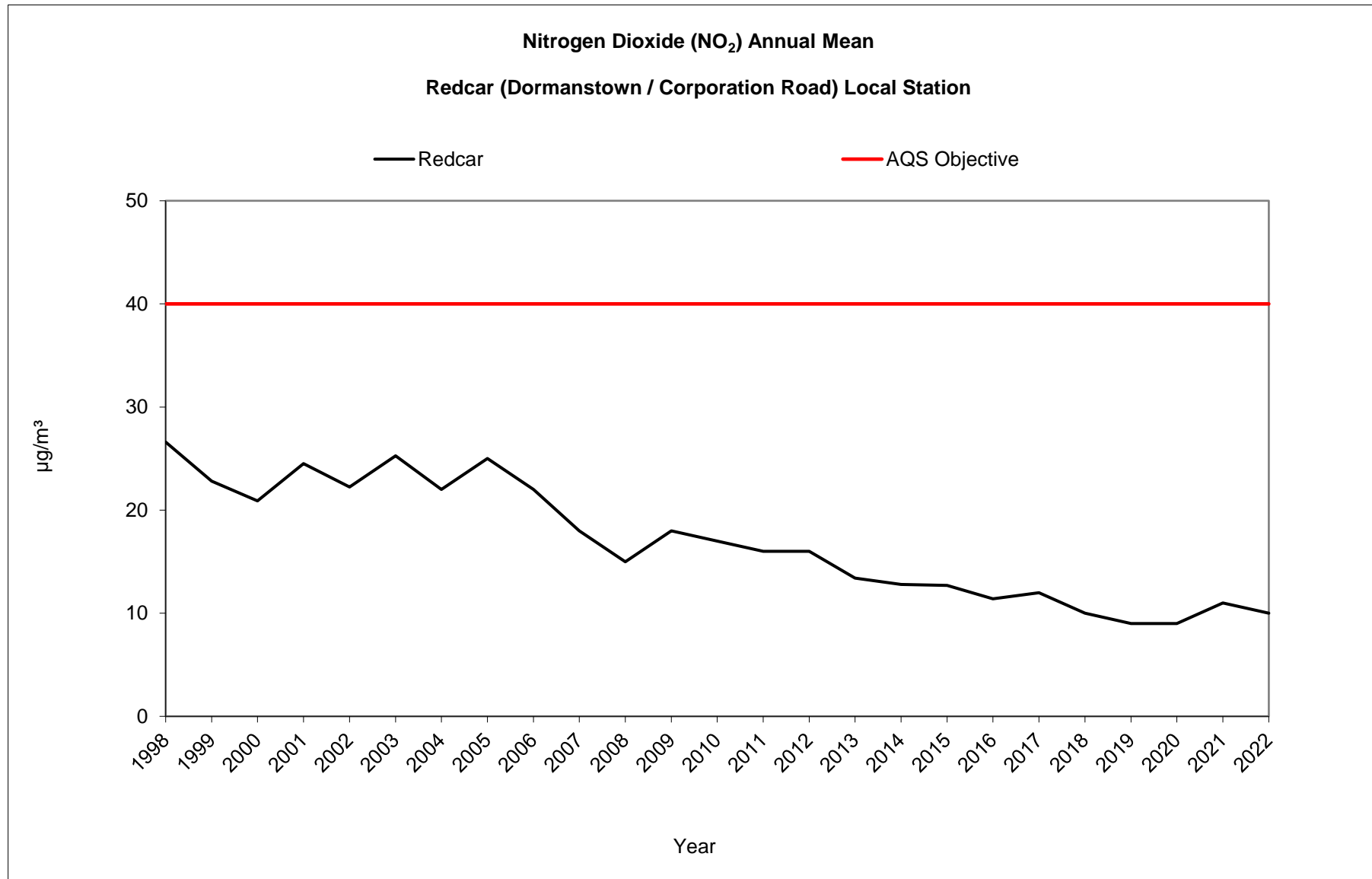


Figure A.2 – Trends in Annual Mean NO₂ Concentrations at Long-Term Diffusion Tube Locations

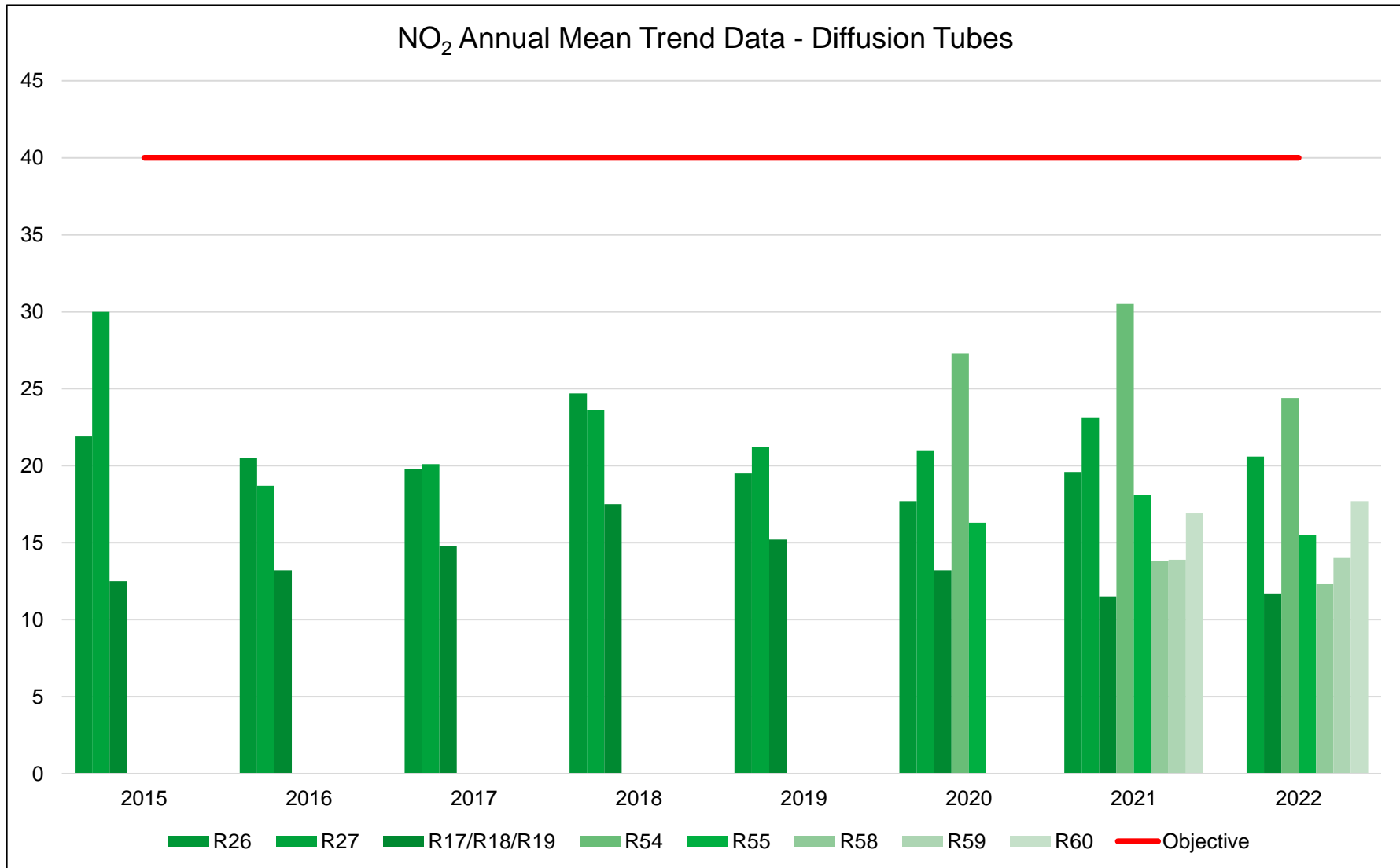


Table A.5 – 1-Hour Mean NO₂ Monitoring Results, Number of 1-Hour Means > 200µg/m³

Site 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
Redcar Dormanstown	458379	523486	Suburban	99.7	100	0	0	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m³ have been recorded.

