



Cyngor Bwrdeistref Sirol
MERTHYR TUDFUL

MERTHYR TYDFIL
County Borough Council

Merthyr Tydfil County Borough Council 2019 Air Quality Progress Report

In fulfillment of Part IV of the Environment Act 1995
Local Air Quality Management

Date (September, 2019)

Merthyr Tydfil County Borough Council

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Executive Summary: Air Quality in Our Area

Ansawdd yr Aer yng Nghyngor Bwrdeistref Sirol Merthyr

Tudful

Prif ffynhonnell llygredd yr aer ym Merthyr Tudful yw traffig ffordd. Mae CBSMT felly'n bryderus ynghylch NO₂. Mae rhwydwaith o diwbiau tryledol yn gweithredu trwy'r ardal. Yn ystod y 6 mlynedd ddiwethaf, cofnodwyd y cofnod uchaf o NO₂ yn yr ardal yn 2013 ac mae'r lefel, ers hynny wedi gostwng. Mae'r gostyngiad hyn wedi lefelu yn ystod y blynyddoedd diwethaf. Nid oes gan y mwyafrif o leoliadau ym Merthyr Tudful yr un crynodiad o NO₂ sydd oddi fewn i'r nod ansawdd aer cymedrig, blynyddol.

Mewn nifer fechan o leoliadau (Rhif 3) roedd y crynodiad yn uwch na lefel y nod ansawdd aer cymedrig, blynyddol ac ers 2017 mae Cynllun Gweithredu Ansawdd (AQMA) wedi bod yn ei le ar hyd Ffordd Twynirodyn. Mae rhagor o wybodaeth ar gael ar https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=402 ac ar www.merthyr.gov.uk. Yn dilyn ymgyngoriad cyhoeddus a

Air Quality in Merthyr Tydfil County Borough

The main source of air pollution within Merthyr Tydfil is road traffic. As such MTCBC are concerned about NO₂. A network of diffusion tubes operates throughout the district. In the past 6 years NO₂ peaked throughout the district in 2013 and has declined since. This decline has levelled out in recent years. Most sites within Merthyr Tydfil have NO₂ concentrations within the annual mean air quality objective.

A small number of sites (No. 3) exceed the annual mean air quality objective, and since 2017 there has been an AQMA in place along Twynirodyn Road. More information is available at https://uk-air.defra.gov.uk/aqma/local-authorities?la_id=402 and www.merthyr.gov.uk. Following public consultation and Council approval, the Welsh Government approved the action plan to reverse traffic flow along Pontmorlais High Street and Church Street

chymeradwyaeth gan y Cyngor, cymeradwyodd Llywodraeth Cymru'r cynllun gweithredol i wrthdroi llif y traffig ar hyd Stryd Fawr Pontmorlais a Heol yr Eglwys fel camau cychwynnol i ymdrin â'r AQMA.

Ar 28 Mai 2019, cafodd y llif traffig ei wrthdroi ar hyd Stryd Fawr Pontmorlais a Heol yr Eglwys. Darparodd hyn lwybrau amgen, i ffwrdd o Tesco a chanol y dref yn hytrach na bod angen defnyddio Heol Twynyrodyn. Ymddengys fod traffig sy'n ymgynnull wedi symud a bod llai o dagfeydd traffig ar Heol Twynyrodyn.

Mae CBSMT hefyd yn ystyried effaith yr ansawdd aer ar ddatblygiadau newydd, a lle y mae hynny'n bosibl, defnyddir amodau cynllunio er mwyn lliniaru'r effeithiau negyddol. Mae'r Cynllun Trafnidiaeth Lleol yn cefnogi teithio gweithredol a'r defnydd o drafnidiaeth gyhoeddus er mwyn lleihau dibyniaeth ar geir.

Camau i Wella Ansawdd yr Aer

Yn 2018, cynhaliwyd ymgynghoriad cyhoeddus, 12 wythnos o hyd er mwyn trafod AQMA Heol Twynyrodyn. Ymgynghorwyd â'r cyhoedd ar 3 opsiwn er mwyn lleihau'r traffig ar Heol

as initial action to address the AQMA.

On 28th May 2019 traffic flow was reversed along Pontmorlais High Street and Church Street. This provided alternative routes away from Tesco and the Town Centre than Twynyrodyn Road. Traffic build-up appears to have shifted with fewer queues developing on Twynyrodyn Road.

MTCBC also consider the impact on air quality of new developments, and where necessary planning conditions are used to mitigate any negative effects. The Local Transport Plan supports active travel and use of public transport to reduce reliance on cars.

Actions to Improve Air Quality

With regards to the Twynyrodyn Road AQMA, in 2018 a 12 week public consultation took place. The public were consulted on 3 options to reduce traffic use of Twynyrodyn Road. Most

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Twynnyrodyn. Mynegodd y mwyafrif o ymatebwyr (94%) fod yn well ganddynt yr opsiwn o wrthdroi llif y traffig ar hyd Stryd Fawr Pontmorlais a Heol yr Eglwys. Cymeradwyodd y Cyngor y dylai cynllun gweithredu gael ei gyflwyno i Lywodraeth Cymru. Derbyniwyd a chymeradwywyd y cynllun gan Lywodraeth Cymru.

Yn mis Tachwedd 2018, cyhoeddodd Adran y Priffyrdd a Pheirianneg, Orchmynion Rheoliadau Traffig. Ar 28 Mai 2019, cafodd y llif traffig ei wrthdroi, yn unol â'r cynllun gweithredu a gymeradwywyd. Er nad oes cyfrifiadau traffig ar gael ar hyn o bryd, mae Swyddogion Iechyd yr Amgylchedd, yn ystod eu gwaith yn yr ardal ac ar eu teithiau dyddiol wedi sylwi fod llai o dagfeydd traffig ar Heol Twynnyrodyn (yr AQMA), a bod peth tagfeydd o amgylch Avenue de Clichy. Ni ystyrir fod hyn yn debygol o achosi risg i iechyd y cyhoedd gan fod tai preswylwyr yn ôl oddi wrth y ffordd ac nid oes unrhyw ardal ar hyd y ffordd lle y byddai pobl yn debygol o aros yno am fwy nag 1 awr. Ar ochr orllewinol Avenue de Clichy mae Afon Taf, felly nid oes unrhyw hafnau stryd posib. Gobeithir y bydd y newid yn y dosbarthiad traffig yn arwain at welliant arwyddocaol yn

respondents (94%) expressed a preference for the option of reversing traffic flow along Pontmorlais High Street and Church Street. Council approved an action plan to this effect being submitted to Welsh Government, who subsequently approved it.

In November 2018 the Highways and Engineering Department issued Traffic Regulation Orders. On 28th May 2019 traffic flow was reversed in accordance with the approved action plan. Although no traffic counts are available yet, Environmental Health Officers during the course of their district work and daily commutes have observed less traffic build-up on Twynnyrodyn Road (the AQMA), with some traffic build-up around Avenue de Clichy. This is not considered likely to pose a public health risk as residential properties are set back from the road and there are no areas along it where people are likely to spend 1 hour+. On the West side of Avenue de Clichy is the River Taff, so there are no possible street canyons. It is hoped the change in traffic distribution will result in a significant improvement in air quality within the AQMA.

ansawdd yr aer oddi fewn i'r AQMA.

Blaenoriaethau Lleol a Heriau

Y flaenoriaeth ar gyfer 2019 oedd gweithredu'r cynllun gweithredu a gymeradwywyd ac ar fonitro a'i effeithioldeb. Er mwyn gwneud hyn, mae tiwbiau tryledol ychwanegol wedi cael eu gosod ar hyd y llwybr traffig sydd wedi ei wrthdroi ac ar strydoedd cyfagos ac mae monitor yr ECC wedi cael ei adleoli i Stryd Fawr Pontmorlais. Os bydd gwrthdroi'r traffig yn llwyddiannus ac yn gwella ansawdd yr aer ar Heol Twynyrodyn, bydd yn caniatáu i'r AQMA gael ei ddiddymu erbyn 2021. Os bydd yn aflwyddiannus, bydd gwaith ychwanegol yn cael ei ystyried mewn cynlluniau gweithredu a fydd yn cael eu diweddarau.

Mae monitro hefyd wedi cael ei ymestyn i gynnwys tiwbiau tryledol ychwanegol mewn mannau a ddynodwyd gan arolwg Sŵn a Seinwedd Llywodraeth Cymru lle y gall traffig trwm hefyd effeithio ar ansawdd yr aer.

Yn ogystal, yn 2018, dynododd rhai misoedd unigol o ddata o diwb tryledol 6/7 Maes Ladysmith y gallai'r cymedr blynyddol o NO₂ pe na bai'n cael ei drin, godi'n uwch na 36µg/m³, oddi fewn i 10% o nod cymedr blynyddol ansawdd yr

Local Priorities and Challenges

The priority for 2019 was the implementation of the approved action plan, and on ongoing monitoring of its effectiveness. To that end additional diffusion tubes have been installed along the traffic reversal route and surrounding streets, and the ECC monitor has been relocated to Pontmorlais High Street. If the traffic reversal is successful in improving air quality on Twynyrodyn Road, this will enable the AQMA to be revoked by 2021. If unsuccessful additional works will be considered in updated action plans.

Monitoring has also been extended to include additional diffusion tubes in areas identified by the Welsh Government Noise and Soundscape survey, where heavy traffic may also affect air quality.

Additionally in 2018 some individual months of diffusion tube data from 6/7 Ladysmith Place indicated if unaddressed the annual mean of NO₂ could have exceeded 36µg/m³, within 10% of the annual mean air quality objective. Observations showed bottle necks caused car access/egress from a car park to the rear of Troedyrhiw Community Primary

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aer. Dangosodd arsylwadau fod tagfeydd traffig yn achosi canlyniadau mynediad/allanfa i geir o faes parcio wrth gefn Ysgol Gynradd Gymunedol Troedyrhiw. Er mwyn pennu effaith y maes parcio, cafwyd mynediad dros dro iddo yn Rhagfyr 2018 a hynny drwy system un ffordd. Roedd y canlyniadau ar gyfer cyfnod 11 a 12 yn $48\mu\text{g}/\text{m}^3$, lle y dangosodd lleoliadau eraill trwy'r ardal gynnydd amlwg yng nghyfnod 12 a ddynododd fod y system un ffordd yn effeithiol er mwyn gwella ansawdd yr aer. Gallai hyn fod yn sgil llif y traffig neu fod llai o bobl yn defnyddio'r maes parcio. Wedi addasiad tueddiad, roedd y cymedr blyneddol yn $34.6\mu\text{g}/\text{m}^3$, yn is na'r lefel sy'n codi pryder. Mae'r maes parcio wedi ei ail agor. Yn seiliedig ar ein profiad o dagfeydd traffig, mae tiwbiau ychwanegol wedi cael eu gosod yn yr ardal hon er mwyn i ni gael darlun llawnach.

Sut i fod yn rhan

Mae gwybodaeth bellach ynghylch llygredd yr aer yn ogystal â mynediad i adroddiadau ansawdd aer blaenorol ar gael ar www.merthyr.gov.uk. Gellir gofyn cwestiynau penodol drwy e-bostio PublicHealth@merthyr.gov.uk neu drwy

School. To determine the impact of the car park, in December 2018 it was temporarily accessible via a one way system. Results for period 11 and period 12 were both $48\mu\text{g}/\text{m}^3$, whereas other sites throughout the district showed a noticeable increase in period 12, indicating the one-way system was effective at improving air quality. This may be by improving traffic flow or by putting people off using the car park. After bias adjustment the annual mean was $34.6\mu\text{g}/\text{m}^3$, below the level for concern. The car park has been reopened. Based on our observations of bottle necks additional tubes have been installed in this area to gain a fuller picture.

How to Get Involved

Further information on air pollution including access to previous air quality reports is available from www.merthyr.gov.uk. Specific questions can be addressed by emailing PublicHealth@merthyr.gov.uk or by

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telephoning 01685 725000.

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1. Actions to Improve Air Quality

1.1 Previous Work in Relation to Air Quality

Merthyr Tydfil County Borough Council has previously undertaken the following review and assessment reports as required by Local Air Quality Management:

Report Title	Date	Outcomes
First stage review and assessment	1998	Negligible risk of AQS objective for benzene, 1,3-butadiene, CO and lead being exceeded in the area Possible risk of objectives for PM ₁₀ , SO ₂ and NO ₂ being exceeded
Second stage review and assessment	2000	Negligible risk of AQS objectives for PM ₁₀ , SO ₂ and NO ₂ being exceeded in area Unnecessary to proceed any further with review and assessment process or declare AQMAs
Updating and screening assessment and progress reports	2003-2005	AQS objectives for 7 pollutants likely to be met at all locations with relevant public exposure Unnecessary to carry out detailed assessment or declare any AQMAs Progress reports 2004 and 2005 found no significant changes in air quality and no developments that might affect air quality within the borough
Updating and screening assessment and progress reports	2006-2008	AQS objectives for the 7 pollutants detailed in regulations likely to be met at all locations with relevant public exposure

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		<p>Unnecessary to carry out a detailed risk assessment or declare any AQMA</p> <p>Progress Report 2007 found NO₂ levels had increased but within AQS objective of 40 µg/m³ at all locations</p> <p>Level at 55 Twynyrodyn Road, was within 10% of the limit and monitoring network expanded in this area</p> <p>Progress report 2008 found levels increased and at 55 Twynyrodyn Road, a marginal exceedence identified</p> <p>Considered necessary to proceed to detailed assessment</p>
Detailed assessment	2009	<p>Reviewed data for monitoring sites on Twynyrodyn Road and modelled NO₂ levels for length of the road</p> <p>Recommended siting of additional diffusion tubes at various points on road and declaring AQMA</p>
Updating and screening assessment and progress reports	2009-2011	<p>NO₂ reduced, AQS objectives met at all locations with relevant public exposure</p> <p>2010 progress report determined based on reduction no longer necessary to carry out further detailed assessment or declare AQMA</p> <p>Detailed assessments necessary for 2 new permitted processed and 1 substantially changed installation</p> <p>Progress report 2011 found NO₂ levels had</p>

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		<p>increased throughout borough, with marked exceedence at 55 Twynyrodyn Road</p> <p>Considered necessary to increase number of monitoring sites on Twynyrodyn Road prior to declaring AQMA in relation to this site</p>
Detailed assessment	2011	<p>Reviewed emissions data from Prince Charles Hospital combustion plant</p> <p>Concluded emissions will not result in any exceedences of objectives unless on-site emergency generators used for extended periods</p>
Updating and screening assessment and progress reports	2012-2014	<p>No new developments or proposed developments that could be considered to adversely affect air quality</p> <p>1 exceedence of NO₂ at 55 Twynyrodyn Road</p> <p>Progress report 2013 found action to reduce NO₂ levels at 55 Twynyrodyn Road, has reduced it to below AQS objective</p> <p>Additional monitoring found further location on same road link where NO₂ levels exceeded AQS objective</p> <p>Progress report 2014 identified new bus station development proposed may adversely affect NO₂. Environmental Health Department liaised with Regeneration Group to ensure air quality considered in planning process</p> <p>NO₂ levels on Twynyrodyn Road had increased to exceed AQS objective. Unclear if temporary</p>

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		<p>and related to ongoing changes to traffic flow.</p> <p>Further monitoring proposed</p> <p>Detailed assessment and declaration of AQMA on Twynyrodyn Road necessary.</p>
Detailed assessment	2015	<p>Elevated NO₂ on Twynyrodyn Road associated with traffic. Wind speed and direction, and 2-storey terraced housing without front gardens resulted in NO₂ accumulating around 55 Twynyrodyn Road</p> <p>Predominantly associated with uphill traffic during early evening</p> <p>Considered necessary to declare AQMA from Western End of Twynyrodyn Road to 147 Gilfach Cynon</p> <p>MTCBC declared AQMA on 30th January 2017</p>
Updating and screening assessment and progress reports	2015-2017	<p>Proposed bus station could adversely affect air quality. Modelling indicates likely to comply with AQS objectives, to be monitored with diffusion tubes prior to bus station opening as modelling based on limited data</p> <p>NO₂ exceedences were contained within AQMA on Twynyrodyn Road</p> <p>Action plan under development for public consultation, on options to improve traffic flow and reduce traffic numbers</p> <p>Additional monitoring in Swansea Road area in anticipation of Trago Mills opening, attracting additional traffic to Swansea Road area</p>

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Annual report	2018	<p>NO₂ exceedences were contained within AQMA on Twynyrodyn Road</p> <p>Action plan to reverse traffic flow along Pontmorlais High Street and Church approved by Welsh Government following public consultation and Council approval.</p> <p>Impact of Trago Mills on Swansea Road has not resulted in annual mean within 10% of AQS objective.</p> <p>Monitoring network reviewed and as of January 2019 network will be extended to include traffic reversal area, Troedyrhiw and areas identified in Welsh Government Noise and Soundscape survey.</p>
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NO₂ continued to exceed the AQS objective in 2017 along Twynyrodyn Road (stretch near 55 Twynyrodyn Road within AQMA). This was in line with results in previous years.

MTCBC currently has one AQMA, Twynyrodyn Road. Following a detailed assessment in 2015 it was declared in January 2017. It was declared due to elevated NO₂ caused by road traffic. A draft action plan identified 3 possible changes to traffic flow anticipated to improve traffic flow, and consequently reduce NO₂. A 12-week public consultation was carried out from 16th March 2018 to 8th June 2018. The majority (94%) of consultation responses were in favour of reversing the traffic flow along Pontmorlais High Street and Church Street. Following the public consultation on 27th June 2018 the Council approved the action plan by reversing traffic flow along Pontmorlais for submission to Welsh Government. Welsh Government approved the action plan on 17th July 2018. The Highways and Engineering Department issued the relevant traffic management orders and following these on 28th May 2019 reversed the traffic flow.

On some months there was elevated NO₂ at Ladysmith Square, Troedyrhiw. This required further investigation. Observations found traffic was building up at the junction of Phyllis Street and Cardiff Road, where cars were accessing and egressing a small car park to the rear of Troedyrhiw Community School. As a semi-rural area a large proportion of children attending the school travel by car. To determine the effect of the car park, in December a one way system was implemented for 4 weeks. Most sites across the district had higher NO₂ concentrations in period 12 than period 11, but at 6/7 Ladysmith Place the concentration remained the same. This indicates either lower traffic numbers or better traffic flow had counteracted the normal cold weather deterioration in air quality. As the annual mean NO₂ concentration was below 36µg/m³ (more than 10% below the objective) no further action is planned at this time. Monitoring has been extended in the area and the effect of the one-way system has been noted.

1.2 Air Quality Management Areas

Air Quality Management Areas (AQMA) are declared when air quality is close to or above an acceptable level of pollution (known as the air quality objective (Please see Appendix B). After declaring an AQMA the authority must prepare an Air Quality Action Plan (AQAP) within 18 months setting out measures it intends to put in place to improve air quality to at least the air quality objectives, if not even better. AQMA(s) are seen by local authorities as the focal points to channel resources into the most pressing areas of pollution as a priority.

A summary of AQMA declared by Merthyr Tydfil County Borough Council can be found in Table 1.1. Further information related to declared or revoked AQMA, including maps of AQMA boundaries are available online at https://uk-air.defra.gov.uk/aqma/details?aqma_ref=2008 and maps are available in Appendix D.

Table 1.1 – Declared Air Quality Management Areas

AQMA	Relevant Air Quality Objective(s)	Comments on Air Quality Trend	City / Town<Delete column if not relevant>	Description	Action Plan
AQMA Twynrod yn Road	NO ₂ annual mean	There has been no significant improvement in air quality in the AQMA since the AQMA was declared in 2017.	Merthyr Tydfil	An area encompassing a number of properties from Tesco Roundabout to Gilfach Cynon.	Air Quality Action Plan 2018 Available from: www.merthyr.gov.uk/resident/pests-pollution-and-food-hygiene/air-pollution/

AMQA boundary maps within Merthyr Tydfil County Borough Council can be viewed at https://laqm.defra.gov.uk/images/aqma_maps/1476_Merthyr%20Tydfil%20AQMA.jpg and are included in Appendix D.

1.3 Implementation of Action Plans

Merthyr Tydfil County Borough Council has taken forward a number of measures during 2017-2019 in pursuit of improving local air quality. This is summarised in Figure 1.1. Details of all measures completed, in progress or planned are set out in Table 1.2. More detail on these measures can be found in the Air Quality Action Plan relating to any designated AQMAs.

Air Quality Action Plans are continuously reviewed and updated whenever deemed necessary, but no less frequently than once every five years. Such updates are completed in close consultation with local communities.

Key completed measures completed in 2018 are: following public consultation and Council approval the action plan has been submitted to and approved by Welsh Government. Traffic management orders were published in November 2018, and following this on 28th May 2019 the traffic flow was reversed along Pontmorlais High Street and Church Street.

Merthyr Tydfil County Borough Council expects the following measures to be completed over the course of the next reporting year:

Diffusion tube monitoring has been extended to include the traffic reversal area and some surrounding streets where it is possible that people could take alternative routes. This started in January 2019, therefore in 2020 the 12 months data will be available for bias adjustment and review. As the reversal took place from 28th May 2019, particular attention will be given to how monitoring periods 6-12 compare to previous years where sites also operated in 2018. Anecdotal evidence of fewer traffic queues on Twynyrodyn Road and some queues developing along Avenue de Clichy indicate the reversal has been successful in reducing traffic through the AQMA, and it is hoped this will be reflected in the annual mean NO₂ concentrations along Twynyrodyn Road. If annual mean NO₂ concentrations within the AQMA are less than 36µg/m³ this will enable the AQMA to be revoked in the near future.

Figure 1.1 – Timeline of events for the Twynrobyn Road AQMA

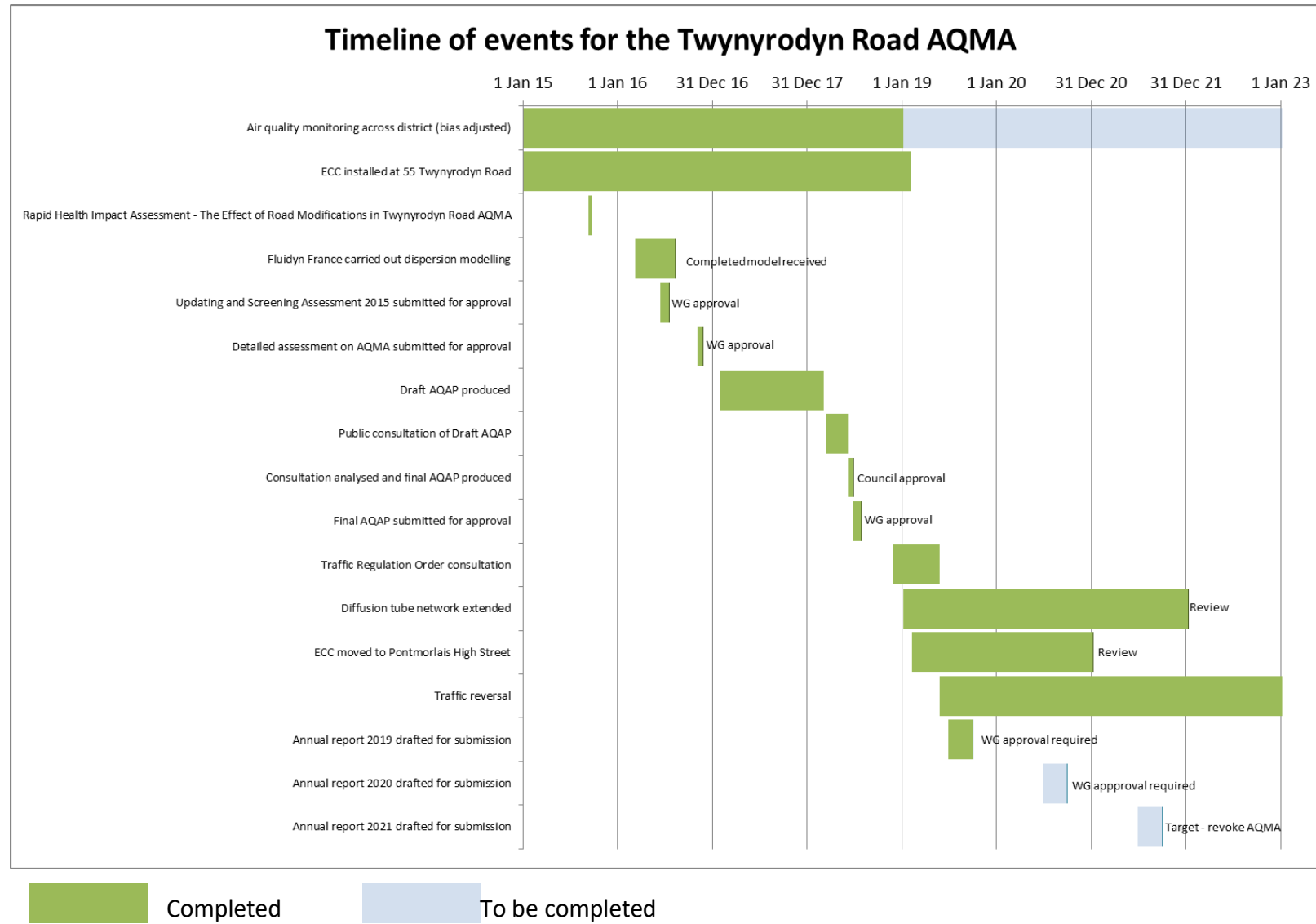


Table 1.2 – Progress on Measures to Improve Air Quality

No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
1	Reversal of 1-way traffic on both Pontmorlais High Street and Church Street (AQAP 2018)	Reduce emissions in the AQMA by providing alternative routes from the town centre	MTCBC	2017-2018	2019-2020	Reduction in NO ₂ at monitoring sites along Twynrodyn Road, and reduced traffic counts along Twynrodyn Road	Reduction of 10µg/m ³ at monitoring sites 14 and 21	Following WG approval, reversal implemented on 28 th May 2019	Public consultation completed. AQAP approved by Council Welsh Government and Defra approval received Traffic Regulation Orders served Signage installed and traffic flow reversed	2020	2019 data will include periods prior to and including traffic reversal, therefore may need analysing as separate periods to determine the impact of the traffic reversal on the AQMA

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No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
2	Increase of environmental charges through permit systems	Environmental Permits charges set by Welsh Government and subject to annual review are according to risk, encouraging businesses to comply with permit conditions to operate at lowest applicable risk for process in question	MTCBC			Proportion of businesses in lowest risk category for their type of operation	0% No permitted processes operate within the AQMA	80% (12 out of 15 active permitted processes) were within lowest risk category for their type of operation in 2018/2019	Newly permitted businesses are being given support to reduce their risk to the lowest possible for each site and process	2020	Following inspections businesses are guided on how to achieve full permit compliance
3	Saturday shuttle bus provision	Reduce journeys to and from the town centre by providing an alternative (free during a 6-week trial)	MTCBC	2018	2018	Number of people getting on and off the shuttle bus at the Red house and College stops	<1% Extremely hard if not impossible to prove.	Use of the shuttle bus was low and it ceased to operate on 25 th December 2018.	The trial was completed and it was found to be unviable	2018	The aim was to bring people to the Town Centre from the outlying retail areas to generate income. The lack of use meant operating the bus was not economically viable

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Comments Relating to Emission Reductions	The aim is for MTCBC works to cycle to work. Although many live in Merthyr Tydfil only a few live within or travel through the AQMA and as such effects will be marginal. There is no way of checking of those who have accessed the scheme whether and how often they cycle to work
Estimated Completion Date	Ongoing
Progress in Last 12 Months	16 new scheme members in 2018
Progress to Date	Scheme attracts a handful of people every year. To date 160 people have joined the scheme
Target Annual Emission Reduction in the AQMA	<1% Extremely hard if not impossible to prove.
Indicator	Number of people joining scheme
Implementation Phase	Ongoing
Planning Phase	2010
Lead Authority	Cycle Solutions
Focus	Salary sacrifice scheme towards purchase of bicycle
Measure	Cycle to work scheme
No.	4

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Comments Relating to Emission Reductions	Schools including Twynrodyn Community Primary school are able to take part in schemes to encourage walking to school including addressing road safety, walking buses, etc. This includes a Walk to School week and Kerbcraft Child Pedestrian Training. It is unclear how effective they are at changing parental choice to drive or walk in the long run. There are plans to obtain baseline data on how students travel to school in
Estimated Completion Date	Ongoing
Progress in Last 12 Months	Not monitored
Progress to Date	Not monitored
Target Annual Emission Reduction in the AQMA	<1% Extremely hard if not impossible to prove.
Indicator	Number of students walking to school
Implementation Phase	Ongoing
Planning Phase	2010
Lead Authority	MTCBC
Focus	Encouraging primary school students to walk to school
Measure	Walking to school initiatives
No.	5

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No.	Measure	Focus	Lead Authority	Planning Phase	Implementation Phase	Indicator	Target Annual Emission Reduction in the AQMA	Progress to Date	Progress in Last 12 Months	Estimated Completion Date	Comments Relating to Emission Reductions
6	Scoot to school	Training to primary school children to travel to school by scooter	Sustrans	2010	Ongoing	Number of students scooting to school	<1% Extremely hard if not impossible to prove.	Not monitored	Not monitored	Ongoing	It is unclear whether being a fun activity means it causes short term rather than long term changes
7	National Standards Cycling Scheme	Training year 6 students on cycling safety	Sustrans	Pre 2010	Ongoing	Number of people signing up to schemes	<1% Extremely hard if not impossible to prove.	Consistently high uptake	Consistently high uptake	Ongoing	By delivery to all 22 primary schools it aims to encourage students starting secondary school to cycle to school. Although many take the course the number who then start secondary school by cycling and those who maintain it throughout their time at secondary school is not known

2. Air Quality Monitoring Data and Comparison with Air Quality Objectives

2.1 Summary of Monitoring Undertaken in 2018

2.1.1 Automatic Monitoring Sites

This section sets out what monitoring has taken place and how results compare with the objectives.

Merthyr Tydfil County Borough Council undertook automatic (continuous) monitoring at 1 site during 2018, however the equipment developed a fault and was only operational for 4% of the monitoring period. MTCBC monitored NO₂.

PM₁₀ and PM_{2.5} were also monitored at a site operated by Merthyr (South Wales) Ltd, in accordance with planning conditions for the Ffos-Y-Fran land reclamation scheme. Table 2.1 presents the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 2.1. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

2.1.2 Non-Automatic Monitoring Sites

Merthyr Tydfil County Borough Council undertook non- automatic (passive) monitoring of NO₂ at 30 sites during 2018. Table 2.2 presents the details of the sites.

Maps showing the location of the monitoring sites are provided in Figure 2.2. Further details on Quality Assurance/Quality Control (QA/QC) and bias adjustment for the diffusion tubes are included in Appendix C.

Table 2.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	Associated with (Named) AQMA?	OS Grid Reference		Pollutants Monitored	Monitoring Technique	Inlet Height (m)	Distance from monitor to nearest relevant exposure (m) ⁽¹⁾	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y						
APM1	Twynyrodyn School	Suburban		305821	206008	PM ₁₀ PM _{2.5}	TEOM	2.43	0	0	N/A
ECC	55 Twynyrodyn Road	Kerbside	Twynyrodyn Road AQMA	305416	205867	NO ₂	ECC	2.75	0	0	2.25

Notes:

(1) 0m indicates that the sited monitor represents exposure and as such **no distance calculation is required**

Figure 2.1 – Map of Automatic Monitoring Sites





	GRADDFA / SCALE: 1:1,826	© Hawffraint y Goron a hawliau cronfa ddata 2019 Ardlwg Ordnans 100025302 "Ni chaniateir i chwigo, tan-drwyddedu, dos barthu neu werthu y data yma i unrhyw drydydd barti mewn unrhyw ffur"	© Crown copyright and database rights 2019 Ordnance Survey 100025302 "You are not permitted to copy, sub-licence, distribute or sell any of this data to third parties in any form."	
	DYDDIAD / DATE: 01/07/2019			
	ADRAN / DEPARTMENT: Environmental Health			
ARLUNIWIYD GAN / DRAWN BY: AR				
TEITL / TITLE: Automatic Monitoring Sites				

Table 2.2 – Details of Non-Automatic Monitoring Sites

Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) ⁽¹⁾	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
1	Imperial Hotel	Roadside		305042	206524	2.3	N	0	3.4	3.4
2	Civic Centre	Urban Background		304743	206261	1.9	N	0	43.3	43.3
3	Twynrodyn Community Primary School	Suburban		305832	205941	2.1	N	0	52.8	52.8
4	15 Lower High Street	Urban Centre		305001	205763	2.5	N	0	3.6	3.6
5	1 Alma Street	Roadside		305140	205910	2.3	N	0	1.1	1.1
6	20 Alma Street	Roadside		305183	205945	2.3	N	0	1.1	1.1

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Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) ⁽¹⁾	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
7	3 Gilfach Cynon	Roadside	Twynrodyn Road AQMA	305431	205863	2.4	N	0	2.2	2.2
8	Victoria Street Taxi Rank	Urban Centre		304866	206137	2.3	N	0	3.4	3.4
9	Six Bells Estate	Suburban		303525	206388	1.9	N	0	6.3	6.3
10	9 Alma Street	Kerbside		305236	205964	2.3	N	0	1.0	1.0
11	11 Alexandra Terrace lamp-post	Roadside	Twynrodyn Road AQMA	305382	205872	3.0	N	1.7	3.0	1.3
12	Dowlais Upper	Roadside		307171	207915	2.4	N	0	1.6	1.6
13	5 Davies Terrace	Roadside	Twynrodyn Road AQMA	305156	205881	2.5	N	0	1.7	1.7

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Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) ⁽¹⁾	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
14	55 Twynyrodyn Road	Roadside	Twynyrodyn AQMA	305410	205410	2.5	Y	0	2.3	2.3
15	Quakers Yard	Suburban		309573	196518	2.0	N	0	3.4	3.4
16	Erw Las	Suburban		303360	206822	2.2	N	0	37.0	37.0
17	11 Alexandra Terrace façade	Roadside	Twynyrodyn AQMA	305382	205873	1.7	N	0	3.0	3.0
18	91 Twynyrodyn Road	Roadside	Twynyrodyn AQMA	305217	205880	2.4	N	0	2.3	2.3
19	40 William Street	Roadside	Twynyrodyn Road AQMA	305316	2058723	2.1	N	0	5.3	5.3
20	17 Court Terrace	Roadside	Twynyrodyn AQMA	305149	205906	2.3	N	0	1.5	1.5

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Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) ⁽¹⁾	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
21	51 Twynyrodyn Road	Roadside	Twynyrodyn AQMA	305394	205871	2.3	N	0	1.5	1.5
22	15 Arfryn Terrace	Roadside	Twynyrodyn AQMA	305147	205906	2.3	N	0	4.9	4.9
23	Mount View, Mardy Street	Roadside		305521	205836	2.2	N	0	3.3	3.3
24	64 Gilfach Cynon	Roadside	Twynyrodyn Road AQMA	305415	205863	2.1	N	1.0	3.7	2.7
25	5 Milton Terrace, Windsor Terrace	Suburban		306260	205941	2.4	N	0	1.9	1.9
26	6 Windsor Terrace	Suburban		305296	205895	2.3	N	0	2.9	2.9
27	2 Jenkins Place, Queens Road	Suburban		305447	205956	2.3	N	0	1.6	1.6

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Site ID	Site Name	Site Type	Associated with Named AMQA?	OS Grid Reference		Site Height (m)	Collocated with a Continuous Analyser?	Distance from monitor to nearest relevant exposure (m) ⁽¹⁾	Distance from Kerb to Nearest Relevant Exposure (m)	Distance from Kerb to Monitor (m)
				X	Y					
28	5 Luther Street	Suburban		305715	205933	2.5	N	0	1.7	1.7
29	6/7 Ladysmith Place	Roadside		307112	202547	2.6	N	0	3.4	3.4
30	Bron-Gelli, Swansea Road	Roadside		303570	206676	2.1	N	0	8.4	8.4

Notes:

(1) 0m indicates that the sited monitor represents exposure and as such **no distance calculation is required**.