Exceedances of the NO₂ 1-hour mean objective (200µg/m³ not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(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 (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.6 – Annual Mean PM₁₀ Monitoring Results (µg/m³)

Site 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
Redcar Dormanstown	458379	523486	Suburban	98.1	100	12	14	13	14	14

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

Notes:

The annual mean concentrations are presented as µg/m³.

Exceedances of the PM₁₀ annual mean objective of 40µg/m³ are shown in **bold**.

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. Annualisation is not required for this data.

(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 (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.2 – Trends in Annual Mean PM₁₀ Concentrations

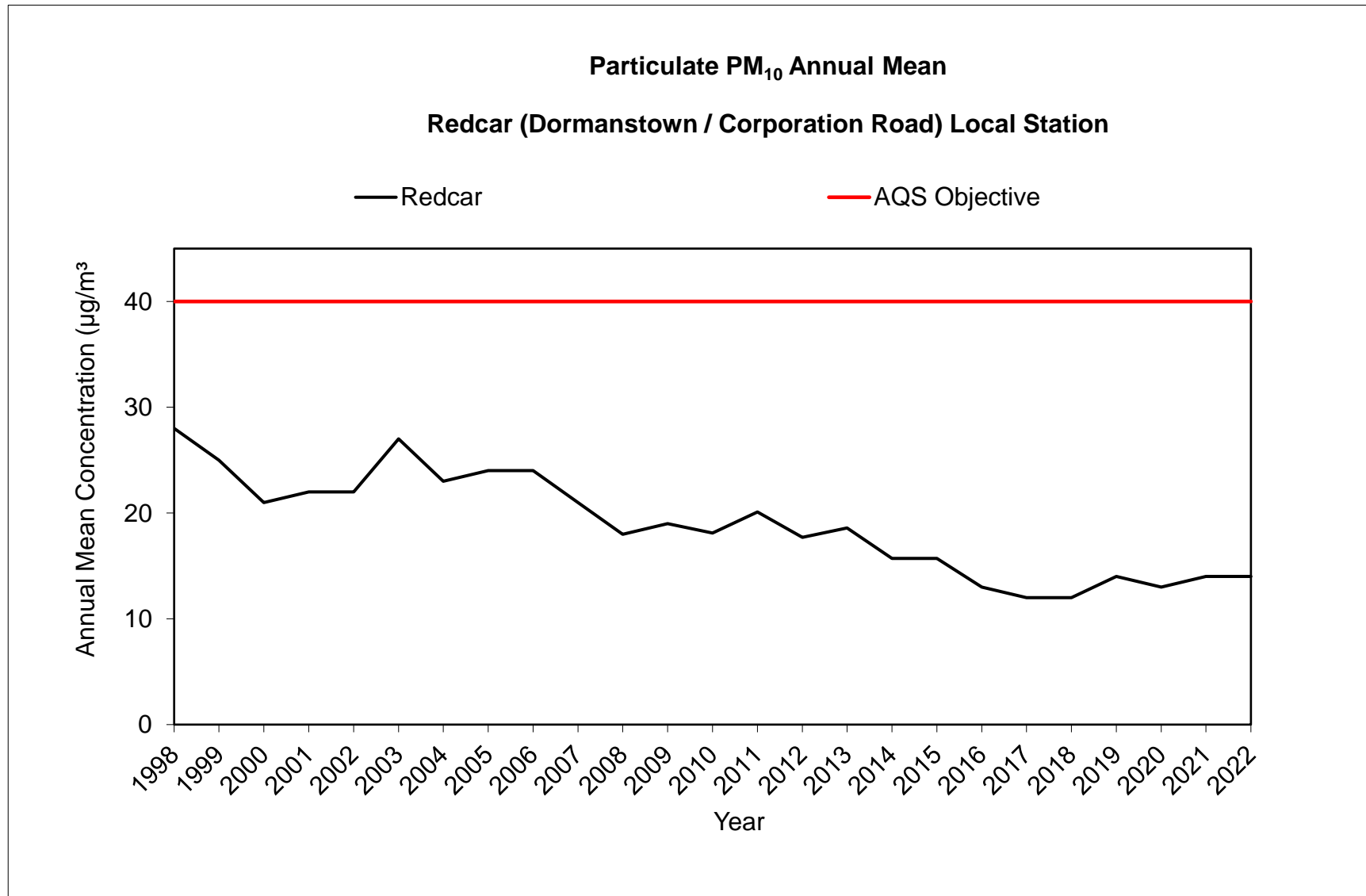


Table A.7 – 24-Hour Mean PM₁₀ Monitoring Results, Number of PM₁₀ 24-Hour Means > 50µg/m³

Site 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
Redcar Dormanstown	458379	523486	Suburban	98.1	100	0	0	0	0	3

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m³ have been recorded.

Exceedances of the PM₁₀ 24-hour mean objective (50µg/m³ not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(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 (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.8 – Annual Mean PM_{2.5} Monitoring Results (µg/m³)

Site 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
Redcar Dormanstown	458379	523486	Suburban	97.3	100	8.4*	9.8*	9.1*	7	7
Middlesbrough Breckon Hill	450506	519620	Urban Background	94	100	8.9	10.3	7.6	6	8
Stockton Eaglescliffe	441623	513674	Roadside	96	100	10	8	8	8	8
Stockton A1305 Nelson Terrace	444331	519170	Roadside	94	100	9	8	8	7	9

Annualisation has been conducted where data capture is <75% and >25% in line with LAQM.TG22. No annualisation has been required.

Notes:

The annual mean concentrations are presented as µg/m³.

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.

(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 (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

* Data has been calculated from PM₁₀ values.

Appendix B: Full Monthly Diffusion Tube Results for 2022

Table B.1 – NO₂ 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 <0.82>	Annual Mean: Distance Corrected to Nearest Exposure	Comment
R17	458379	523486	24.8	18.9	15.2	9.4	11.0	9.9	10.0	11.6	11.1	14.0	15.4	18.4	-	-	-	Triplicate Site with R17, R18 and R19 - Annual data provided for R19 only
R18	458379	523486	26.0	19.9	15.9	10.7	10.6	10.9	10.8	11.3	9.9	14.0	16.0	17.2	-	-	-	Triplicate Site with R17, R18 and R19 - Annual data provided for R19 only
R19	458379	523486	22.2	20.0	14.6	10.9	9.7	11.7	11.9	11.9	10.3	12.8	14.5	22.4	14.3	11.7	-	Triplicate Site with R17, R18 and R19 - Annual data provided for R19 only
R26	453142	520836														-	-	Diffusion tubes were missing from the site each collection month
R27	454712	520678	30.5	22.9	31.2	33.7	21.4	20.7	22.0	27.6	27.9	17.8	21.9	23.7	25.1	20.6	-	
R51	455379	520543	18.7	13.3	20.7	14.4	10.5	9.7	11.1	13.7	13.9	11.4	17.2	18.0	14.4	11.8	-	
R52	460292	524876			23.9	16.2	15.2	14.3	16.4	18.6	19.5	17.4	22.3		18.2	14.9	-	
R54	453831	516212		24.7	31.7	32.6	26.0	25.0		29.1	38.8	26.5	31.5	31.1	29.7	24.4	-	
R55	461553	516074		22.2	24.1	17.8	16.3	16.3	15.0	15.0	18.7	17.6	23.1	21.4	18.8	15.5	-	
R58	455518	519353	20.1	13.5	22.1	12.7	12.2		11.9	15.3	14.0	13.6	14.8		15.0	12.3	-	
R59	460869	523657	22.8	15.7	24.1	15.6		10.4	11.2	13.5	15.1	15.4	21.4	22.0	17.0	14.0	-	
R60	454864	517813	29.4	17.9	24.4		18.2	18.0	18.6	17.0	21.0	21.0	26.0	26.4	21.6	17.7	-	
R61	459695	524414	19.8	14.2	17.5	11.2	10.0	8.7			12.7	14.2	18.0	15.8	14.2	11.7	-	
R62	461308	523946	22.8	12.9	12.5	7.3	7.1	7.8	7.3	8.9	10.2	10.2	15.3	13.9	11.3	9.3	-	
R63	453462	516420	19.1	10.4	16.8	13.6	8.3	7.5	8.6	11.7	13.9	9.9	15.6	17.7	12.8	10.5	-	
R64	460440	515021	10.0	5.0	10.7	5.5	4.9	4.3	4.9	5.3	6.4	7.1	9.7	11.5	7.1	5.8	-	