Figure 2.2 – Map of Non-Automatic Monitoring Sites across County Borough

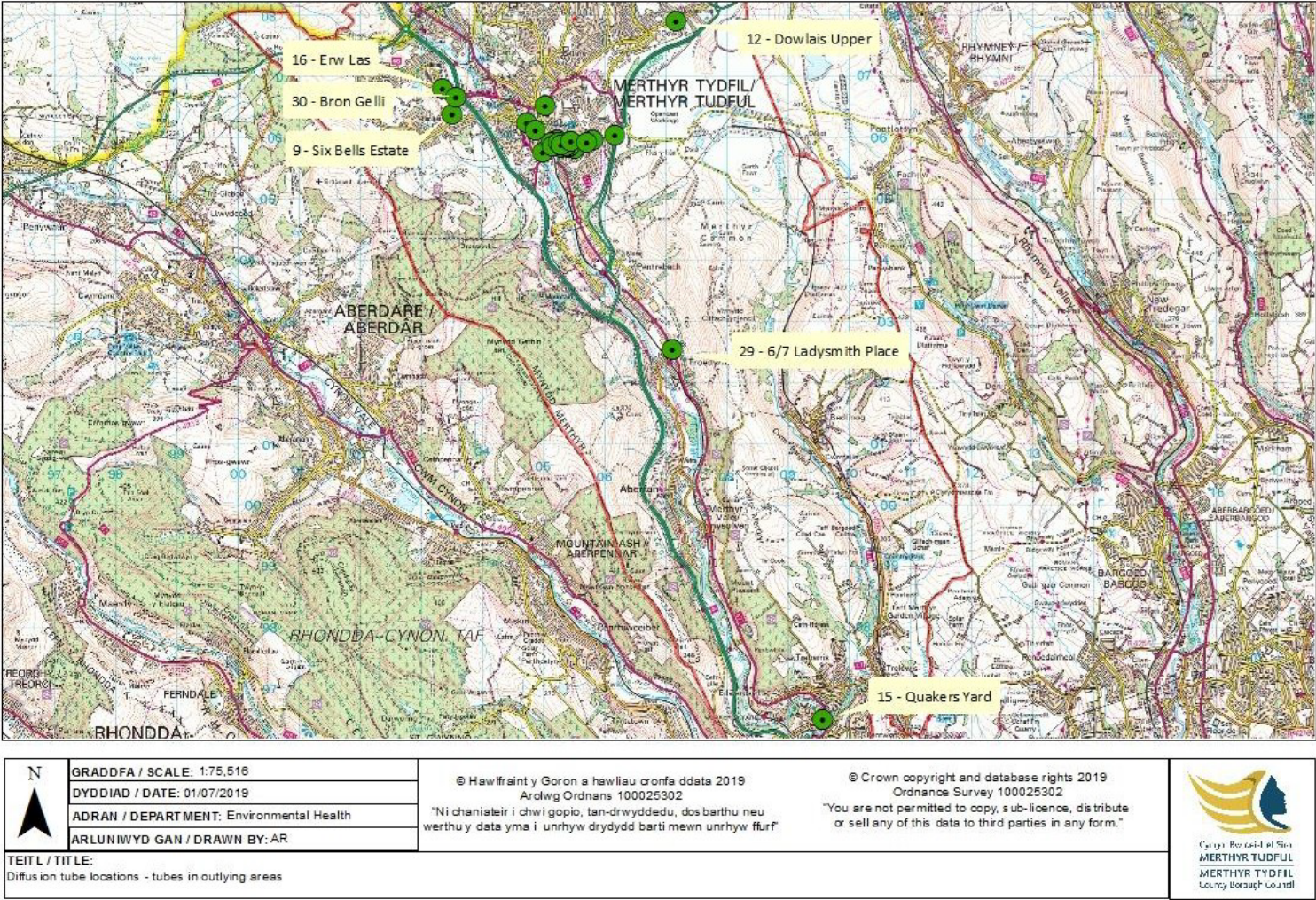


Figure 2.3 – Map of Non-Automatic Monitoring Sites across Town Ward

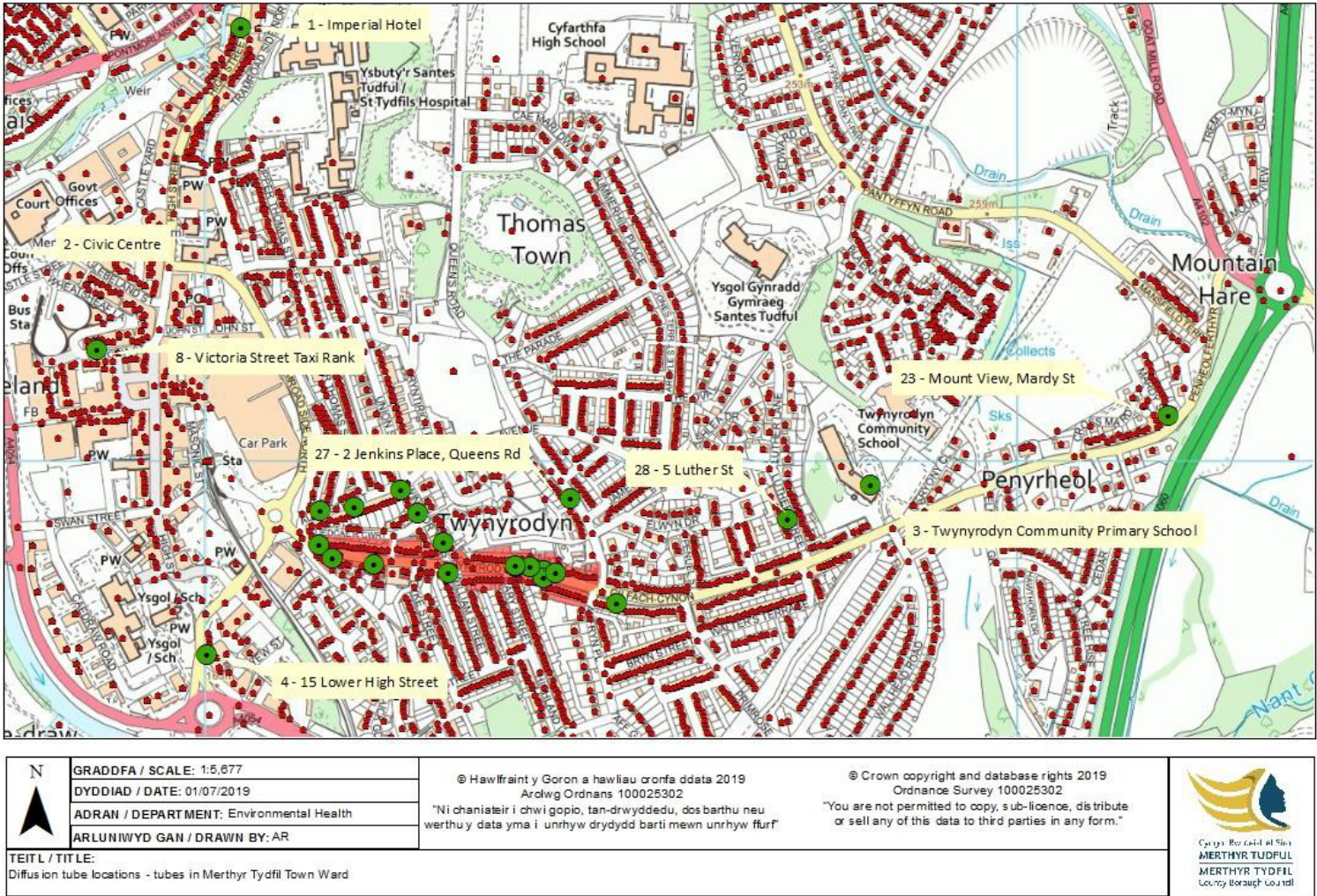
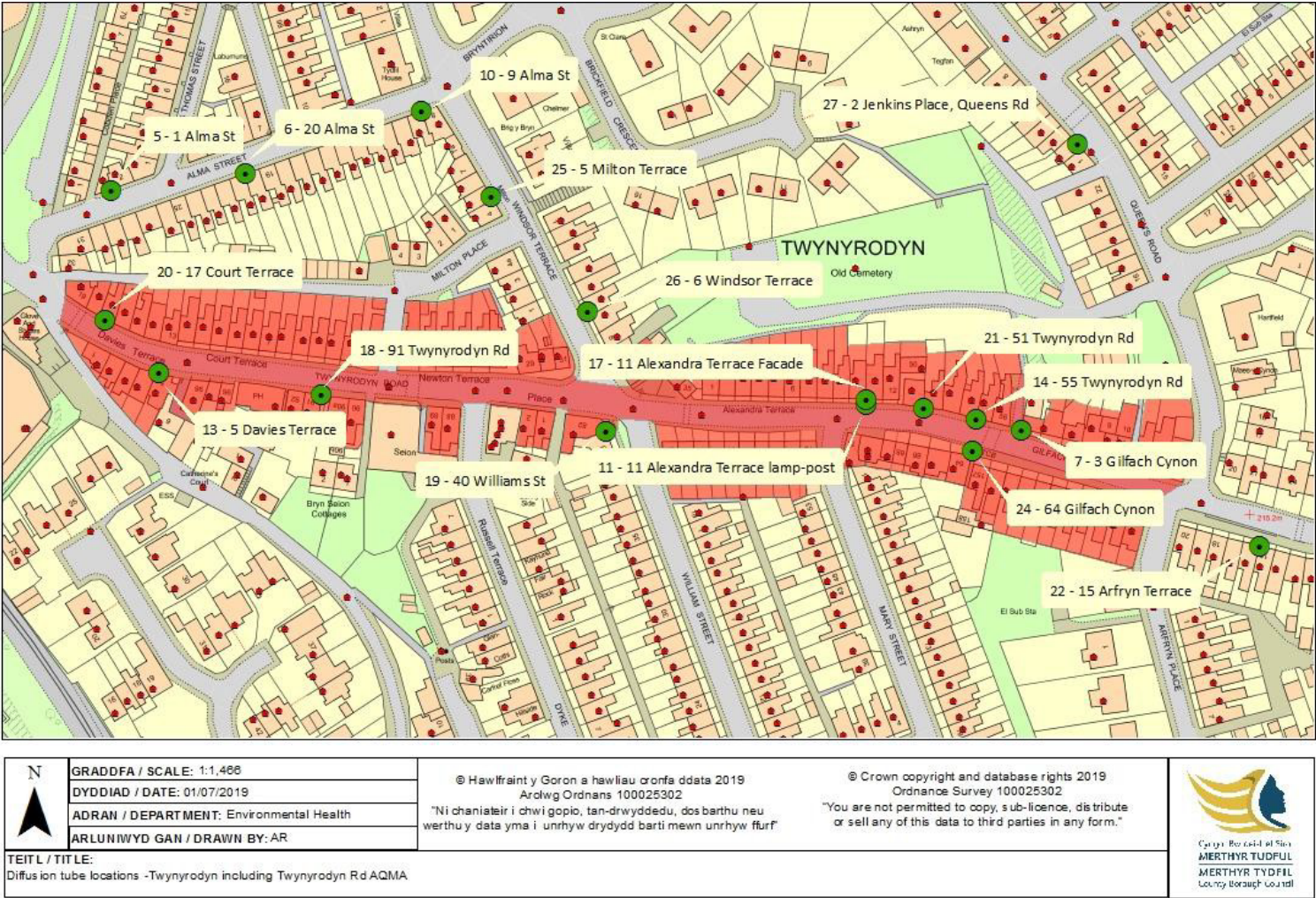


Figure 2.4 – Map of Non-Automatic Monitoring Sites across Twynnyrodyn



2.2 2018 Air Quality Monitoring Results

Table 2.3 – Annual Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
ECC	Roadside	Automatic		4	52.3	46.1	39.7	41.1*	39.9*
1	Roadside	Diffusion tube	100	100	23.1	23.2	21.2	21.3	20.8
2	Urban Background	Diffusion tube	92	92	19.4	16.4	18.1	17.9	15.2
3	Suburban	Diffusion tube	83	83	12.4	12.5	13.0	11.4	10.7
4	Urban Centre	Diffusion tube	92	92	28.7	26.5	25.3	26.9	29.3
5	Roadside	Diffusion tube	100	100	19.7	19.7	19.8	18.5	18.1
6	Roadside	Diffusion tube	92	92	17.1	16.3	17.0	15.9	17.3
7	Roadside	Diffusion tube	100	100	36.5	38.0	37.8	38.3	34.7
8	Urban Centre	Diffusion tube	100	100	24.3	23.6	22.9	22.2	20.4
9	Suburban	Diffusion tube	100	100	11.4	10.8	10.6	10.2	10.0
10	Kerbside	Diffusion tube	100	100	17.8	17.7	17.7	16.3	17.3
11	Roadside	Diffusion tube	100	100	43.3	42.5	40.9	40.5	40.3
12	Roadside	Diffusion tube	100	100	26.1	25.3	26.4	23.4	23.3

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Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
13	Roadside	Diffusion tube	100	100				28.3	30.6
14	Roadside	Diffusion tube	100	100	45.7	44.6	43.2	40.7	39.6
15	Suburban	Diffusion tube	100	100	12.8	12.9	12.8	12.8	12.2
16	Suburban	Diffusion tube	100	100	11.5	11.9	12.6	12.9	12.1
17	Roadside	Diffusion tube	100	100	35.4	36.7	36.0	35.6	33.0
18	Roadside	Diffusion tube	100	100	29.1	28.5	25.9	26.2	26.3
19	Roadside	Diffusion tube	100	100	22.2	22.2	21.5	21.9	20.3
20	Roadside	Diffusion tube	100	100	30.6	29.6	31.1	28.6	29.4
21	Roadside	Diffusion tube	100	100	45.9	45.1	48.5	46.2	47.0
22	Roadside	Diffusion tube	92	92	33.4	33.4	31.5	31.8	29.2
23	Roadside	Diffusion tube	100	100	22.3	21.0	23.2	21.9	22.3
24	Roadside	Diffusion tube	100	100	23.1	23.5	24.5	25.2	23.7
25	Suburban	Diffusion tube	100	100				16.1	17.7
26	Suburban	Diffusion tube	100	100				16.6	17.7
27	Suburban	Diffusion tube	100	100				12.6	13.4

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ Annual Mean Concentration (µg/m ³) ⁽³⁾				
					2014	2015	2016	2017	2018
28	Suburban	Diffusion tube	100	100				15.7	15.9
29	Roadside	Diffusion tube	100	100				33.0	34.6
30	Roadside	Diffusion tube	100	100				17.0	20.0

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**.

(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%).

(3) Means for diffusion tubes have been corrected for bias. All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

* *Annualised figure*

Figure 2.5 – Trends in Annual Mean NO₂ Concentrations – all monitoring locations

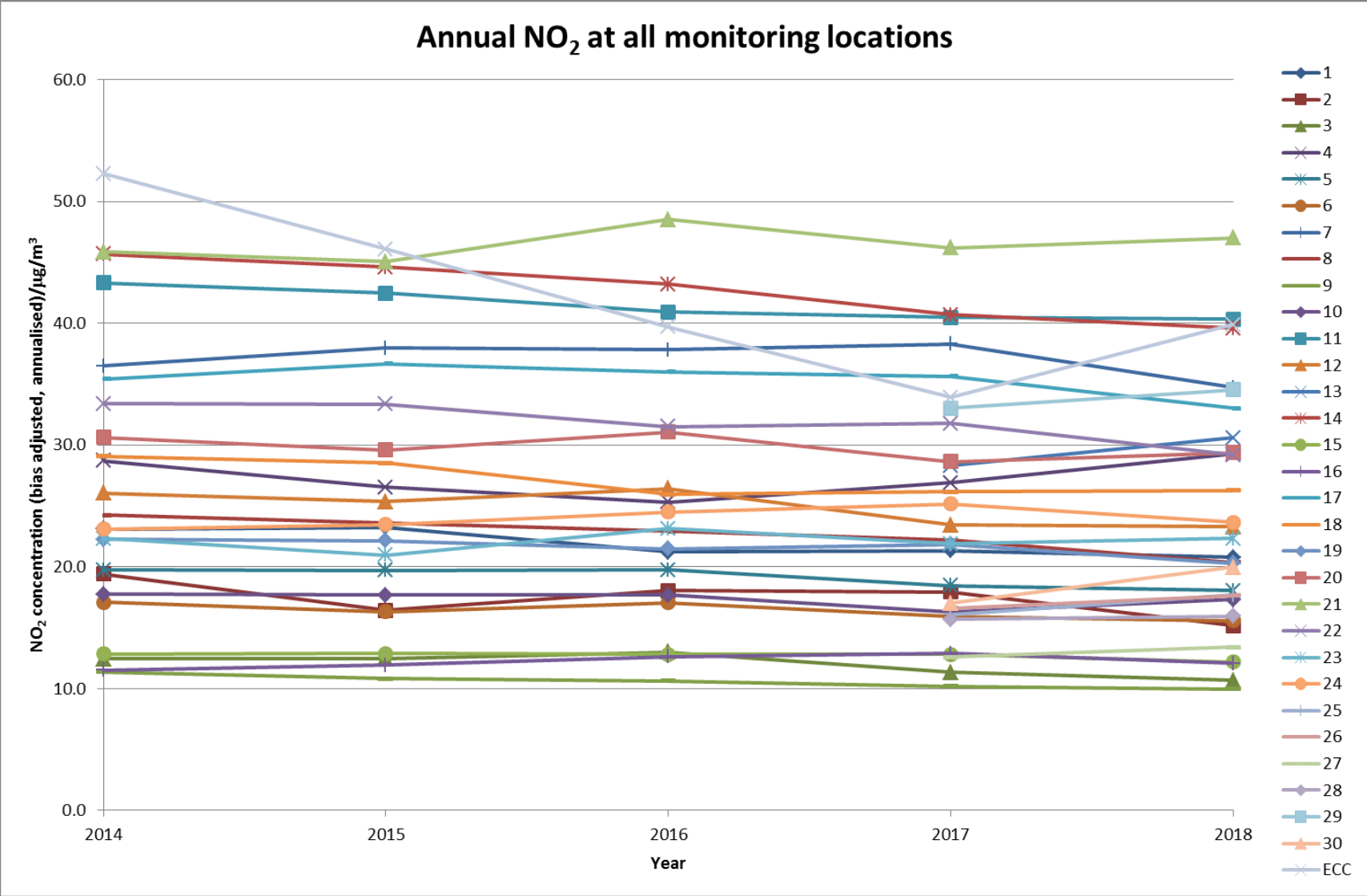


Figure 2.6 – Trends in Annual Mean NO₂ Concentrations – monitoring locations outside Twynyrodyn Area

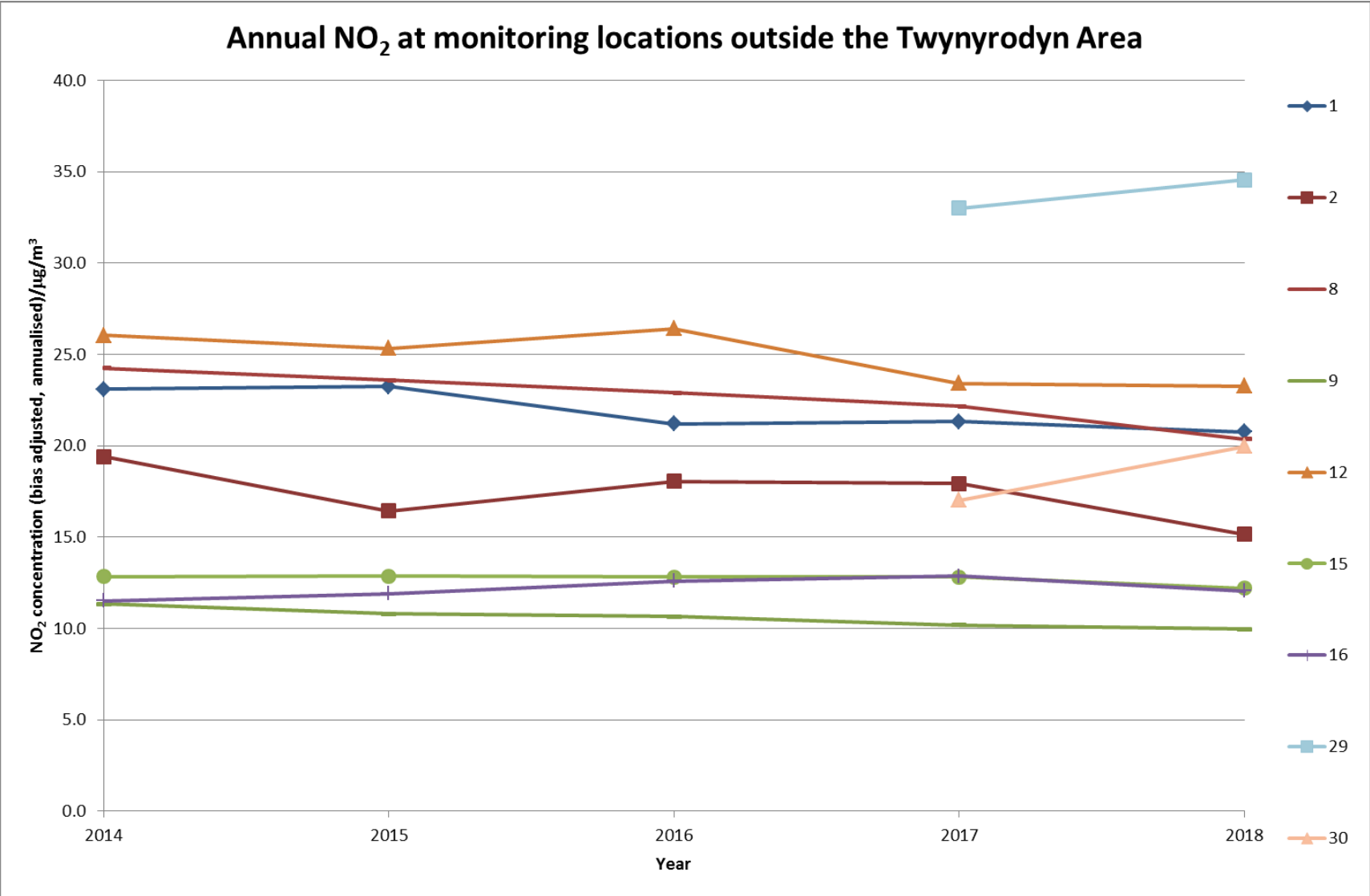


Figure 2.7 – Trends in Annual Mean NO₂ Concentrations – monitoring locations within Twynrodyn Area

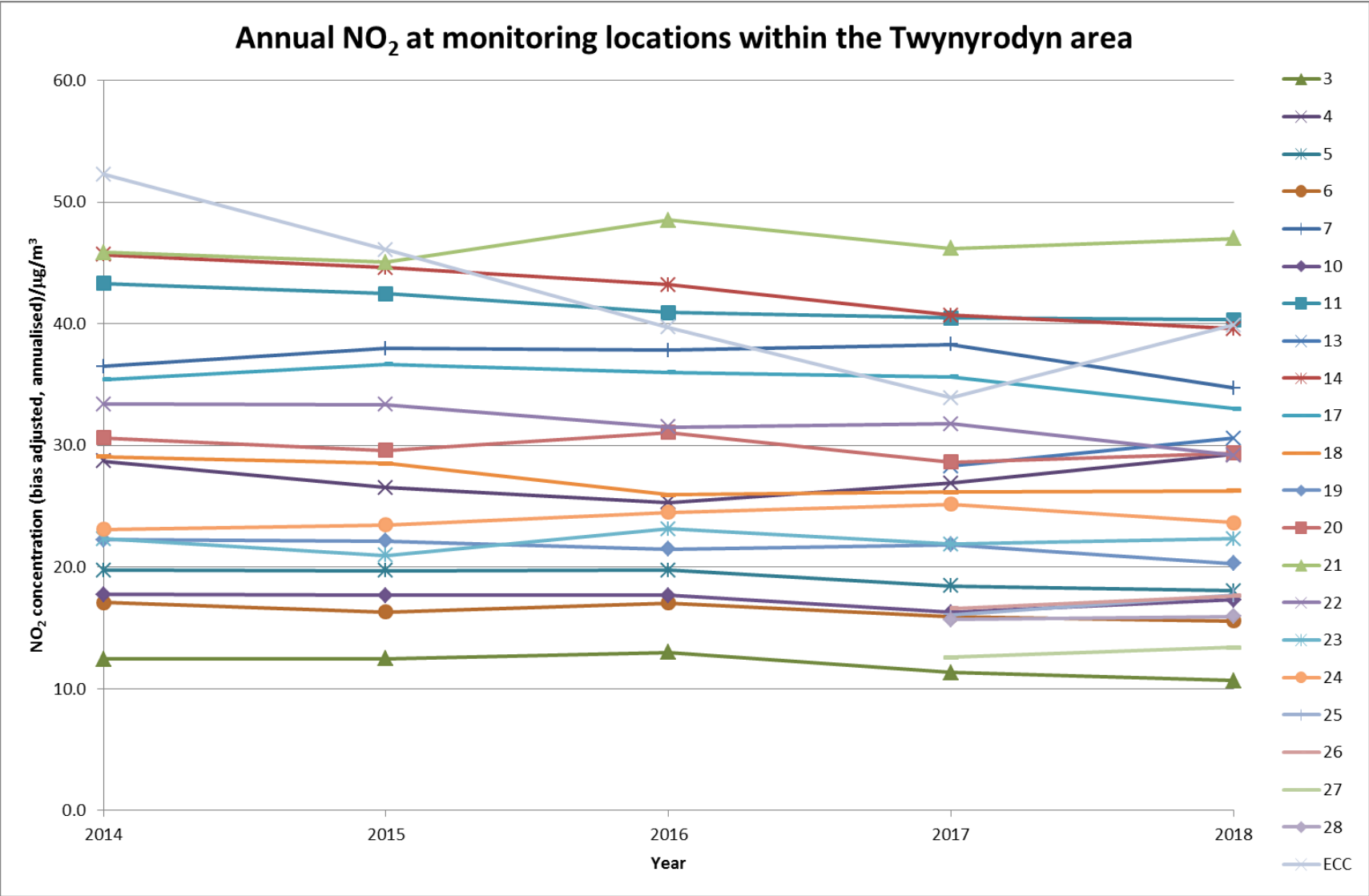


Figure 2.8 – Trends in Annual Mean NO₂ Concentrations – monitoring locations on Twynyrodyn Road

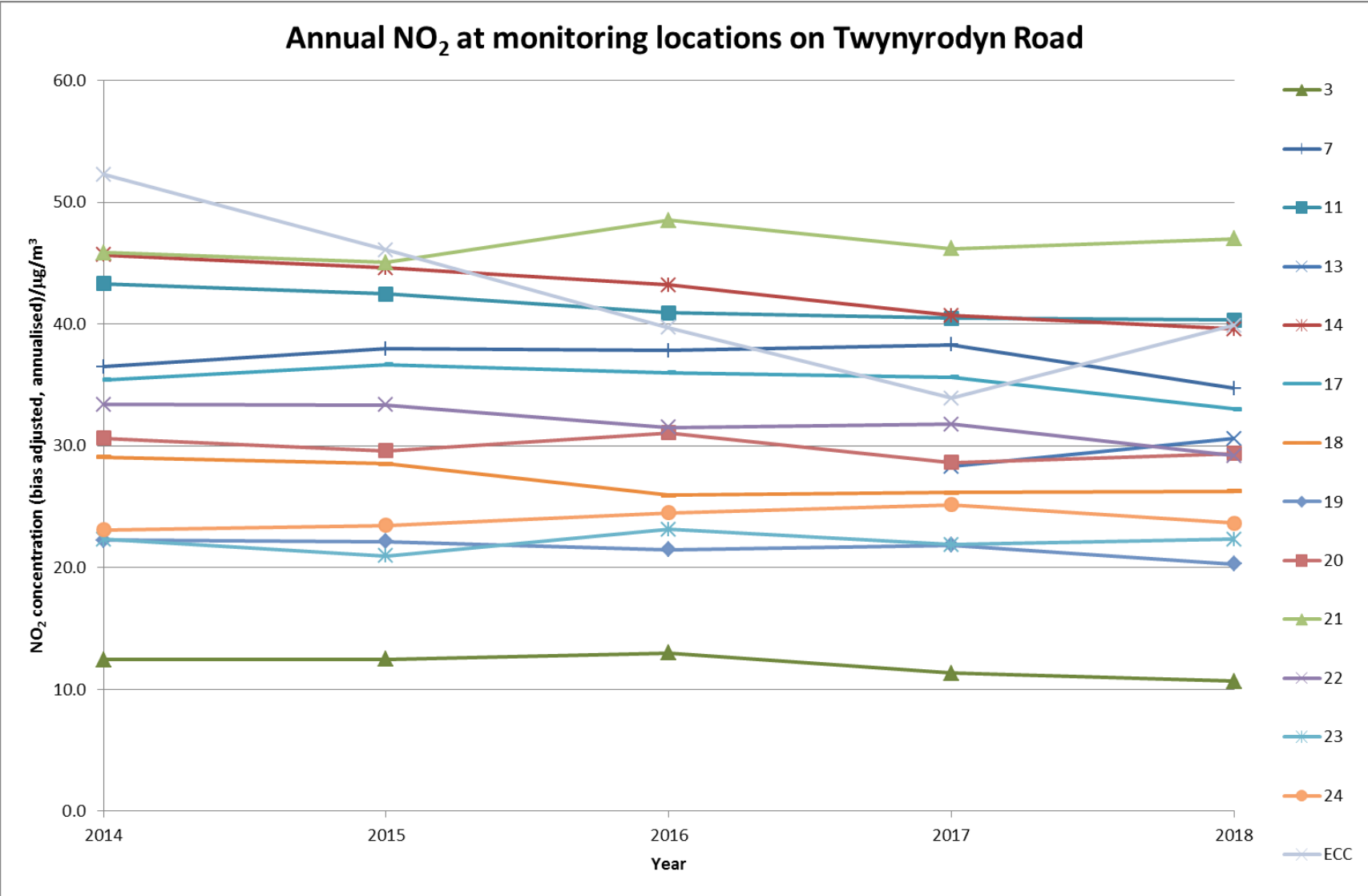


Figure 2.9 – Trends in Annual Mean NO₂ Concentrations – monitoring locations within the AQMA

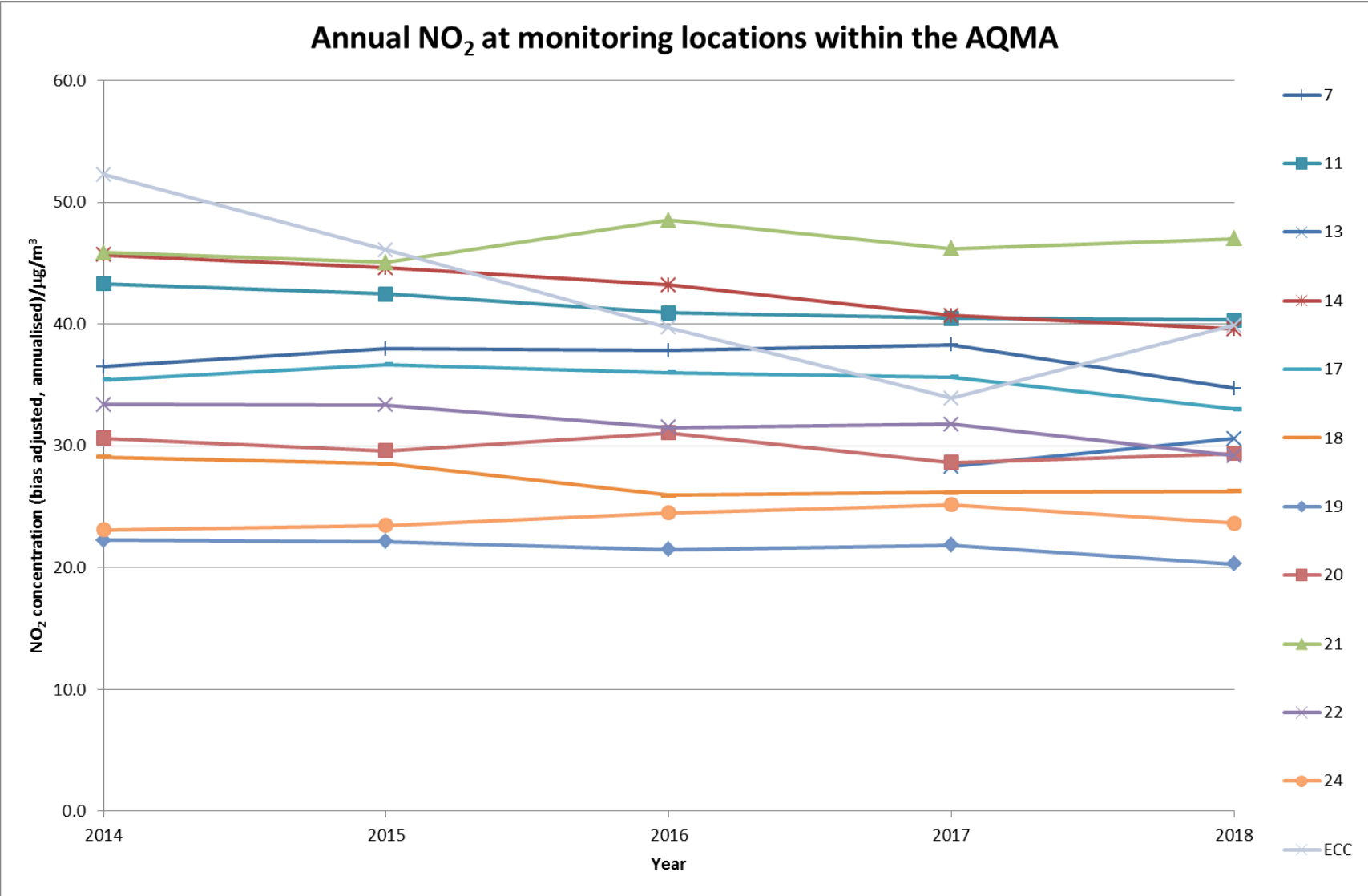


Figure 2.10 – Trends in Annual Mean NO₂ Concentrations – monitoring locations on Streets surrounding the AQMA

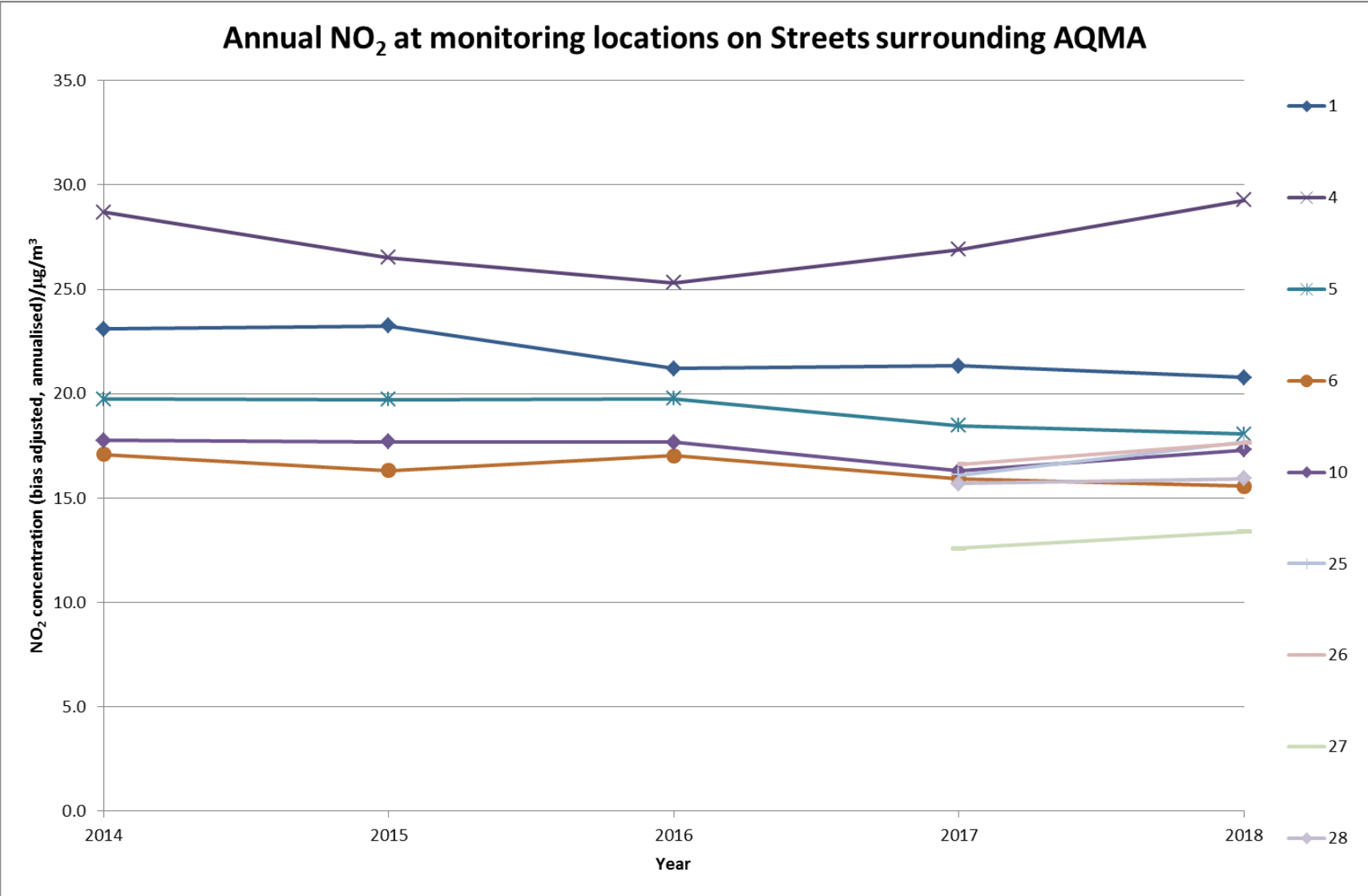


Figure 2.11 – Trends in Annual Mean NO₂ Concentrations – collocated monitoring location