- All erroneous data has been removed from the NO₂ 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.
- National bias adjustment factor used.
- Where applicable, data has been distance corrected for relevant exposure in the final column. Distance correction not required for 2022 data.
- Redcar and Cleveland Borough Council confirm that all 2022 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System.

Notes:

Exceedances of the NO₂ annual mean objective of 40µg/m³ are shown in **bold**.

NO₂ annual means exceeding 60µg/m³, indicating a potential exceedance of the NO₂ 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 Redcar and Cleveland During 2022

Redcar and Cleveland have identified the following new sources relating to air quality within the reporting year of 2022, largely arising through the [planning process](#).

The former steelworks site in Redcar continues to be re-developed as part of the wider [Teesworks](#) ambition. The area has produced several planning applications during 2022 as redevelopment progresses, largely for the discharge of conditions. An overview of these applications is listed below.

- R/2022/0342/CD - Partial discharge of conditions 21 (piling risk assessment) and 25 (gas risk assessment) phase 3 of outline planning permission R/2020/0357/OOM for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated infrastructure works all matters reserved other than access.
- R/2022/0343/ESM - Application for the approval of reserved matters, namely appearance, landscaping, layout and scale in respect of a class B2 manufacturing unit with ancillary offices, parking, servicing, and landscaping following approval of outline planning permission R/2020/0357/OOM.
- R/2022/0411/CD - Partially discharge condition 18 (noise) of outline planning permission R/2020/0357/OOM for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated infrastructure works all matters reserved other than access.
- R/2022/0454/CD - Partial discharge of condition 5 (Construction Environmental Management Plan, CEMP) of planning permission R/2020/0357/OOM for outline planning application for demolition of existing structures on site and the

development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated infrastructure works all matters reserved other than access.

- R/2022/0526/CD - Partial discharge of condition 28 (construction traffic assessment) of outline planning permission R/2020/0357/OOM for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated infrastructure works all matters reserved other than access.
- R/2022/0746/CD - Partial discharge of condition 5 (CEMP) of outline planning permission R/2020/0357/OOM for demolition of existing structures on site and the development of up to 418,000 sqm (gross) of general industry (use class B2) and storage or distribution facilities (use class B8) with office accommodation (use class B1), HGV and car parking and associated infrastructure works all matters reserved other than access.
- R/2022/0755/CD - Discharge of conditions 3 (CEMP) & 6 (land contamination) of planning permission R/2021/1048/FFM for engineering operations associated with ground remediation and preparation of the site.
- R/2022/0816/FFM - Formation of hardstanding, buildings, access roads from A1085 trunk road, associated facilities and landscaping works in association with the creation of a park and ride facility.

Redcar and Cleveland also have a number of other large-scale developments progressing through construction which have the potential to be sources of air quality pollution, both during construction and once operational. These can be broken down into the following developments:

- [Sofia Offshore Wind Farm Development](#), the project is still undertaking the construction phase which involves construction onshore. During 2022 the project has submitted the following discharge of conditions planning applications; R/2022/0159/CD, R/2022/0319/CD, R/2022/0846/CD, R/2022/0854/CD, R/2022/0923/CD, R/2022/0989/CD, R/2022/0990/CD.
- [The Woodsmith Project](#), spanning two local authority areas (Redcar and Cleveland and North Yorkshire) for the development of a polyhalite mine and underground transfer tunnel system. The project is still within the construction phase and 2022

has seen the application of the following discharge of conditions plans;

R/2022/0317/CD, R/2022/0401/CD, R/2022/0402/CD, R/2022/0636/CD, R/2022/0977/CD.

Additional planning applications that have been identified as possible new sources within Redcar and Cleveland are:

- R/2020/0025/RMM – Reserved matters application for the development of 812 dwellings, convenience store, school and petrol filling station.
- R/2022/0176/CD – Discharge of conditions for the TeesRep power station development.
- R/2022/0252/FF – Installation and operation of a site batch ready mix concrete plant for a temporary period. This application has obtained planning permission and has also been successful in the application for an Environmental Permitting Regulations Part B Permit.
- R/2022/0615/FFM - Renewable energy generating station comprising ground-mounted photovoltaic solar arrays with primary substation and control building compound.
- R/2022/0340/SCP - Scoping opinion on the Tees Valley Lithium Project under regulation 17 of the Town and Country Planning (Environmental Impact Assessment) Regulations 2017.
- R/2022/0675/SCP - Scoping opinion for a Lithium refining plant.
- R/2022/0773/ESM - Construction of a Lithium Hydroxide Monohydrate manufacturing plant and ancillary development.
- R/2022/0290/FFM – Construction of a plastics recycling facility.

During the 2022 reporting year Redcar and Cleveland Borough Council has also received the following planning application, which has not been identified for possible new sources, however it does highlight a change in vehicle occupation across the Borough.

- R/2022/0936/FF - Demolition of car wash and creation of electric vehicle charging (EV) zone to include the provision of 6 EV charging points, erection of canopy, substation enclosure and associated forecourt works.

Additional Air Quality Works Undertaken by Redcar and Cleveland Borough Council During 2022

Redcar and Cleveland Borough Council, in conjunction with Middlesbrough Borough Council has produced the first South Tees Clean Air Strategy. The strategy includes an action plan to bring air quality to the forefront of decision making. The draft strategy has been submitted with the 2023 ASR and is currently in the process of consultation prior to adoption via council processes.

QA/QC of Diffusion Tube Monitoring

Gradko International Limited provided Redcar and Cleveland with the entire 2022 diffusion tube supply, 50% Trimethylamine (TEA) in Acetone. Gradko International are a UKAS accredited laboratory and participate in the [AIR-PT](#) analysis scheme. The most recent round of results for May – June 2022 successfully achieved 100% of results determined to be satisfactory.

Changeover of the diffusion tubes was completed in accordance with the [2022 national calendar](#) without any deviation. Diffusion tubes are deployed in accordance with LAQM Guidance to ensure correct installation over the specified exposure time period.

Diffusion Tube Annualisation

Throughout the 2022 reporting year Redcar and Cleveland suffered a full year of missing diffusion tubes at R26, which is located adjacent to a local Youth Probation site. Despite various efforts from staff to secure the diffusion tube at the location, each month offered a missing tube. Site R26 was one of the long-established monitoring sites within Redcar and Cleveland located close to the A66 major road throughfare, this site will not form part of the 2023 monitoring regime.