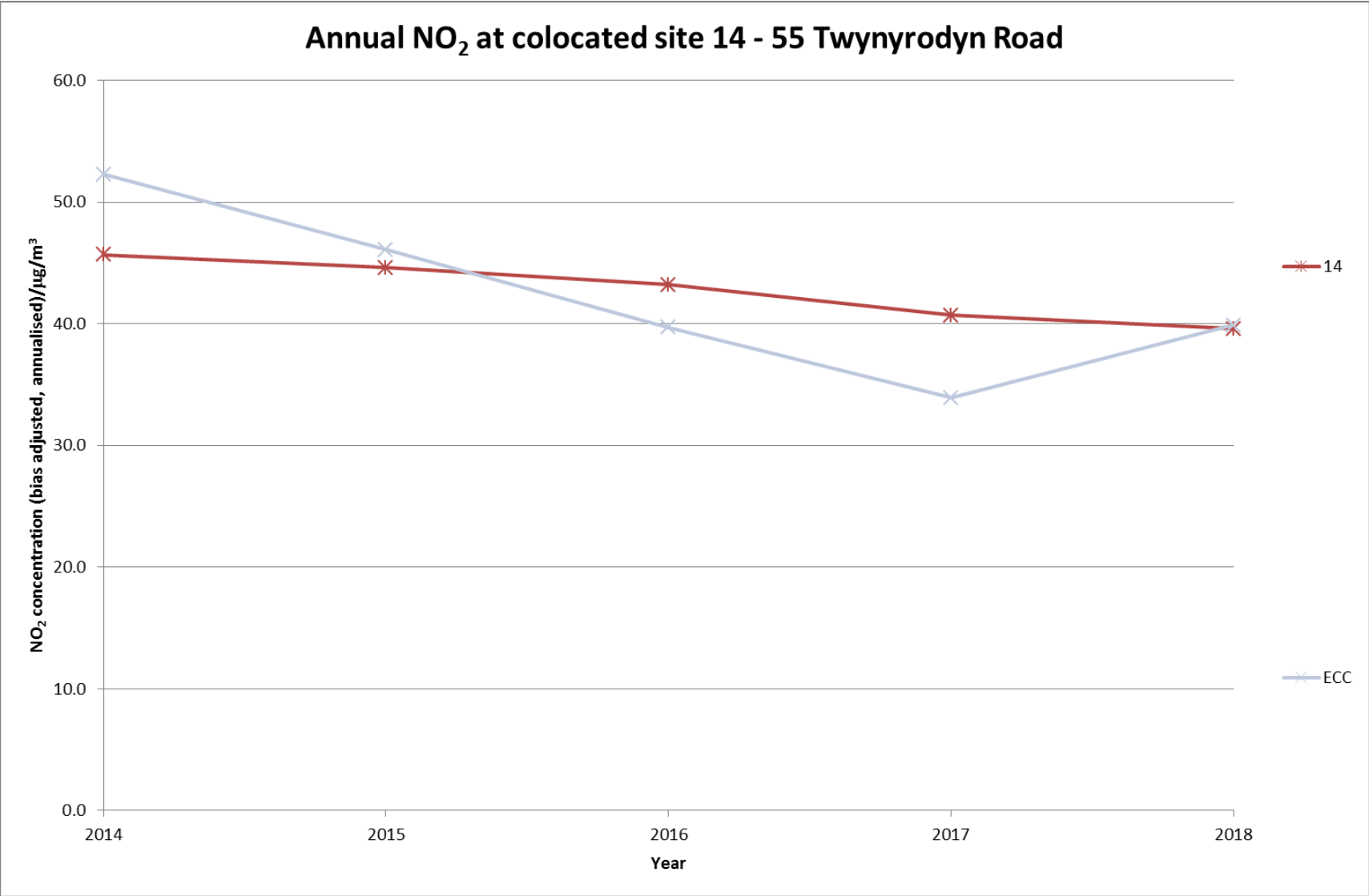


Table 2.4 – 1-Hour Mean NO₂ Monitoring Results

Site ID	Site Type	Monitoring Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	NO ₂ 1-Hour Means > 200µg/m ³ ⁽³⁾				
					2014	2015	2016	2017	2018
ECC	Roadside	Automatic			1	0	0	1 (154.5)	1 (153.7)

Notes:

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

(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%).

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

Table 2.5 – Annual Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	PM ₁₀ Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2014	2015	2016	2017	2018
TEOM	Suburban			9.63	9.26	8.41	11.32	8.7

Notes:

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

(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%).

(3) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 2.12 – Trends in Annual Mean PM₁₀ Concentrations

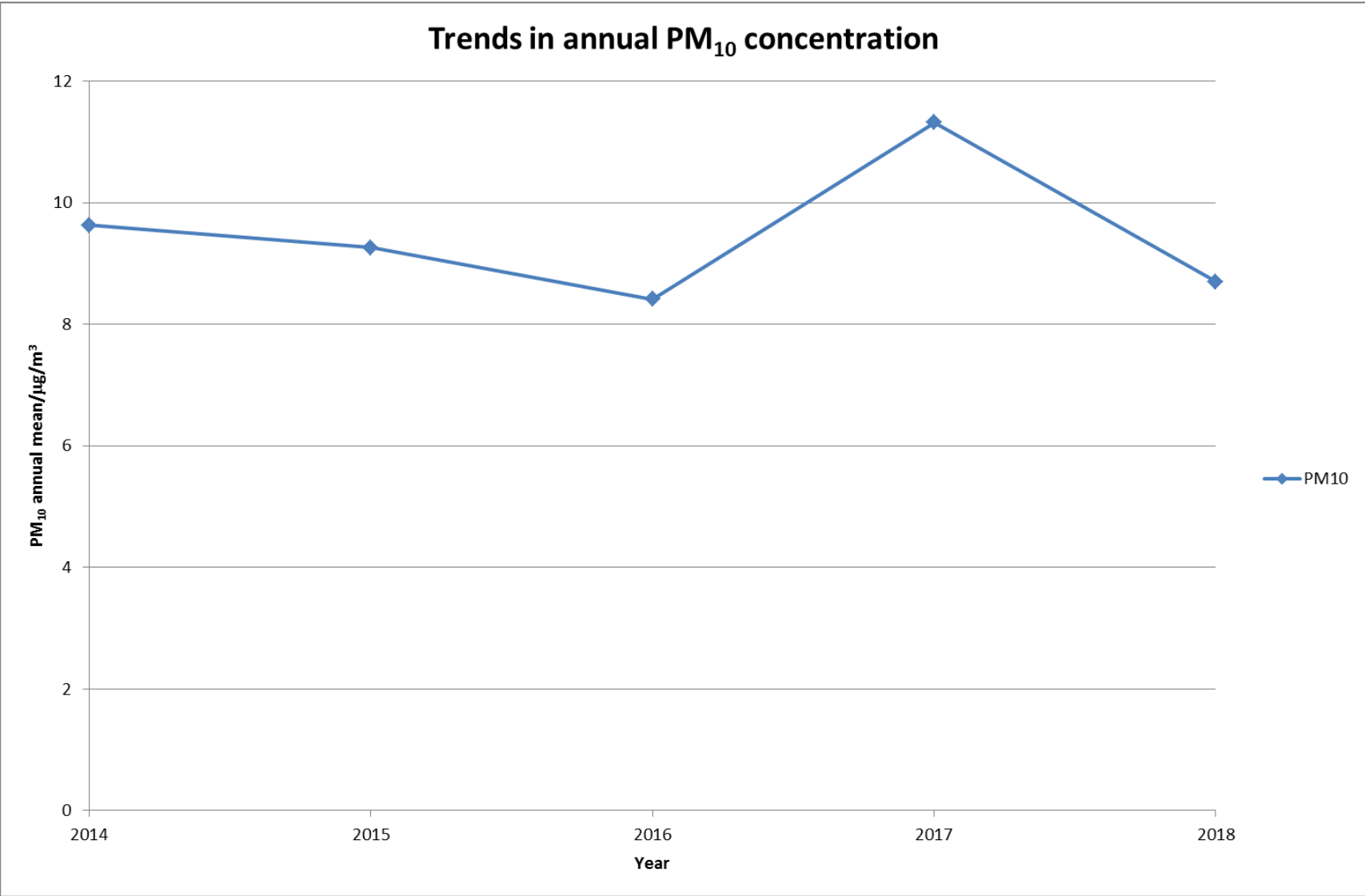


Table 2.6 – 24-Hour Mean PM₁₀ Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	PM ₁₀ 24-Hour Means > 50µg/m ³ ⁽³⁾				
				2014	2015	2016	2017	2018
TEOM	Suburban	96	96	0	0	0	0	0

Notes:

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

(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%).

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

Table 2.7 – Annual mean PM_{2.5} Monitoring Results

Site ID	Site Type	Valid Data Capture for Monitoring Period (%) ⁽¹⁾	Valid Data Capture 2018 (%) ⁽²⁾	PM _{2.5} Annual Mean Concentration (µg/m ³) ⁽³⁾				
				2014	2015	2016	2017	2018
TEOM	Suburban	96	96	5.83	5.01	3.78	4.47	4.5

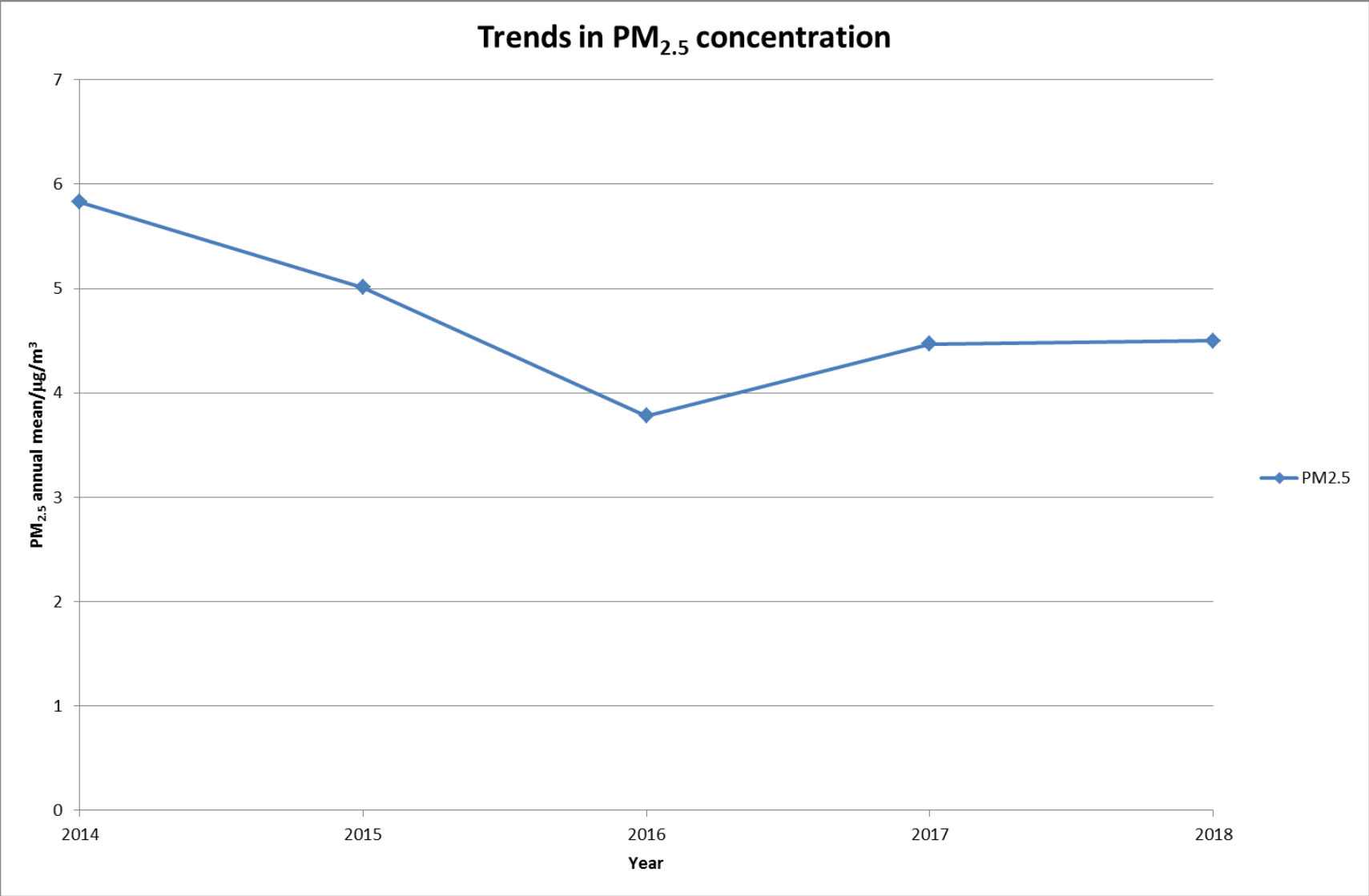
Notes:

(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%).

(3) All means have been “annualised” as per Boxes 7.9 and 7.10 in LAQM.TG16, valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Figure 2.13 – Trends in Annual Mean PM_{2.5} Concentrations



2.3 Comparison of 2018 Monitoring Results with Previous Years and the Air Quality Objectives

Generally NO₂ concentrations have remained relatively stable over the last 5 years, as shown in Figure 2.5. Most sites are within the 40µg/m³ AQS objective as shown in Figure 2.5 and 2.6 (all sites and sites outside Twynrodyn). There are 2 sites within the AQMA where 40µg/m³ is exceeded, as shown in Figure 2.7 and Figure 2.8. Site 21 – 51 Twynrodyn Road has remained above the annual mean AQS objective as has site 11 – Alexandra Terrace Lamp-post. Site 14 remains close to the annual mean AQS objective, and when the error of diffusion tubes is taken into account there is a risk it exceeds it as in 2017. Following the public consultation in 2018, on 28th May 2019 traffic flow changes along Pontmorlais will be implemented. It is predicted this will reduce traffic along Twynrodyn Road and air quality within the AQMA will improve to within AQS objectives by the end of 2020.

The effectiveness of the ECC monitor is of concern. It was only functioning for 4% of the monitoring period. In some years has noticeably over-read or under-read compared to bias adjusted diffusion tubes, as shown in Figure 2.11. However in 2018, following annualisation the correlation appears good (over-read of 1% compared to site 14 – 55 Twynrodyn Road diffusion tube). The sensors have been described by AirMonitorsUK as prone to damage by cold weather. They have been developing more robust sensors and this may be the reason why correlation appears better than in previous years. Cold weather is the time of year when it is most critical as it is when engines perform most poorly and heating is in use, so NO₂ concentrations are at their highest. Loss of the sensors during the cold weather and cross interference from ozone may explain its sometimes poor correlation with diffusion tubes.

It should be noted the ECC monitor is not an established technology and is not a recognised and standardised approach to measuring annual NO₂ levels, unlike chemiluminescent monitors. It has been chosen as a monitor as it is small enough to attach to street furniture, and by giving real time results can be used to see trends such as diurnal patterns, and monitoring changes in patterns such as following road diversions including the reversal implemented under the action plan. Although it has been used here to calculate the annual NO₂ concentration, this is not a purpose it was designed for. One of the uses MTCBC intends for the ECC is observing changes in NO₂ as traffic measures are put in place under the action

plan. This is why in 2019 the ECC has been relocated to Pontmorlais High Street, where it will be used to monitor the extent of increased NO₂ associated with diverted traffic. Pontmorlais High Street has retail units at ground floor level, with a number of residential flats at first floor level. Elevated NO₂ in excess of the annual AQS objective is not anticipated, however the presence of tall buildings and a narrow street means there may be a canyon effect and the real world performance of the Fluidyn France modelling will need to be scrutinised.

After 4 years of reducing PM₁₀ and PM_{2.5} increased in 2017. PM₁₀ reduced to be in line with 2014-2016 concentrations in 2018. This cannot be inferred as a stabilisation until 2019 at the earliest. PM_{2.5} was similar to 2017 levels, and above previous years. They are still significantly below the AQS objective, and are not currently of concern.

2.3.1 Nitrogen Dioxide (NO₂)

Monitoring at the majority of sites was for the full calendar year. A small number of tubes went missing but no one site was subject to several months of missing tubes.

The ECC showed poor data capture at 4%. The device was found to have suffered sensor problems in February and March, therefore this data had to be removed in screening. The sensor was replaced and the device reinstalled, however a connection to AirMonitors UK could not be achieved. AirMonitors UK attempted to repair the connection, however they were unsuccessful. The device was sent off for repair and due to the time involved was not reinstalled in 2018. On advice from Defra the period mean has been calculated for the continuous data collection period and compared to 3 chemiluminescent monitors in Caerphilly Hafod-yr-Ynys, Cwmbran and Swansea Roadside, in order to calculate the annual mean. Although it is not ideal as 2 of these sites are roadside (Caerphilly and Swansea), these were identified by the LAQM helpdesk based on data capture and proximity as the best combination for the period mean to annual mean conversion. Although the ECC is useful for providing real time data, for monitoring annual mean NO₂ concentrations diffusion tubes have proven to be more reliable. It may have missed exceedences of the short term 200µg/m³ limit as the sensors failed during February and March, classed as cold weather periods and as such the times of year when NO₂ concentrations are expected to be highest. It may be useful when the action plan is implemented as, being designed for real time monitoring, it has been relocated to Pontmorlais High Street. The relocation was on 11th

February 2019 and as such it will have captured data prior to and after 28th May 2019, on which the action plan was implemented. For long term monitoring the diffusion tubes will continue to be the main approach taken by MTCBC.

2 diffusion tube sites exceeded the annual mean AQS objective for NO₂: Site 11 (11 Alexandra Terrace lamp-post), and Site 21 (51 Twynrodyn Road). Site 21 is located on the façade of a terraced property and is indicative of the exposure residents will receive. Site 14 (55 Twynrodyn Road) and the collocated ECC were within 10% of the AQS objective. All 3 sites are within the existing AQMA. Following the public consultation and approval by Council, Welsh Government and Defra, works to improve traffic flow took place on 28th May 2019. These works consisted of temporary and permanent signage and temporary concrete barriers to prevent drivers turning the wrong way onto Church Street. It is predicted NO₂ concentrations will then reduce.

The general trend throughout the district has been for a reduction and levelling out of NO₂ concentrations. Concentrations increased in 2013 when various road changes took place throughout the town centre, interrupting a declining trend likely to be associated with fleet changes. This has since reduced and levelled out, however as stated a small number of sites within the AQMA have levelled out above the AQS objective.

Sites 5, 6, 10, and 25-28 are on the streets surrounding Twynrodyn Road. The proposal to construct a diversionary route along these streets has not been implemented as there was a low response in favour of it during the public consultation. A number of these tubes were closed on 2019, with only sites 5 – 1 Alma Street, and 26 – 6 Windsor Street remaining open. The 2018 results shows they have capacity to take additional vehicles without NO₂ concentrations reaching 36µg/m³ or more should the action plan be unsuccessful and the action plan need to be revised with previous options being revisited. They will also give an indication along with newly opened tubes in Union Street, Darren View and Brynteg as to whether the reversal has resulted in side streets being used as back routes.

Comparing the ECC with tube 14, a collocated diffusion tube at 55 Twynrodyn Road, shows correlation is better than in previous years. This may be by chance or may be as the sensors have been developed. The sensor responds to ozone resulting in some negative readings and reduced readings of NO₂. Although it provides some useful data in terms of diurnal patterns and short-term changes, it is not an established technology and is not sufficiently reliable at

this time to provide annual means. This will continue to be monitored primarily through diffusion tube monitoring. The ECC will continue to be used to give real time data on the effectiveness of the action plan, however it will primarily be used as an indicative measure. It has been relocated to Pontmorlais and can be relocated to other locations should there be any indication it is required.

2.3.2 Particulate Matter (PM₁₀)

PM₁₀ and PM_{2.5} are monitored by Merthyr (South Wales) Ltd as a planning condition for the Ffos-y-Fran land reclamation scheme, an opencast coal reclamation scheme. They operate the TEOM at Twynyrodyn Community Primary School. PM₁₀ was reducing, but in 2017 increased, with 2018 reducing in line with previous years. It remains significantly below the 40µg/m³ limit at the background site. There were no exceedences of the daily mean of 50µg/m³. PM₁₀ may be higher and more prone to variation within the AQMA as it is also produced by traffic. This means any improvements achieved by the action plan will also benefit public health by reducing PM₁₀. On 28th May 2019, in accordance with the action plan a traffic reversal took place, reversing traffic flow on Church Street and Pontmorlais High Street. Anecdotal evidence from staff using Twynyrodyn Road is that since the traffic reversal was implemented there have been noticeably fewer cars on Twynyrodyn Road at peak times. The traffic reversal was primarily to reduce NO₂ concentrations within the AQMA, but a reduction of traffic on Twynyrodyn Road is also likely to reduce PM₁₀ throughout the Twynyrodyn Road AQMA from 2019 onwards.

2.3.3 Particulate Matter (PM_{2.5})

PM_{2.5} was reducing, but in 2017 has increased, following the same pattern as PM₁₀. It remained at a similar level in 2018. It remains significantly below the 25µg/m³ target at the background site. It comprises about half of the PM₁₀ measured on site. PM_{2.5} may be higher within the AQMA as it is also produced by traffic. This means any improvements achieved by the action plan will also benefit public health by reducing PM_{2.5}. As previously stated the traffic reversal took place, reversing traffic flow on Church Street and Pontmorlais High Street was primarily to reduce NO₂ concentrations within the AQMA, but a reduction of

traffic on Twynyrodyn Road is also likely to reduce PM_{2.5} throughout the Twynyrodyn Road AQMA from 2019 onwards.

2.4 Summary of Compliance with AQS Objectives as of 2018

MTCBC has examined the results from monitoring in the borough.

Concentrations within the Twynyrodyn Road AQMA still exceed the annual mean AQS objective of 40µg/m³ for NO₂. Therefore the AQMA should remain.

3. New Local Developments

At this time there have been no new developments that have required an air quality assessment since the previous Air Quality Progress Report. The Environmental Health Department is aware of planned developments through consultation on the planning process and the Local Development Plan.

3.1 Road Traffic Sources (and Other Transport)

Narrow Congested Streets with Residential Properties Close to the Kerb

Twynyrodyn Road

As identified in previous reports and the Detailed Assessment 2015, Twynyrodyn Road is a narrow, busy street with residential properties close to the kerb, and is currently the location of an AQMA.

Following the Detailed Assessment and declaration of the AQMA, MTCBC has carried out a public consultation on 3 options identified by the action plan to reduce traffic along Twynyrodyn Road. The consultation involved a letter drop to properties likely to be affected by the options considered, consultation documents being placed on the MTCBC website and Cwm Taff hub, an article in Contact Magazine distributed across the borough, 4 public drop-in sessions and a Social Media session attended by Environmental Health, Corporate Communications, Highways and Engineering. The results of the public consultation was that the majority of respondents (94%) were in favour of reversing traffic flow along Pontmorlais High Street, offering the public with an alternative route away from Tesco and the town centre, where it is believed a significant proportion of drivers on Twynyrodyn Road originate from. Following approval of the action plan by the Council and by Welsh Government, on 28th May 2019 engineers reversed the flow of traffic on Pontmorlais High Street and Church Street. NO₂ monitoring stations on Pontmorlais High Street and many of the NO₂ monitoring stations on Twynyrodyn Road were retained to determine whether the reversal has had the predicted effect. Additionally 5 tubes have been relocated from the network to provide additional monitoring on Somerset Place, Darren View, Pontmorlais High Street and Pontmorlais West. The first two tubes are to monitor for changes caused by people taking

back routes to avoid the traffic reversal, and the remaining 3 are to monitor the reversal route for any potential breaches of the NO₂ annual mean air quality standard (40µg/m³). Pontmorlais High Street has a number of tall buildings and is a relatively narrow road (11.3m between buildings on opposite sides of the road) and there is the potential for a canyon effect. Modelling indicated this would not result in a breach of the NO₂ annual mean air quality standard, however it will be important to check the model for real-world performance. To that end in addition to the diffusion tubes introduced in January 2019, in February 2019 the ECC has also been moved to Pontmorlais High Street to allow real time monitoring of the effect on air quality on Pontmorlais High Street. Should there be any early indications the air quality standard is likely to be breached the reversal would have to be reviewed. MTCBC aims to revoke the Twynyrodyn Road AQMA, however if the reversal could result in a new AQMA the relative numbers of people affected would need to be compared to determine whether the reversal remained the most appropriate solution.

At this time there is limited data for comparison between the situation before and after the reversal. Definitive data will not be available until the reversal has been in place for at least 12 months. For the purpose of this report period 6 2018 and period 6 2019 have been compared for sites along Twynyrodyn Road and Pontmorlais that have been retained from 2018 into 2019. This is presented in Figures 3.1 – 3.3. As 2019 tubes will not have a bias adjustment factor until early 2020, instead unadjusted data has been used. Error bars of +/- 20% have been included to show best case and worst case scenarios. As period 6 is not a cold weather period its usefulness is limited, and the only conclusion that can be reached is that the NO₂ levels on Twynyrodyn Road appear to have decreased noticeably for all sites within the AQMA with some minor increases outside the AQMA at Site 1 – Imperial Hotel, Site 2 – Civic Centre, and Site 26 – 6 Windsor Terrace. We cannot conclude from this that the AQMA can be revoked as it is only a snapshot and many of the error bars overlap. However it is an indicator that the general trend for decreases and increases is as expected and that some improvement within the AQMA is likely.

Figure 3.1 – Comparison of Period 6 2019 and Period 6 2018 for all sites within the AQMA, near the AQMA or on or near the diversion

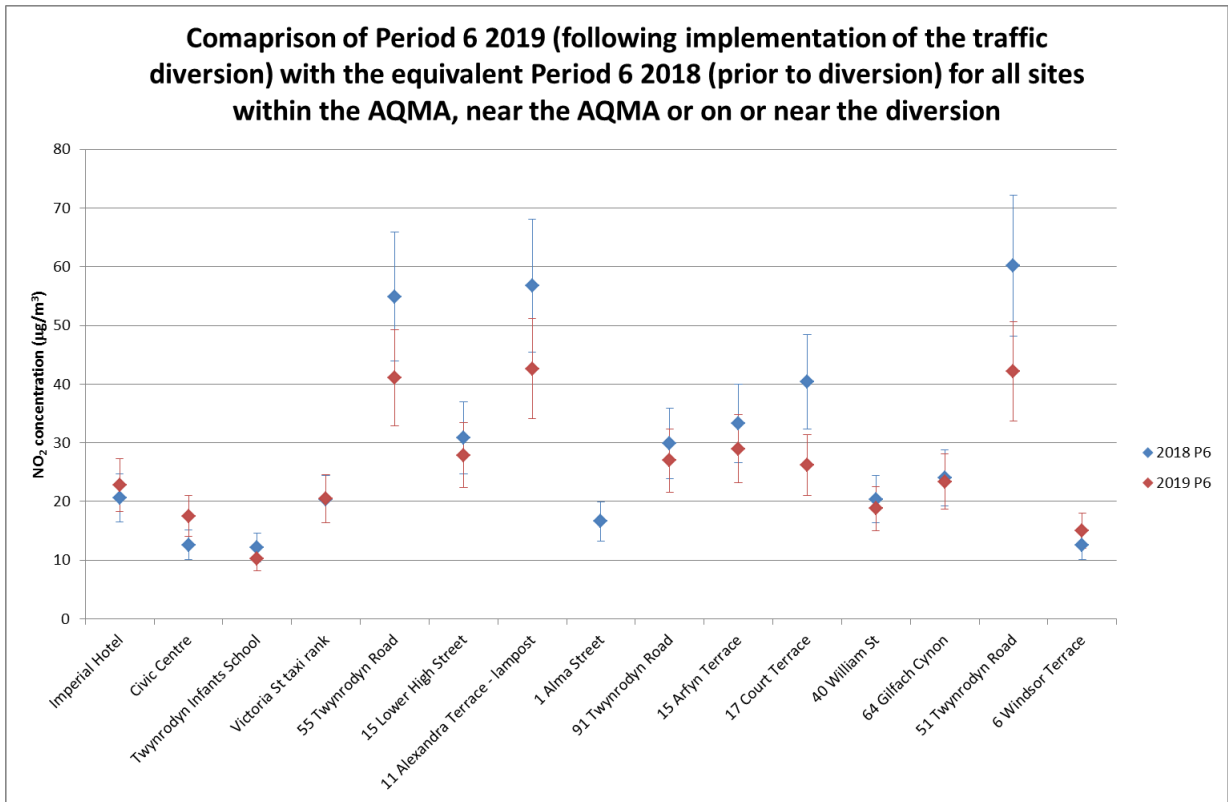


Figure 3.2 – Comparison of Period 6 2019 and Period 6 2018 for all sites within the AQMA

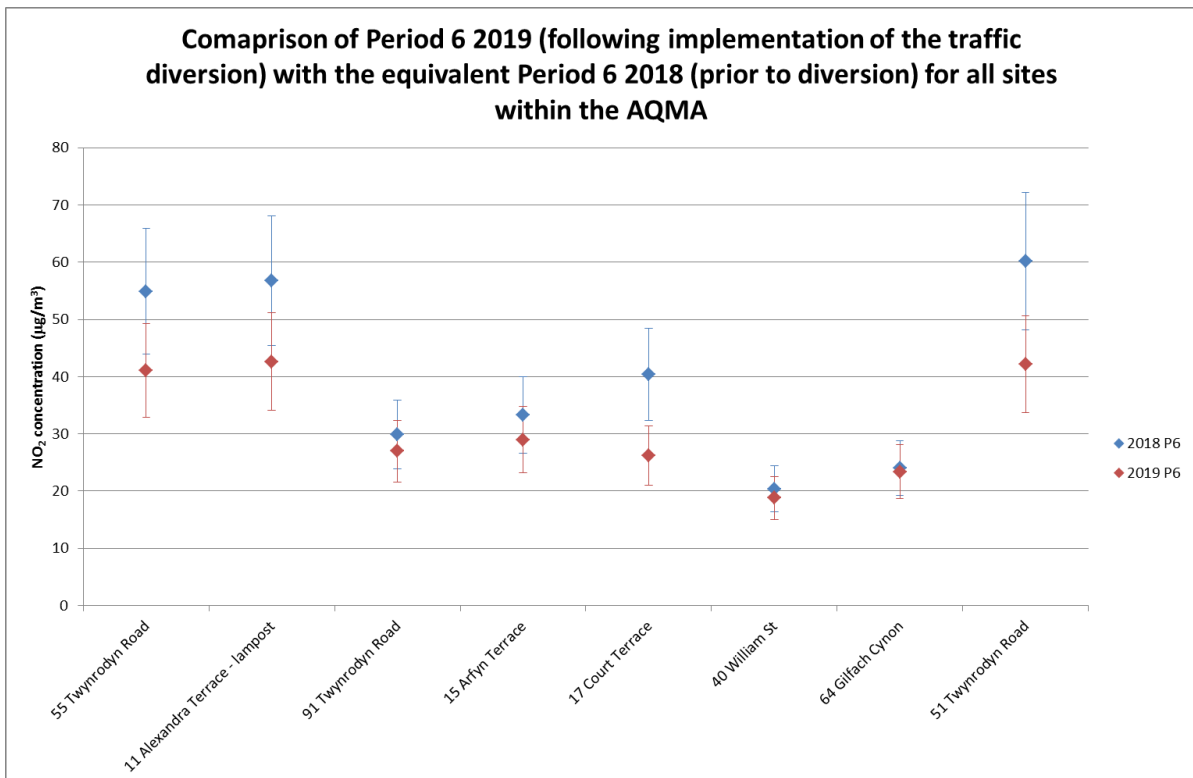
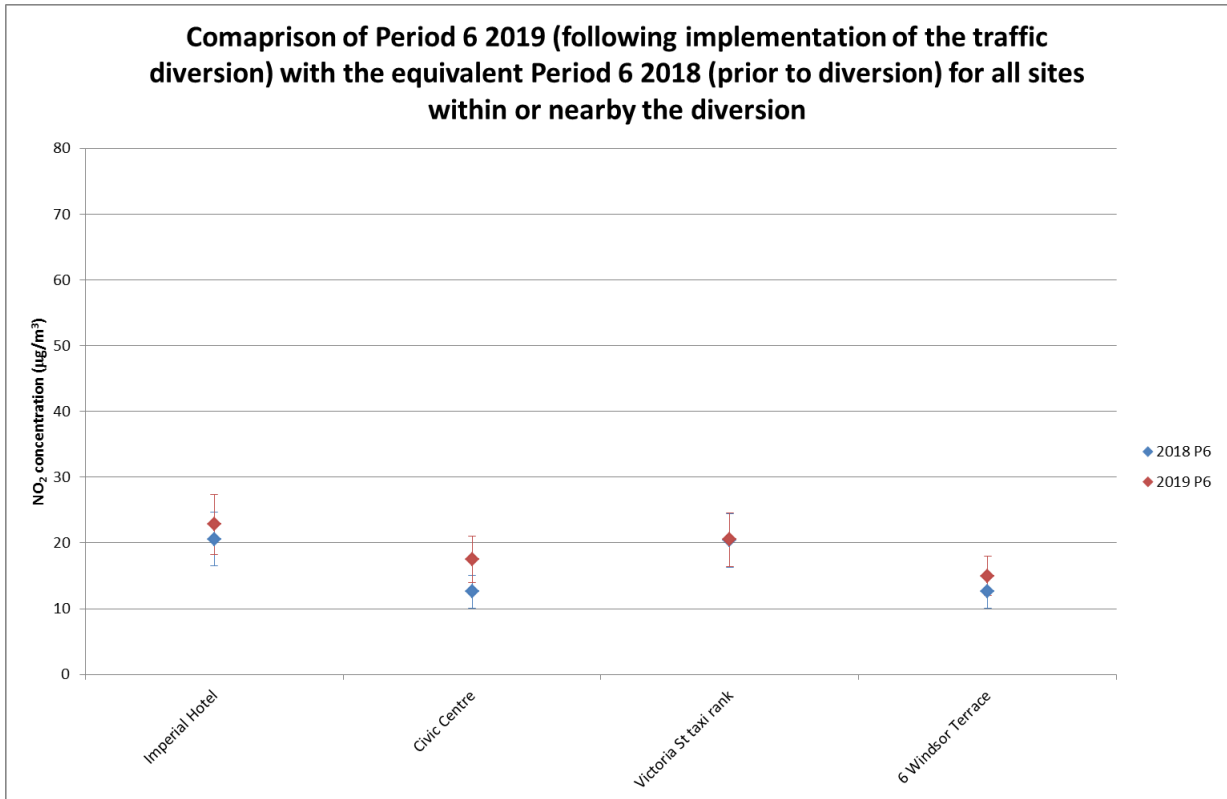


Figure 3.3 – Comparison of Period 6 2019 and Period 6 2018 for all sites within or nearby the diversion



Pontmorlais High Street and Avenue de Clichy

As stated traffic flow has been reversed along Pontmorlais High Street, with the aim of diverting traffic away from Twynyrodyn Road. Due to the potential for canyon effects on Pontmorlais High Street, additional monitoring is being carried out. Anecdotal evidence indicates the reversal has diverted traffic away from Twynyrodyn Road, with MTCBC staff observing fewer traffic queues on Twynyrodyn Road and new traffic queues on Avenue de Clichy during their daily commutes and some congestion at the roundabout at the North end of Pontmorlais High Street. Build-up of traffic on Avenue de Clichy is unlikely to be of public health concern as the West side of the street is bounded by the River Taff, making canyon effects unlikely. On the East side there are a small number of residential flats set back from the road by at least 6.5m, which is a sufficient distance that any deterioration in air quality will remain well below the air quality standard. To provide public reassurance that modelling is correct, a diffusion tube was installed at Caedraw Flats, Avenue de Clichy in August 2019.

As previously stated Pontmorlais High Street may be subject to canyon effects. Modelling predicted an increase in traffic would not result in a breach of the air quality standard, and

diffusion tubes and the ECC have been installed in the area to confirm this. The comparison between periods 6 of 2018 and 2019 gives a snapshot that this assumption is being borne out.

Cardiff Road, Troedyrhiw

The monitoring location at 6/7 Ladysmith Place is along this stretch of the Cardiff Road. The Environmental Health Department met with the Highways and Engineering Department in November 2018 as early indications from 2018 figures, were that the annual mean may get close to the air quality objective, although complete data and bias adjustment was not available. A site visit found a large number of cars turning onto and from Phyllis Street causing traffic build up along Cardiff Road close to the diffusion tube site. Cars were accessing and leaving a small car park to the rear of Troedyrhiw Community Primary School, at school drop-off time and more noticeably at school collection time. There were also some sections of Cardiff Road where parking on one side of the street caused traffic to move slowly. In order to prevent the possible declaration of an additional AQMA a temporary one way system for operated for 4 weeks in December 2018 and early January 2019. The annual mean was below $36\mu\text{g}/\text{m}^3$. Results in November, prior to the one way system, and December with the one way system were the same, when an increase would normally be expected due to seasonal factors. This shows if in future the annual mean AQS objective for NO_2 were approached or exceeded a one way system of access to the car park could be considered as part of a range of solutions. As the bias adjusted figures were below the annual mean there is no need to implement a permanent solution at this time. On the basis of observing bottle necks around 6/7 Ladysmith Place additional diffusion tubes have been placed in the area to gather a better picture of where any potential hotspots of air pollution occur.