All other diffusion tube monitoring locations within Redcar and Cleveland recorded data capture of 75% or above therefore it was not required to annualise any monitoring data. In addition, any sites with a data capture below 25% do not require annualisation.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2022 ASR have 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/NO₂ continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Redcar and Cleveland Borough Council have applied a national bias adjustment factor of 0.82 to the 2022 monitoring data. A summary of bias adjustment factors used by Redcar and Cleveland Borough Council over the past five years is presented in Table C.1.

The Gradko International Limited bias figures use results from the national database of 14 co-location studies, which Redcar and Cleveland contribute data towards. The 14 studies used to derive the 2022 national bias adjustment factor all had good tube precision and study lengths of 9 months or greater. Version 03/23 of the National Diffusion Tube Bias Adjustment Factor Spreadsheet was used for the 2022 reporting year.

National Diffusion Tube Bias Adjustment Factor Spreadsheet						Spreadsheet Version Number: 03/23					
Follow the steps below in the correct order to show the results of relevant co-location studies						This spreadsheet will be updated at the end of June 2023					
Data only apply to tubes exposed monthly and are not suitable for correcting individual short-term monitoring periods						LAQM Helpdesk Website					
Whenever presenting adjusted data, you should state the adjustment factor used and the version of the spreadsheet											
This spreadsheet will be updated every few months; the factors may therefore be subject to change. This should not discourage their immediate use.											
The LAQM Helpdesk is operated on behalf of Defra and the Devolved Administrations by Bureau Veritas, in conjunction with contract partners AECOM and the National Physical Laboratory.						Spreadsheet maintained by the National Physical Laboratory. Original compiled by Air Quality Consultants Ltd.					
Step 1:	Step 2:	Step 3:	Step 4:								
Select the Laboratory that Analyses Your Tubes from the Drop-Down List	Select a Preparation Method from the Drop-Down List	Select a Year from the Drop-Down List	Where there is only one study for a chosen combination, you should use the adjustment factor shown with caution. Where there is more than one study, use the overall factor ³ shown in blue at the foot of the final column.								
If a laboratory is not shown, we have no data for this laboratory.	If a preparation method is not shown, we have no data for this method at this laboratory.	If a year is not shown, we have no data ²	If you have your own co-location study then see footnote ⁴ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@bureauveritas.com or 0800 0327953								
Analysed By	Method	Year ⁵	Site Type	Local Authority	Length of Study (months)	Diffusion Tube Mean Conc. (Dm) (µg/m ³)	Automatic Monitor Mean Conc. (Cm) (µg/m ³)	Bias (B)	Tube Precision ⁶	Bias Adjustment Factor (A) (Cm/Dm)	
Gradko	50% TEA in Acetone	2022	KS	Adur District Council	10	30	21	42.9%	G	0.70	
Gradko	50% TEA in Acetone	2022	UC	Falkirk Council	12	32	26	22.7%	G	0.81	
Gradko	50% TEA in Acetone	2022	UB	Falkirk Council	9	15	13	16.4%	G	0.86	
Gradko	50% TEA in Acetone	2022	R	Lb New ham	12	30	23	29.1%	G	0.77	
Gradko	50% TEA in acetone	2022	SU	Redcar & Cleveland Borough Council	12	14	10	44.9%	G	0.69	
Gradko	50% TEA in Acetone	2022	R	Worthing Borough Council	9	33	23	44.2%	G	0.69	
Gradko	50% TEA in acetone	2022	KS	Marylebone Road Intercomparison	12	52	42	23.0%	G	0.81	
Gradko	50% TEA in acetone	2022	R	City Of London	11	60	54	11.6%	G	0.90	
Gradko	50% TEA in acetone	2022	UB	City Of London	12	28	23	23.7%	G	0.81	
Gradko	50% TEA in Acetone	2022	KS	London Borough Of Croydon	12	41	37	11.1%	G	0.90	
Gradko	50% TEA in Acetone	2022	R	Royal Borough Of Windsor And Maidenhead	12	30	26	13.9%	G	0.88	
Gradko	50% TEA in Acetone	2022	R	Royal Borough Of Windsor And Maidenhead	12	27	27	-1.0%	G	1.01	
Gradko	50% TEA in Acetone	2022	R	Sandwell Mbc	12	34	27	27.1%	G	0.79	
Gradko	50% TEA in Acetone	2022	UB	Sandwell Mbc	12	21	19	11.9%	G	0.89	
Gradko	50% TEA in acetone	2022	Overall Factor ³ (14 studies)							Use	0.82

Redcar and Cleveland have a single co-location study within the Borough, Dormanstown automatic monitoring site. The national bias adjustment factor has been used for a number of years at Redcar and Cleveland, this has continued for the 2022 reporting year as the national figure provides a more conservative adjustment value than that which would be offered from a local bias adjustment factor based on one co-location study. A comparison of the national and local bias adjustment factors on 2022 diffusion tube data is shown in Table C.1 below.

Table C.1 – Comparison of National and Local Bias Adjustment

Site ID	NO ₂ Raw Data	Local Bias Adjustment (0.69)	National Bias Adjustment (0.82)
R17/R18/R19	14.3	9.9	11.7
R26	-	-	-
R27	25.1	17.3	20.6
R51	14.4	9.9	11.8
R52	18.2	12.6	14.9
R54	29.7	20.5	24.4
R55	18.8	13.0	15.4
R58	15.0	10.4	12.3
R59	17.0	11.7	14.0
R60	21.6	14.9	17.7
R61	14.2	9.8	11.6
R62	11.3	7.8	9.3
R63	12.8	8.8	10.5
R64	7.1	4.9	5.8

Table C.1 – Bias Adjustment Factor

Monitoring Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2022	National	03/23	0.82
2021	National	03/22	0.83
2020	National	03/21	0.82
2019	National	03/20	0.87
2018	National	03/19	0.92

Table C.2 – Local Bias Adjustment Calculation

Redcar and Cleveland Borough Council has not used a local bias adjustment factor for 2022 data, however an overview of the calculation of the local bias factor has been provided below for information only.

	Local Bias Adjustment Input 1
Periods used to calculate bias	12
Bias Factor A	0.7 (0.65 - 0.76)
Bias Factor B	44% (32% - 55%)
Diffusion Tube Mean ($\mu\text{g}/\text{m}^3$)	14.3
Mean CV (Precision)	6.6%
Automatic Mean ($\mu\text{g}/\text{m}^3$)	10.0
Data Capture	100%
Adjusted Tube Mean ($\mu\text{g}/\text{m}^3$)	10 (9 - 11)

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the Diffusion Tube Data Processing Tool/NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No diffusion tube NO₂ monitoring locations within Redcar and Cleveland required distance correction during 2022.

QA/QC of Automatic Monitoring

The automatic monitoring station, located at Dormanstown, monitored the following pollutants during 2022:

- NO_x
- PM₁₀
- PM_{2.5}
- O₃

Redcar and Cleveland have a comprehensive service contract in place with the analyser suppliers to assist with routine maintenance and fault rectification. Continuous monitoring data has been collected and rescaled by [Ricardo-AEA](#) with current and historic data available on-line. Local Site Operator (LSO) duties are predominantly undertaken by one officer from the Environmental Protection Team on a fortnightly basis. Officers within Environmental Protection Team have received training from the analyser suppliers to enable these duties to be completed.

Redcar and Cleveland are committed to ensure that data collected is representative of ambient air quality by implementing quality assurance and control programmes, regular routine site calibration, validation of data and a thorough documentation process. During 2022 Redcar and Cleveland returned to a fortnightly calibration visit to the Dormanstown site as the extended monthly visits undertaken in 2021 appeared to be linked to an increase in errors / faults with the analysers.