Roads with significantly changed traffic flows

Trago Mills Development, Swansea Road

The Trago Mills development opened on 21st April 2018. The development is a £40 million 30,250m² retail development and includes 38 retail departments, leisure facilities and is likely to include a petrol station in the near future.

In April 2017 MTCBC opened a new diffusion tube location on Swansea Road to gather information on background levels, prior to the proposed 2018 opening. Existing NO₂ was found to be 17.02µg/m³. In 2018 this had increased to 20.00µg/m³. This remains well below the annual mean AQS objective. Trago Mills has proven less popular than expected so has not significantly increased traffic in the area.

This tube is being kept open as this may change as Trago Mills opens further leisure facilities and the possible petrol station. They are known to heavily discount fuel attracting a large number of customers. Swansea Road may also be affected by diversions along the A470 as works to dual the A465 Heads of the Valleys Road reach Merthyr Tydfil.

A465 Heads of the Valleys and Surrounding Roads

There is an ongoing project to convert sections of the A465 Heads of the Valleys Road to dual carriageway. Following works between Fochriw and Abergavenny, it is anticipated work will start on the A465 in Merthyr Tydfil in late 2019 and could go on until 2022. This will result in slowed traffic on the A465 and the use of diversions through the Dowlais and Twynyrodyn areas through town, to re-join the A465 from the A470. Traffic will be increased on the A470 where diversions will join at Rhyd-y-car and by Cyfarthfa Retail Park to re-join the A465 at Cefn Coed. It is likely during such diversions, NO₂ will increase along the diversionary routes. As this is temporary, MTCBC are not considering any actions to reduce NO₂ in the affected areas for the time being. Different diversions are predicted to last for up to 6 months. This policy of no action will be reviewed if diversions and consequent deterioration in air quality are more significant or of longer duration than anticipated.

3.2 Industrial / Fugitive or Uncontrolled Sources / Commercial Sources

There are no other industrial sources identified since the previous Progress Report.

3.3 Planning Applications

Merthyr Tydfil Bus Station Development

MTCBC has had planning permission to build a new bus station at Swan Street, Merthyr Tydfil for a number of years. Modelling in 2015 at the time of application indicated it was not anticipated to result in any breach of any AQS objectives. However the Environmental Health Department had some concerns over the quantity of diffusion tube data and its lack of cold weather data, and the quality of road traffic data used in the model. An agreement was reached that when the bus station opened 4 tubes would be installed in the surrounding area to check the model's real world performance. Site development has been slow due to funding and the level of site clearance. However development has now begun. On 15th July 2019 construction of the bus station commenced with an estimated build time of 18 months. Environmental Health will continue to monitor this and install diffusion tubes to monitor NO₂ in the run up to the bus station coming into use.

Other planning matters

Planning applications have been for small scale developments and this is expected to continue. These are scattered at various locations throughout the district. They are not considered likely to have a significant effect on air quality.

The Environmental Health Department have commented in the Local Development Plan 2018. Some of the proposed developments are accessed via Twynyrodyn Road, and planning conditions will be used to limit the impact any development can have on the AQMA.

The Local Development Plan includes a large development on the former Hoover Factory site. This will be up to 800 houses, and is also intended to include public transport. Planning conditions may be used to offset the effect on air quality of an increased number of cars, such as charging points for electric vehicles.

The Environmental Health Department is considering special planning guidance to allow for mitigation of deterioration in air quality.

3.4 Other Sources

Bonfires occur occasionally, both around November 5th and in domestic gardens. As these occur on an isolated rather than continuous basis they are not considered likely to significantly affect air quality. Some properties have installed domestic wood burners. This is on a scattered and random basis throughout the borough. Due to the scattered nature it is not considered to have significantly affected air quality.

MTCBC has identified the following new or previously unidentified local developments which may impact on air quality in the Local Authority area.

- Pontmorlais High Street and Avenue de Clichy
- Merthyr Tydfil Bus Station development

These will be taken into consideration in the next Annual Progress Report.

Therefore MTCBC will need further consider the implications to local air quality arising from the developments.

4. Policies and Strategies Affecting Airborne Pollution

4.1 Local / Regional Air Quality Strategy

MTCBC have an informal strategy of addressing air quality. We use diffusion tube monitoring and real time monitoring to assess air quality, and produce the relevant annual reports. Changes to the traffic network are regularly considered including whether these necessitate a change to the air quality monitoring network. MTCBC have taken steps to improve air quality by carrying out the traffic reversal on Pontmorlais High Street and Church Street as identified in the AQMA action plan.

At present the Environmental Health Department is considering drawing up a written local air quality strategy that formalises our current approach. It is likely to be published in 2020/2021 due to current workloads and temporary reductions in staffing levels. The strategy will complement the finalised Welsh Government Air Quality Plan, published in November 2018. When produced it will be made available to the public by our website.

4.2 Air Quality Planning Policies

The Local Development Plan 2016-2031 was updated in 2018. Environmental Health provided comments on candidate sites, including on their potential to impact on local air quality. Development includes a small increase in industrial and commercial sites and a significant increase in residential sites, in particular a substantial housing development on the former Hoover site. The size of the Hoover site means that although increased residential use will affect air quality, it offers sustainable travel options being large enough to accommodate a Metro site and/or Park and Ride. The size of modern properties and requirements for roadways and parking mean canyon effects within the development are unlikely offering a degree of protection to residents. As it is likely to be developed in phases by a single large-scale developer this will allow mitigation measures to be considered during the planning process.

Also identified was the conversion of former offices to residential flats, within the town centre. Depending on location this may necessitate expansion of the air quality monitoring

network, however as the town centre is substantially pedestrianised or otherwise restricted the air quality impact is not considered to be a major factor.

The Environmental Health Department has considered the Special Planning Guidance produced by various councils and is considering producing SPG to require mitigation measures to offset some of the deterioration in air quality caused by increased residential use, particularly the introduction of domestic vehicles to an area. This will be explored further when a local air quality strategy is formalised.

4.3 Local Transport Plans and Strategies

MTCBC's local transport plan is as part of the South East Valleys Local Transport Plan, with 4 other councils. These areas make up the capital city region in that they are within commuting distance of Cardiff.

The plan focusses on economic growth both by improving commuting to Cardiff and Newport, and transport to encourage economic growth in other areas, social inclusion through providing transport to disadvantaged areas, and improving environmental quality through safer, healthier and sustainable travel.

The plan considers various other related documents including the Wales Transport Strategy 2008, National Transport Plan 2011 and the Active Travel (Wales) Act 2013. It incorporates the Cardiff Capital Region Metro, a plan to link various modes of transport to improve connectivity between Cardiff and the South East Valleys.

The aim is to offer other modes of transport than driving such as active travel (walking and cycling), regional rail and buses, and highway improvements to ease congestion and assist in freight transport. Aims include integrating active travel and public transport to offer multi-modal alternatives to the car.

To carry out the aims of the LTP, MTCBC is expected to seek funding through sources including the private sector and Welsh Government funds. Under the LTP, MTCBC will be developing the new bus station, and aim to provide a railway Park and Ride scheme serving Pentrebach station, improve pedestrian and cycle access to Merthyr College and Cyfarthfa Retail Park and improve the Taff Trail for active travel. Additionally the LTP covers the

dualling of the A465 Heads of the Valleys Road to improve West-East routes between the South East Wales valleys.

4.4 Active Travel Plans and Strategies

Active Travel aims to improve access for walking, including the use of mobility scooters, and cycling. It addresses routes to schools, workplaces, shops and services such as healthcare and leisure. It does not address walking or cycling for recreational purposes. MTCBC has improved various walking and cycling routes. Within the next 1-5 years new routes will be developed and in 5 or more years routes will be developed or improved subject to feasibility studies.

It is aimed at improving healthier lifestyles and reducing the negative impacts of traffic on neighbourhoods and communities. The aim of improving the active travel routes is to encourage people to swap from car journeys to active travel methods. By reducing the number of journeys made by car, in particular short journeys where car engines have little time to warm up and perform inefficiently, air quality should improve.

4.5 Local Authorities Well-being Objectives

Air pollution is considered in the well-being objectives, specifically in relation to the Twynyrodyn AQMA. There are 4 key areas of well-being: Best start to life; working life; environmental well-being; and living well. Implementation of the action plan to address the Twynyrodyn Road AQMA is a key performance indicator in environmental well-being and a specific project for working life. This is as in addition to affecting air quality congestion affects people's perception of the area and can slow journeys to work.

The key performance indicator set is that NO₂ levels at any diffusion tube along Twynyrodyn Road, should be not more than the current range of 36-48.8µg/m³ prior to 2021 and by 2021 should be <40µg/m³. i.e. Air quality along Twynyrodyn Road should not deteriorate as the action plan is implemented, and by 2021 should have improved to within AQS objectives. This timescale allows for the action plan to be revised and further steps implemented if the first step of reversing traffic flow along Pontmorlais High Street and Church Street to ease traffic flow is insufficient.

The Environmental Health Department reports on progress towards this performance indicator at quarterly scrutiny meetings. Following the traffic reversal on 28th May 2019, Environmental Health will be reporting on the changes in air quality. As bias adjusted data will not be available until 2021 at this stage snapshots such as the change in period 6 between 2018 and 2019 will be all that is available and will be presented with caution as indicative rather than conclusive.

4.6 Green Infrastructure Plans and Strategies

MTCBC does not currently have a Green Infrastructure Strategy. Green infrastructure has been considered in the Local Development Plan, and may need formalising into a strategy in the near future.

4.7 Climate Change Strategies

The well-being objectives cover the need to limit climate change. Low carbon usage contributes towards the objectives of a prosperous Wales and a resilient Wales. The well-being objectives for MTCBC include, under environmental wellbeing, the key performance indicator of carbon management of local authority buildings. Carbon dioxide emissions from local authority buildings reduced from 2016/2017 to 2018/2019 and there are targets to reduce emissions further. This is in order to comply with Welsh Government's plan for the Welsh Public Sector to be carbon neutral by 2030. Current work includes feasibility studies for solar farms within the county borough.

5. Conclusions and Proposed Actions

5.1 Conclusions from New Monitoring Data

The AQS objective for NO₂ continued to be exceeded within the Twynyrodyn Road AQMA, specifically at 51 Twynyrodyn Road and 11 Alexandra Terrace lamp-post. On this basis the existing AQMA should not be revoked. The action plan has been implemented in 2019. The Highways and Engineering Department reversed traffic flow along Pontmorlais High Street. The Environmental Health Department will continue to monitor air quality along Twynyrodyn Road to check the changes in traffic flow are reducing NO₂ concentrations as anticipated. Rough calculations indicate NO₂ along Twynyrodyn Road has decreased, however this is data from a 1 month snapshot (period 6 2018 and period 6 2019), and is not bias adjusted. It has an error of +/-20% which could mean any observed decreases may be artefacts of error inherent to diffusion tubes. As data from period 7 onwards is received the Environmental Health Department will continue to monitor the situation. We will be waiting until 12 months of bias adjusted data post-diversion is available before seeking to revoke the AQMA. This is likely to be 2021.

There were no exceedences outside the AQMA. However some of the monthly NO₂ readings in 2018 were high for 6/7 Ladysmith Square, Troedyrhiw. Site visits showed bottle necks likely to be associated with school pick-ups from a car park to the rear of Twynyrodyn Primary School. On this basis in 2019 MTCBC introduced some additional tubes to Cardiff Road, Troedyrhiw, to further investigate the area.

The tube at Swansea Road will remain in place to monitor the impact of Trago Mills, particularly any further development, however at this time there has not been significant congestion observed, and it is not considered likely the AQS objective would be exceeded as the 2018 annual mean NO₂ concentration is well below the AQS objective.

5.2 Conclusions relating to New Local Developments

Although Cardiff Road is not a new road, it is a new area for investigation. There are concerns based on some of the 2017 and 2018 monthly diffusion tube readings at 6/7 Ladysmith Square that in certain conditions the AQS could be approached. The bottle necks

observed on site visits require further investigation. To monitor the situation in 2019 additional tubes were introduced to the stretch of road in Troedyrhiw where parking on both sides of the road slows traffic flows. A test one way system may have reduced NO₂ in December, which will be taken into consideration if in future action becomes necessary. Trago Mills opened in April 2018 and changes in air quality are monitored using a diffusion at Bron-Gelli, Swansea Road (30). Comparing 2017 and 2018 there has been an increase in NO₂. However the increase is likely to remain within the AQS objective. Trade has been more moderate and steady than expected and the anticipated increase in congestion on the A470 around Trago Mills and Cyfarthfa Retail Park has not been experienced.

The development most likely to have a significant impact on air quality is the dualling project on the A465 Heads of the Valleys Road. The phase of development in Merthyr is expected to start in late 2019 and continue until 2022. At times it will be necessary to close whole sections of the A465 and divert traffic at various times through Dowlais, Twynyrodyn and the Town Centre to re-join the A465 from the A470. This may cause congestion at various pinch points including the Cyfarthfa Retail Park/Trago Mills roundabout and through the AQMA. Each diversion could last a number of months. The impact on air quality may be unavoidable as the scheme to dual to A465 has been assessed as necessary for the long term well-being of Wales. As the effect will be temporary it is not considered necessary to take action at this time. It will be reviewed if any diversions remain in prolonged use or if the public raise health concerns that warrant investigation.

5.3 Other Conclusions

During 2019 the action plan has been implemented, through reversing traffic flow along Pontmorlais High Street and Church Street. It is anticipated that although in 2018 the AQS objective has been exceeded, offering alternatives routes from the town centre, NO₂ levels along Twynyrodyn Road will reduce in 2019.

In the long term the focus of the Local Transport Plan on providing alternatives to the car should improve air quality, as will improvements to the existing vehicle fleet as older vehicles are replaced.

The Environmental Health Department will continue to monitor air quality and will look to produce an air quality strategy, and are considering special planning guidance around air quality. Due to temporary changes in staffing levels in 2019, it is likely these documents will not be finalised until after that date.

5.4 Proposed Actions

The following actions are proposed to address air quality:

- No new AQMAs will be declared in 2019.
- The existing AQMA will not be revoked at this time as the exceedance of the AQS objective for annual mean NO₂ remains. When bias adjusted data from 2019 is available this may be reconsidered, although 12 months bias adjusted data post-traffic reversal will not be available until 2021. In order to revoke the AQMA MTCBC would need to be satisfied the action plan had been proven to be successful and to have long term effects.
- Monthly monitoring data to date from 6/7 Ladysmith Square indicates that although bottle necks exist the NO₂ concentrations at this site remain within the AQS objective. Additional monitoring at Brookfield Place will be used to check the bottle necks are not having an effect at other locations on Cardiff Road, specifically in the area of parked cars at Tydfil Terrace opposite narrowing the road.
- When construction of the Bus Station Development is near complete diffusion tubes will be installed in anticipation of its opening. They will remain in place for a period of at least 3 years.
- In 2020 when, after a period of maternity leave, the lead officer for Air Quality returns, the department will look to produce strategies and policies, in particular focussing on collaboration with other departments to take a proactive stance in preventing or minimising the effects of air pollution.

References

Title	Author	Date
Prince Charles Hospital, Merthyr Tydfil Detailed Assessment of Air Quality	AEA for MTCBC	2011
Particulate Measurement at Twynyrodyn Primary School Monitoring Site - 2015 Data	AQ Data Services for Miller Argent (South Wales) Ltd	2016
Detailed Assessment of Air Quality at Twynyrodyn Road, Merthyr Tydfil	AQC for MTCBC	2009
South East Valleys Local Transport Plan	Blaenau Gwent CBC, Caerphilly CBC, Merthyr Tydfil CBC, Rhondda Cynon Taff CBC and Torfaen CBC	2015
Local Air Quality Management – Technical Guidance (LAQM TG(16))	DEFRA	2016
National Diffusion Tube Bias Adjustment Factor Spreadsheet (03/19)	DEFRA	2019
Local Air Quality Management Technical Guidance (TG16)	Defra	2018
LAQM Helpdesk February 2019: Summary of laboratory performance in AIR NO ₂ proficiency testing scheme April 2017 – February 2019	LAQM	2019
First Stage Review and Assessment	MTCBC	1998
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Detailed Assessment of Air Quality at Twynyrodyn Road, Merthyr Tydfil	MTCBC	2015
Updating and Screening Assessment	MTCBC	2015
Progress report	MTCBC	2016
Progress report	MTCBC	2017
Annual Report	MTCBC	2018
Active Travel Policy	MTCBC	2017
First replacement Local Development Plan 2016-2031	MTCBC	2018
Focus on the future: Wellbeing in our community 2017-2022	MTCBC	2018
Wellbeing of Future Generations (Wales) Act 2015	Welsh Government	2015