Additional detail regarding QA/QC processes within Redcar and Cleveland are provided below:

Calibration	Daily 'automatic' calibration with routine fortnightly checks by an experienced and trained member of the Environmental Protection Team. Calibration gas is obtained from an approved gas standard supplier. Annual site calibration is completed by Ricardo-AEA. The third-party analyser supplier completes service / maintenance visits when required.
Equipment	A comprehensive service agreement is in place with the analyser supplier.
Data Capture	Site operators are experienced and trained personnel. Monitoring data capture is inspected daily, where possible, by Ricardo-AEA to ensure that faults are detected and corrected quickly.
Ratification	Data verification is carried out on an ongoing basis to check for unusual measurements. Data ratification reviews all calibrated data, information from analyser services, repairs and any other information available for the particular site or analyser over the entire ratification period. In addition, the results from the independent QA/QC audits are

incorporated to take account of any problems detected during the audits, such as:

- Long-term drift in an ozone instrument calibration
- Faulty NO_x converters
- Drifts in calibration cylinder concentrations
- Instrument leaks or flow faults
- Faulty instrument configuration

Incorporation of the QA/QC audits ensure that ratified data is traceable to UK national and international gas calibration standards.

The automatic monitoring data reported during the 2022 reporting year has been ratified externally up to 30th June 2022, provisional data is reported from this date until 4th January 2023 in-line with the national diffusion tube changeover periods.

PM₁₀ and PM_{2.5} Monitoring Adjustment

The automatic PM₁₀ and PM_{2.5} analysers located at the Dormanstown site are BAM gravimetric equivalence for particulate matter. The PM₁₀ analyser has been subject to the Ricardo Energy and Environment correction factor.

Automatic Monitoring Annualisation

The automatic monitoring station within Redcar and Cleveland, Dormanstown, recorded a data capture of greater than 75% for all analysers and therefore annualisation was not required. The data capture range for 2022 at Dormanstown was 97.3% to 99.7%.

NO₂ Fall-off with Distance from the Road

Wherever possible, monitoring locations are representative of exposure. However, where this is not possible, the NO₂ concentration at the nearest location relevant for exposure has been estimated using the NO₂ fall-off with distance calculator available on the LAQM Support website. Where appropriate, non-automatic annual mean NO₂ concentrations corrected for distance are presented in Table B.1.

No automatic NO₂ monitoring locations within Redcar and Cleveland Borough Council required distance correction during 2022.

Appendix D: Maps of Monitoring Locations

Figure D.1 – Map of 2022 Non-Automatic Monitoring Sites

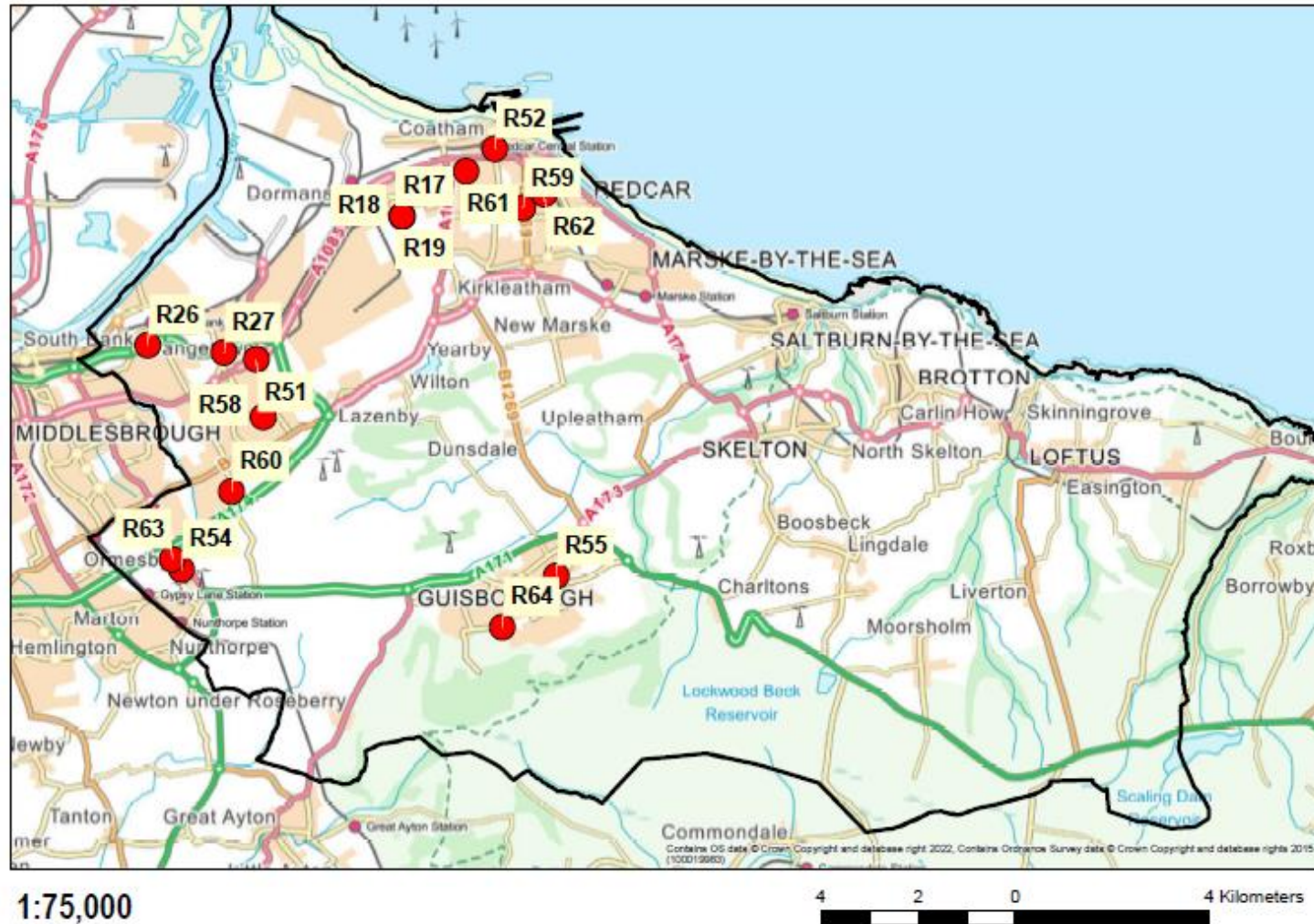
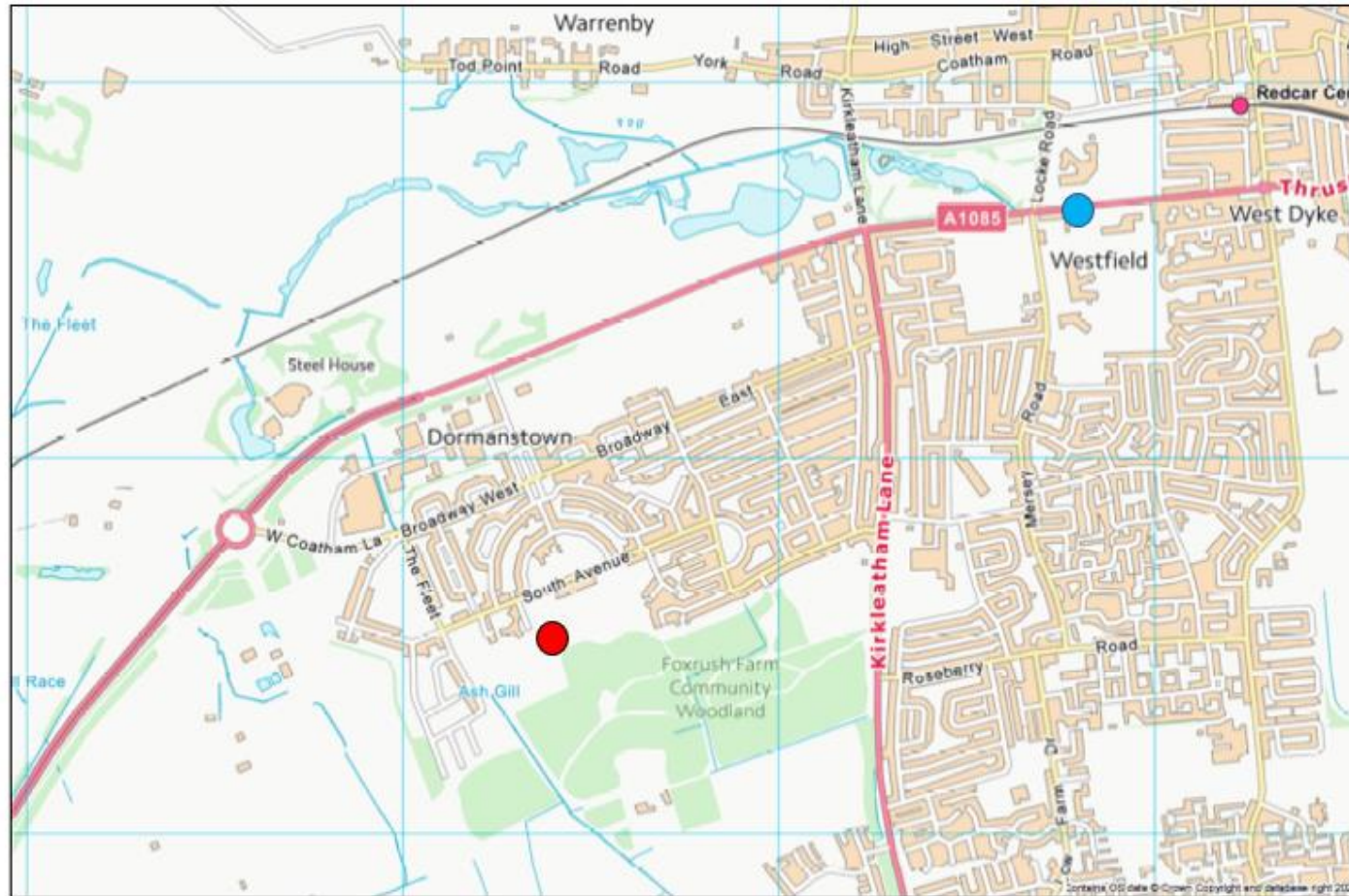


Figure D.2 Automatic Monitoring Location and Historic Monitoring Site



1:10,000

0.5 0.25 0 0.5 Kilometers

Dormanstown ●

Corporation Road (Historic) ●

Figure D.3 – Map of Guisborough Area Non-Automatic Monitoring Sites

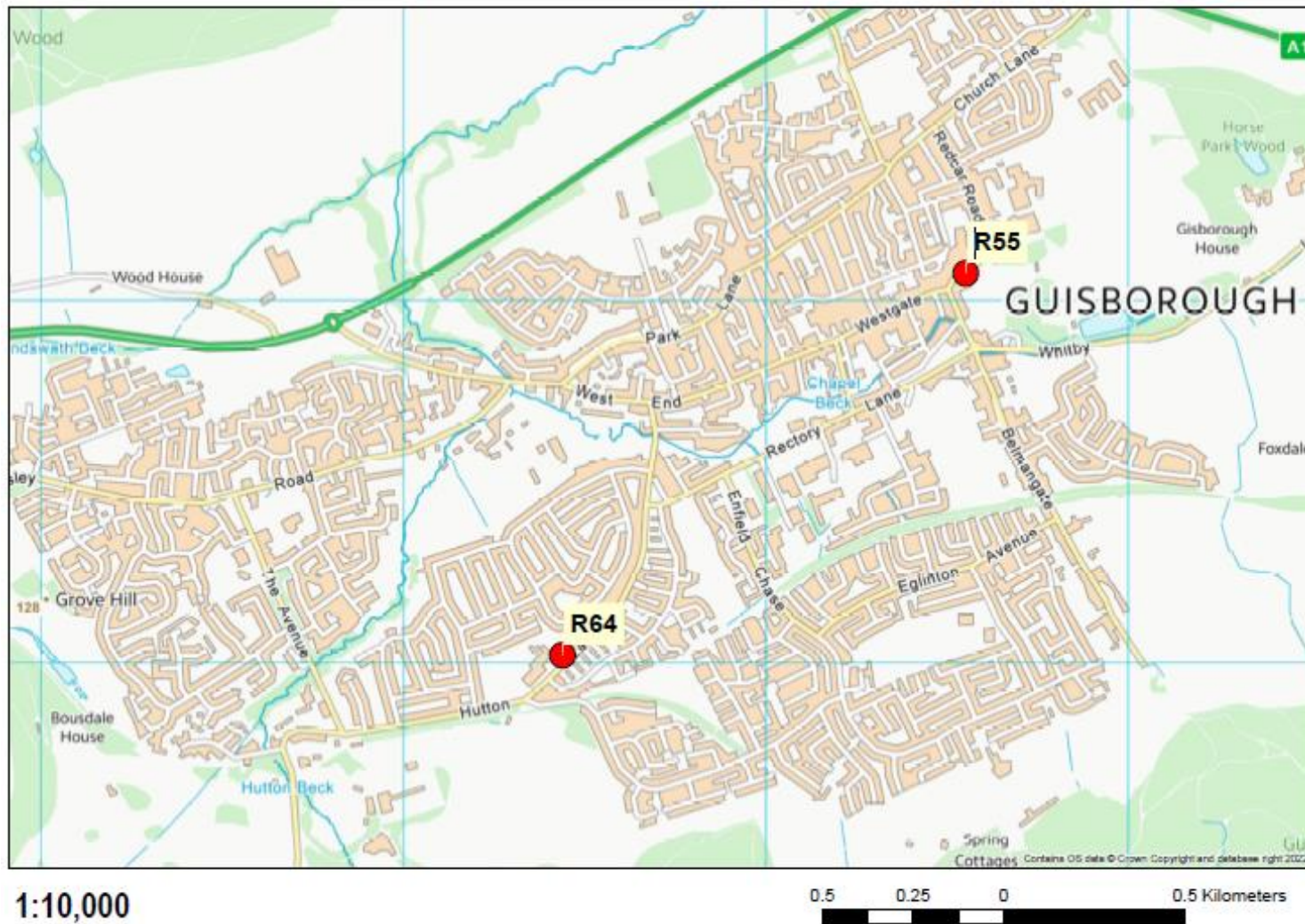


Figure D.4 – Map of Redcar Area Non-Automatic Monitoring Sites

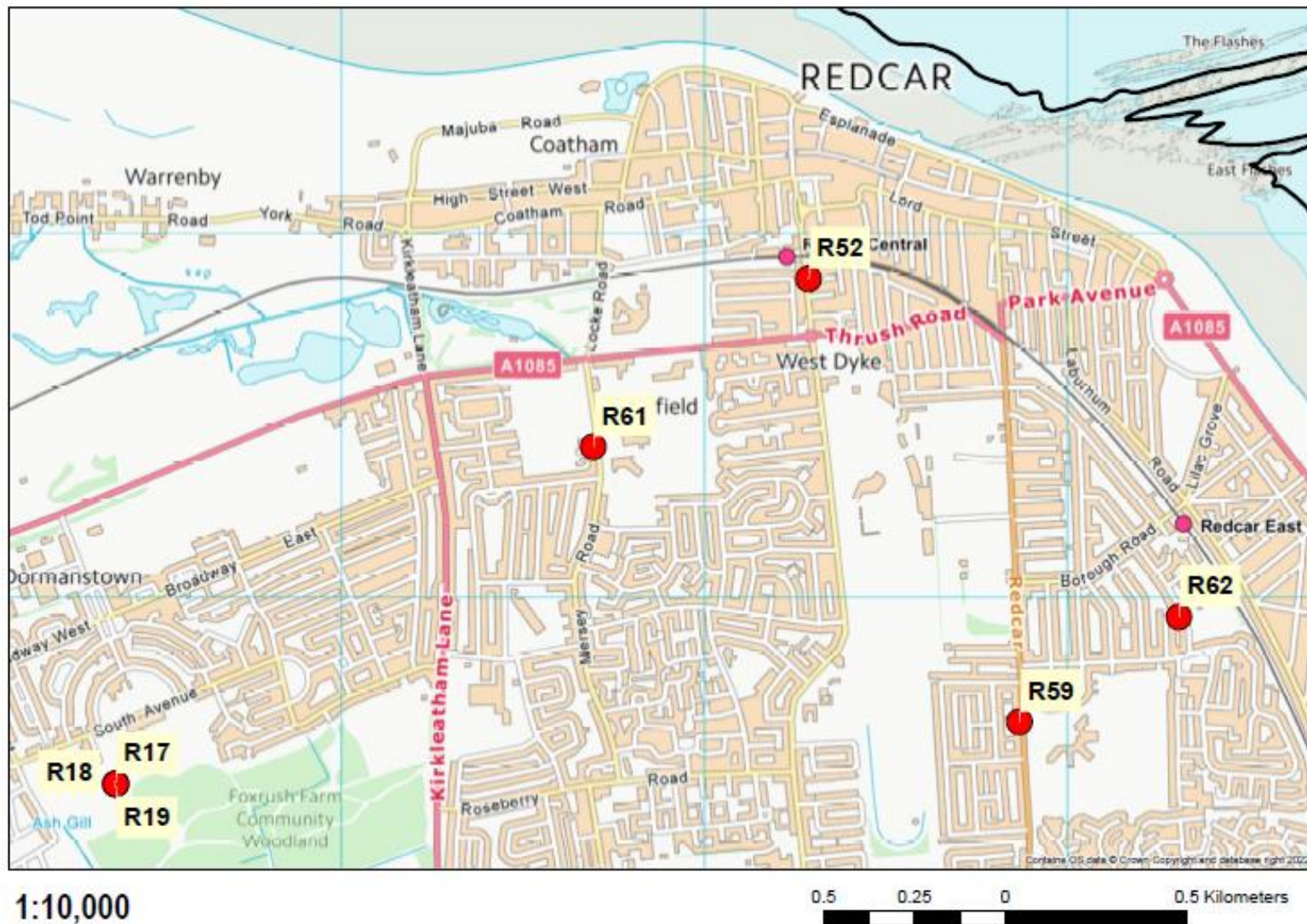


Figure D.5 – Map of Grangetown and South Bank Area Non-Automatic Monitoring Sites

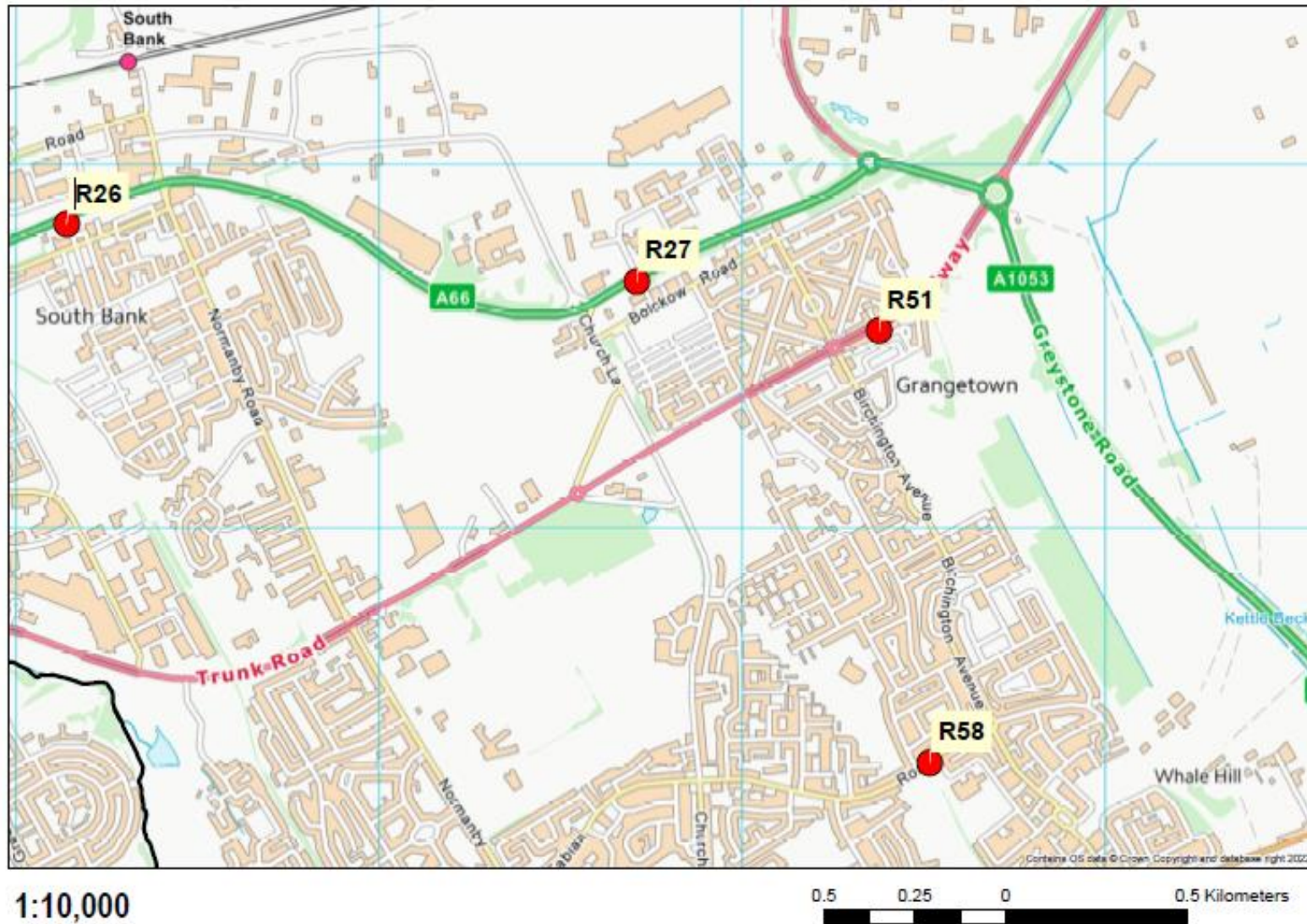


Figure D.6 – Map of Ormesby and Normanby Non-Automatic Monitoring Sites

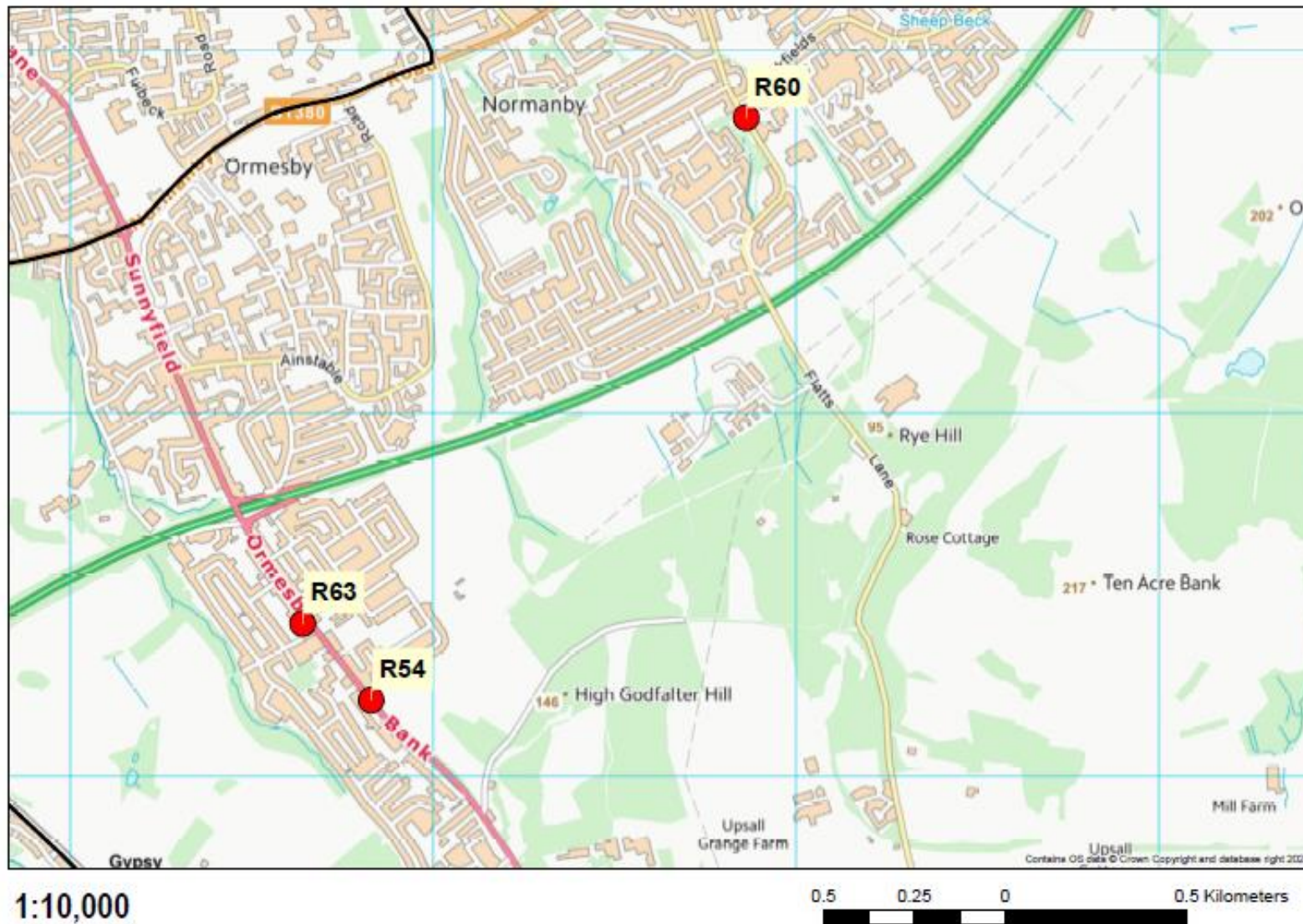


Figure D.7 – Map of Redcar and Cleveland Smoke Control Areas

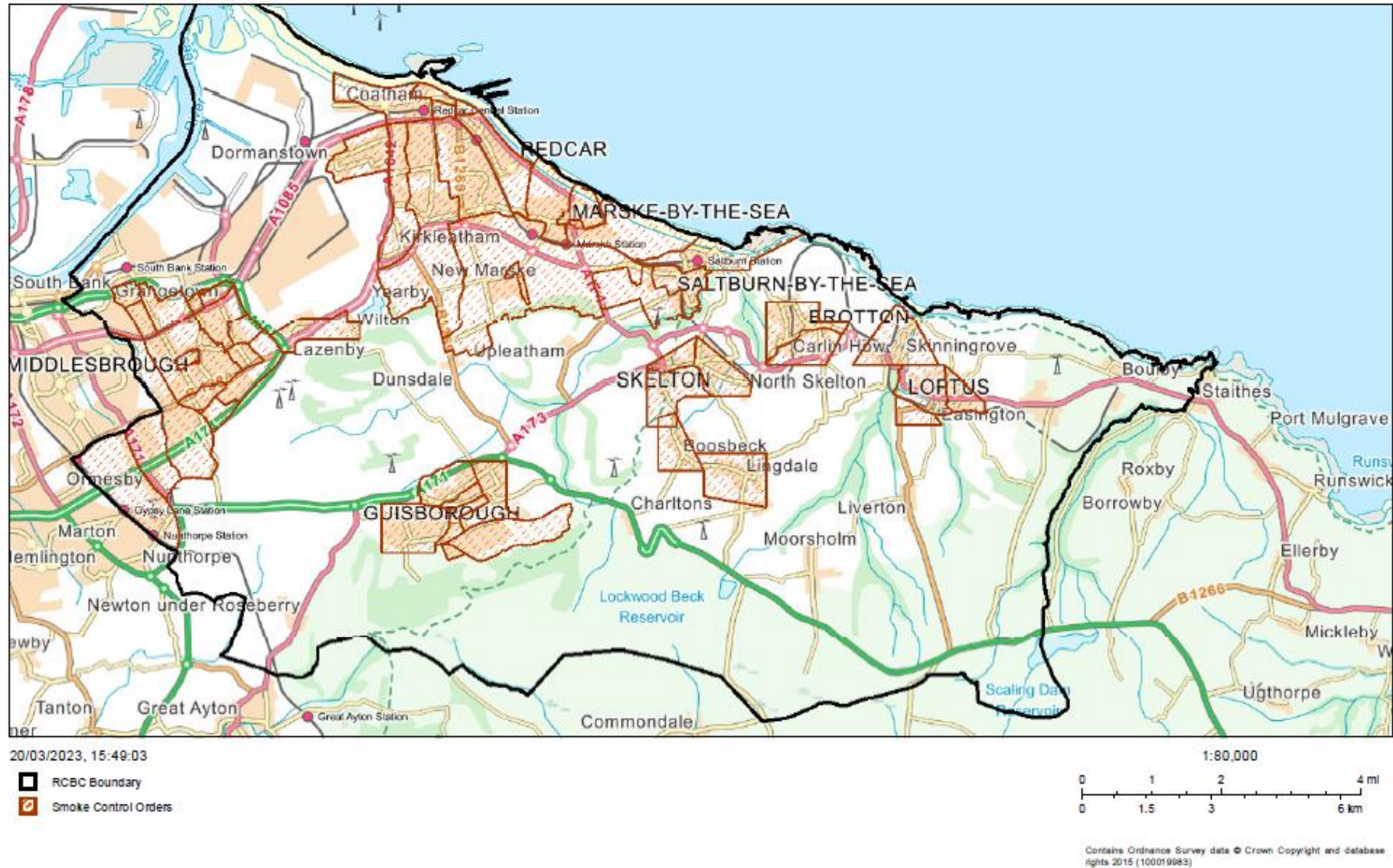


Figure D.8 - Map of South Tees Area



Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England⁷

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/m³).

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
CEMP	Construction Environmental Management Plan
DAQI	Daily Air Quality Index
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
EV	Electric Vehicle
FDMS	Filter Dynamics Measurement System
HGV	Heavy Goods Vehicle
HVO	Hydrotreated Vegetable Oil
LAQM	Local Air Quality Management
O ₃	Ozone
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
SCA	Smoke Control Area
SO ₂	Sulphur Dioxide
TEA	Trimethylamine
TVCA	Tees Valley Combined Authority
VOC	Volatile Organic Compounds

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.