Appendices

Appendix A: Monthly Diffusion Tube Monitoring Results

Appendix B: A Summary of Local Air Quality Management

Appendix C: Air Quality Monitoring Data QA/QC

Appendix D: AQMA Boundary Maps

Appendix E: ECC Meteorological data, NO₂ and O₃ 15-minute readings

Appendix A: Monthly Diffusion Tube Monitoring Results

Table A.1 – Full Monthly Diffusion Tube Results for 2017

Site ID	NO ₂ Mean Concentrations (µg/m ³)													Annual Mean		
	Period 1 11/01/18 - 07/02/18	Period 2 07/02/18 - 08/03/18	Period 3 08/03/18 - 04/04/18	Period 4 04/04/18 - 03/05/18	Period 5 03/05/18 - 08/06/18	Period 6 06/07/18 - 02/08/18	Period 7 06/07/18 - 02/08/18	Period 8 02/08/18 - 11/09/18	Period 9 11/09/18 - 12/10/18	Period 10 12/10/18 - 31/10/18	Period 11 31/10/18 - 10/12/18	Period 12 10/12/18 - 08/01/19	Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)	
1	30.8	30.6	24.6	29.2	19.9	20.6	22.8	25	23.5	33	30.6	37.3	27.3	20.8	20.8	
2	23.8	23.7	20	22.5	15.2	12.6	16.7	19.1	9.9	26.3		29.6	19.9	15.2	15.2	
3	17.2	14.5	13.5	15.7	12.2	12.2	9.6	11			18.1	16.6	14.1	10.7	10/7	
4	36.1		82.5	33.7	35	30.8	28.3	28.1	26.6	42.1	37.6	42.9	38.5	29.3	29.3	
5	29.7	27	22	23.8	17.9	16.6	17.7	21.1	20.1	31.9	25.6	31.6	23.8	18.1	18.1	
6	24.4	25.9	19.6	21.6	15.7	14.6	15	18	17	25.2		28.2	20.5	15.6	15.6	
7	43.4	53.5	43.1	46.1	47.3	51.1	37.6	43.2	38.1	48.9	44.8	51	45.7	34.7	34.7	
8	35.1	34.3	29.3	28.9	21.6	20.4	19	24.5	22.5	37.5	13.5	35.2	26.8	20.4	20.4	
9	15.9	20.5	12	12.7	9.4	9.5	6.6	9	6.6	16.6	18.6	19.9	13.1	10.0	10.0	
10	23.7	26	17.2	20.1	14.5	15.3	13.6	17.6	15.9	27.5	25.9	56.1	22.8	17.3	17.3	
11	48.2	49.3	50.7	58.7	56	56.8	48.1	52	46.8	68.2	45.1	57.1	53.1	40.3	34.7	
12	30.1	37.1	31.3	36	26.3	31.3	26.3	26.2	25.9	33.5	30.7	32.9	30.6	23.3	23.3	
13	43.3	33.1	37.2	48.3	35	36.8	36.2	32.9	35.4	48.2	45	51.9	40.3	30.6	30.6	
14	58.4	55.2	48.1	56	41.4	54.9	43.7	49.8	40.3	63.6	52.9	60.7	52.1	39.6	39.6	
15	20.4	20.6	14.5	16.3	11.87	11.8	11	12.9	12.6	18.1	19.1	23.4	16.0	12.2	12.2	
16	17.7	19.5	13.5	17.2	14.4	11	10.9	14.3	14.3	19.3	17	21.3	15.9	12.1	12.1	
17	34.5	45.4	43.7	42.9	44.9	47.2	36.8	41.5	37.4	58.1	39.5	49.4	43.4	33.0	33.0	
18	37.7	40.9	34.3	37.4	29.9	29.9	31.2	30.9	29.8	39.3	34.5	39	34.6	26.3	26.3	
19	32.8	30.4	21.6	27.5	20	20.4	18.8	26.3	23.1	35.4	29	35.3	26.7	20.3	20.3	

Site ID	NO ₂ Mean Concentrations (µg/m ³)												Annual Mean		
	Period 1 11/01/18 - 07/02/18	Period 2 07/02/18 - 08/03/18	Period 3 08/03/18 - 04/04/18	Period 4 04/04/18 - 03/05/18	Period 5 03/05/18 - 08/06/18	Period 6 06/07/18 - 02/08/18	Period 7 06/07/18 - 02/08/18	Period 8 02/08/18 - 11/09/18	Period 9 11/09/18 - 12/10/18	Period 10 12/10/18 - 31/10/18	Period 11 31/10/18 - 10/12/18	Period 12 10/12/18 - 08/01/19	Raw Data	Bias Adjusted (factor) and Annualised (1)	Distance Corrected to Nearest Exposure (2)
20	38.5	47.8	40	40.9	39.7	40.4	28.2	29.9	29.2	47.1	37.1	45	38.7	29.4	29.4
21	65.8	65.2	58.1	60	58.2	60.2	52.4	79.9	50.7	76.8	49.7	65.4	61.9	47.0	47.0
22	43.3		37.8	41.7	29.7	33.3	34.8	36.2	32.8	41.4	41.4	49.9	38.4	29.2	29.2
23	29.4	34	31.1	32.9	26.2	24.1	21.8	22.7	24.5	36.4	32.4	36.9	29.4	22.3	22.3
24	33.4	37.5	28.2	30.1	24.3	24	22.6	25.8	28.1	40.1	36.7	43	31.2	23.7	23.7
25	30.1	30.4	21.6	21.4	19.2	16.9	14.5	18	18.6	30.7	25.1	32.5	23.3	17.7	17.7
26	28.5	30	22.7	23.8	18	18.8	15.9	18.8	18.8	27.7	24.6	31.2	23.2	17.7	17.7
27	18.6	22.9	16.4	19.2	13.5	12.6	11.2	14.4	14.8	21.9	19	26.9	17.6	13.4	13.4
28	24.3	25	15.7	20.7	16.2	16.7	15.8	18.5	18.3	29.3	23	28	21.0	15.9	15.9
29	52.1	54.6	43	50.4	38.1	35.2	34.7	43.6	43.4	54.5	48	48	52.1	39.6	39/6
30	26.2	32.8	26.6	29.7	21.3	21.9	20.7	19.7	21.5	32.5	33	29.5	26.3	20.0	20.0

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**.

(1) See Appendix C for details on bias adjustment and annualisation.

(2) Distance corrected to nearest relevant public exposure.

Appendix B: A Summary of Local Air Quality Management

Purpose of an Annual Progress Report

This report fulfils the requirements of the Local Air Quality Management (LAQM) process as set out in the Environment Act 1995 and associated government guidance. 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 being achieved. Where exceedances occur, or are likely to occur, the local authority must then declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) within 18 months of declaration setting out the measures it intends to put in place in pursuit of the objectives. Action plans should then be reviewed and updated where necessary at least every 5 years.

For Local Authorities in Wales, an Annual Progress Report replaces all other formal reporting requirements and have a very clear purpose of updating the general public on air quality, including what ongoing actions are being taken locally to improve it if necessary.

Air Quality Objectives

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138), Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298), and are shown in Table B.1.

The table shows the objectives in units of microgrammes per cubic metre $\mu\text{g}/\text{m}^3$ (milligrammes per cubic metre, mg/m^3 for carbon monoxide) with the number of exceedances in each year that are permitted (where applicable).

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Table B.1 – Air Quality Objectives Included in Regulations for the Purpose of LAQM in Wales

Pollutant	Air Quality Objective		Date to be achieved by
	Concentration	Measured as	
Nitrogen Dioxide (NO ₂)	200µg/m ³ not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40µg/m ³	Annual mean	31.12.2005
Particulate Matter (PM ₁₀)	50µg/m ³ , not to be exceeded more than 35 times a year	24-hour mean	31.12.2010
	40µg/m ³	Annual mean	31.12.2010
Sulphur dioxide (SO ₂)	350µg/m ³ , not to be exceeded more than 24 times a year	1-hour mean	31.12.2004
	125µg/m ³ , not to be exceeded more than 3 times a year	24-hour mean	31.12.2004
	266µg/m ³ , not to be exceeded more than 35 times a year	15-minute mean	31.12.2005
Benzene	16.25µg/m ³	Running annual mean	31.12.2003
	5µg/m ³	Annual mean	31 12 2010
1,3 Butadiene	2.25µg/m ³	Running annual mean	31.12.2003
Carbon Monoxide	10.0mg/m ³	Maximum Daily Running 8-Hour mean	31.12.2003
Lead	0.25µg/m ³	Annual Mean	31.12.2008

Appendix C: Air Quality Monitoring Data QA/QC

Diffusion Tube Bias Adjustment Factors

Diffusion tubes may systematically under- or over-read NO₂ concentrations compared to a chemiluminescent analyser. This is known as bias and can be adjusted for using a suitable bias adjustment factor. Applying a bias adjustment factor improves the accuracy of the data. Merthyr Tydfil County Borough Council does not undertake any co-location studies and as such applies a National bias adjustment factor.

The National bias adjustment factor applied was obtained from National Diffusion Tube Bias Adjustment Factor Spreadsheet: Spreadsheet Version Number: 03/19. This is the most up to date version of the spreadsheet at the time of writing. The tubes used are supplied and analysed by Socotec. They are analysed using 50% TEA in acetone. 30 co-location studies were undertaken in England and Wales in 2017, and an overall bias adjustment factor of 0.77 was obtained as shown in the abstract below.

National Diffusion Tube Bias Adjustment Factor Spreadsheet							Spreadsheet Version Number: 03/19			
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 2019			
Data only apply to tubes exposed monthly and are not suitable for correcting individual short term monitoring periods							L5224 Helpdesk, 03030			
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 ⁵ 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.		If you have your own co-location study then see footnote ⁶ . If uncertain what to do then contact the Local Air Quality Management Helpdesk at LAQMHelpdesk@uk.bureauveritas.com or 0800 0327953				
Analysed By ¹	Method ²	Year ³	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 ⁴	Bias Adjustment Factor (A) (Cm/Dm)
SOCOTEC Didcot	50% TEA in acetone	2018	R	Cambridge City Council	12	42	30	40.2%	G	0.71
SOCOTEC Didcot	50% TEA in acetone	2018	R	Canterbury City Council	11	38	28	35.8%	G	0.74
SOCOTEC Didcot	50% TEA in acetone	2018	UB	Canterbury City Council	12	16	12	36.3%	G	0.73
SOCOTEC Didcot	50% TEA in acetone	2018	R	Hambleton District Council	12	21	18	20.8%	G	0.83
SOCOTEC Didcot	50% TEA in acetone	2018	R	Ipswich Borough Council	12	34	29	17.9%	G	0.85
SOCOTEC Didcot	20% TEA in water	2018	KS	South Lakeland District Council	12	38	22	70.0%	G	0.59
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	12	41	27	54.2%	G	0.65
SOCOTEC Didcot	50% TEA in acetone	2018	UB	City of York Council	11	22	15	52.0%	G	0.66
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	12	34	26	30.8%	G	0.76
SOCOTEC Didcot	50% TEA in acetone	2018	R	City of York Council	11	30	23	32.9%	G	0.75
SOCOTEC Didcot	50% TEA in acetone	2018	R	Dumfries and Galloway Council	12	36	30	19.8%	G	0.83
SOCOTEC Didcot	50% TEA in acetone	2018	R	Knowsley MBC	12	47	38	26.5%	G	0.79
SOCOTEC Didcot	50% TEA in acetone	2018	R	Suffolk Coastal DC	11	44	33	32.4%	G	0.76
SOCOTEC Didcot	50% TEA in acetone	2018	R	Thanet District Council	10	26	21	25.4%	G	0.80
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	11	33	23	42.2%	G	0.70
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	12	33	29	17.2%	G	0.85
SOCOTEC Didcot	50% TEA in acetone	2018	R	Horsham District Council	12	30	26	16.1%	G	0.86
SOCOTEC Didcot	50% TEA in acetone	2018	UB	Slough Borough Council	10	38	31	25.6%	G	0.80
SOCOTEC Didcot	50% TEA in acetone	2018	SU	Slough Borough Council	11	32	22	46.7%	G	0.68
SOCOTEC Didcot	50% TEA in acetone	2018	R	Slough Borough Council	11	39	32	22.5%	G	0.82
SOCOTEC Didcot	50% TEA in acetone	2018	R	Vale of Glamorgan	12	39	25	57.8%	G	0.63
SOCOTEC Didcot	20% TEA in water	2018	KS	Marylebone Road Intercomparison	9	96	87	9.6%	G	0.91
SOCOTEC Didcot	50% TEA in acetone	2018	KS	Marylebone Road Intercomparison	9	95	87	9.1%	G	0.92
SOCOTEC Didcot	20% TEA in water	2018		Overall Factor⁵ (2 studies)					Use	0.74
SOCOTEC Didcot	50% TEA in acetone	2018		Overall Factor⁵ (21 studies)					Use	0.76

Factor from Local Co-location Studies

None - no co-location studies are currently undertaken by Merthyr Tydfil County Borough Council. Although there is a continuous ECC NO₂ monitor collocated with 1 diffusion tube at

55 Twynirodyn Road, the monitor is not suitable for a colocation study in that it is not a chemiluminescent monitor as specified in best practice.

Discussion of Choice of Factor to Use

A national Bias Adjustment Factor has been used for the following reasons:

- There are currently no co-location studies undertaken in accordance with best practice in Merthyr Tydfil County Borough.
- The sites listed in the Bias Adjustment Factor spreadsheet are in generally comparable locations and;
- The diffusion tube mean concentrations measured at significant Merthyr sites are within the range of results obtained from the specified national co-location sites;

Although there are general similarities between the sites there are also some significant differences. The derived bias adjustment factor is therefore used with a degree of caution.

PM Monitoring Adjustment

Instrument Service Routine

Main QA and QC procedures for the Thermo Fisher TEOM analysers are carried out at the routine service visits, normally carried out at 6 monthly intervals by AQ Data Services.

Filter Change Procedures

At each site visit for exchange of the TEOM filters, a routine of record keeping has been established whereby the analyser operating parameters (flow, temperatures etc.) are recorded before and after the filter change. This gives a reference datum of instrument performance at that time, and can often give good information on flows beginning to drop off etc., which can assist in arranging call-out of support engineers thereby preventing down time for the analyser.

Data Collection / Storage

Analog outputs from the 2 TEOM analysers are fed to the data logger system. To ensure correct analog to digital conversion, periodic checks are made to compare the data stored within the system against the internal data storage within each of the TEOM analyser control units.

Data Management

Data is downloaded from the data logger system using the Enview2000 data management system. The data is initially “screened” to remove obvious spikes (both negative and positive spikes) caused by electrical disruption, after filter change, after analyser start-up etc.

PM Monitoring Adjustment

Equivalence Testing has shown that the TEOM can under read possible losses of volatile material from the TEOM filter.

Data can be corrected for the loss of volatiles by applying the King’s College London Volatile Correction Model – a spreadsheet for Correction. The VCM takes FDMS purge measurements from the two nearest FDMS equipped TEOM analysers, and an average of all the other FDMS purge measurements within 130 km. The two nearest sites are Port Talbot AURN at Margam Fire Station and Newport AURN. More information on the VCM can be found at <http://www.volatile-correction-model.info/>.

At the time of writing data from the FDMS purge measurements used had been ratified and the PM₁₀ and PM_{2.5} data should be considered reliable.

Short-Term to Long-Term Data Adjustment

The site that needed adjustment from a period mean to an annual mean was the ECC automatic monitor. There were significant gaps in the data at the start and end of the year, when the sensors failed and were replaced. There were also some periods of intermittent signal so some data was not collected. The 3 nearest suitable sites were identified as chemiluminescent monitors in Caerphilly Hafod-yr-Ynys (98.5% data capture), Cwmbran (99.3% data capture) and Swansea Roadside (98.7% data capture). Ideally 3 urban background monitors would have been selected, however there was only 1 urban background monitor (Cwmbran) with suitable data capture. On advice from the Air Quality Helpdesk the 2 roadside sites were selected on the basis of their high levels of data capture. A suitable period of continuous data from the ECC was identified as from 10/01/18 – 24/01/18, and this was matched with monitoring from the chemiluminescent monitors to obtain relevant period means.

The period mean for the ECC for this time was 52.7µg/m³, and based on an AM:PM ratio of 1.26, this gave an annual mean of 39.9µg/m³.

Table C.1 – Short-Term to Long-Term Monitoring Data Adjustment

Site	Site Type	Annual Mean (µg/m ³)	Period Mean (µg/m ³)	Ratio
Caerphilly Hafod-yr-Ynys	Roadside	62.4	81.9	0.762
Cwmbran	Urban background	12.7	17.0	0.745
Swansea Roadside	Roadside	23.5	30.8	0.764
Average				0.757

QA/QC of Automatic Monitoring

The ECC is manufactured by Air Monitors UK. The model is the AQMesh Pod. It was first produced in 2013 and has been through regular upgrades to improve performance.

The ECC is tested and calibrated by the manufacturer. In laboratory conditions accuracy is ±5ppb. It is designed with a sensor life and battery life of 2 years. After 2 years the battery and sensors should be replaced. It has also been discovered recently that the sensors can fail in cold and damp conditions, and this should be checked for to enable fast replacement and to minimise data loss.

Colocation studies have been carried out against reference methods such as the chemiluminescent monitor. The correlations are variable, with v4.2 in 3 trials giving correlation of 0.70, 0.81 and 0.89. This shows the device should be used for indications of variations in NO₂, rather than as an accurate NO₂ concentration.

Once installed on site there is a short period of stabilisation as the ECC adjusts to environmental conditions. During the 2-year lifespan of the sensors and battery no further calibration is required. Performance may be affected after 2 years.

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When re-installed in 2016 the device was collocated with 2 diffusion tubes and could be checked for significant differences. It was generally within 10% of diffusion tubes, with a tendency to under-read. Looking at the pattern between 2014 and 2018 with Tube 14 – 55 Twynyrodyn Road only it has fluctuated between over-reading by +14% and under-reading by -17%. On the basis of it not being the recognised continuous monitoring technique and its periods of prolonged downtime it is regarded as an indicator of temporal fluctuations, and we will continue to use bias adjusted diffusion tubes as the key mechanism for establishing the annual mean NO₂ concentration.

QA/QC of Diffusion Tube Monitoring

Diffusion tubes were manufactured and analysed by Socotec. The absorbant is analysed for NO₂ concentration using 50% TEA in acetone. Diffusion tubes were kept and used in accordance with the manufacturer's instructions, and were left out for a minimum of 4 weeks.

Precision is the ability of a measurement to be consistently reproduced. Diffusion tubes are defined as having good precision when the coefficient of variation between triplicate tubes is <20% for eight periods out of 12, and <10% overall. In 2018 good precision was found in 23 out of 23 co-location studies. As such the precision for the diffusion tubes used in Merthyr Tydfil County Borough in 2018 is likely to be good.

Socotec participates in the AIR PT NO₂ proficiency testing, an independent scheme supported by the Health and Safety Laboratory (HSL). It uses artificially spiked Palmes type diffusion tubes on a quarterly basis to determine a laboratory's analytical performance. Tubes are doped with a known amount of nitrate to determine accuracy, with at least two of the tubes being duplicates, to determine laboratory performance. A different mass of nitrate is used each quarter and reflect the typical analytical range encountered in NO₂ monitoring in the UK. From this a performance score (z-score) is generated based on deviation between the known concentration and the value measured by the laboratory. Laboratories with 19 out of 20 (95%), from 5 rounds of testing, z-scores of $\leq \pm 2$ provide satisfactory performance. For the quarters from January – February 2018 to January – February 2019, Socotec for

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97.5% of testing achieved z-scores within this range. This is above 95%, the threshold for a laboratory to be considered satisfactory, and as such the results are regarded as satisfactory.

Appendix D: AQMA Boundary Maps

Figure D.1



Appendix E: ECC Meteorological data, NO₂ and O₃ 15-minute readings

The data is available on request.

Glossary of Terms

Abbreviation	Description
AQ	Air quality
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the LA 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
AQS	Air quality standard
APR	Air quality Annual Progress Report
AURN	Automatic Urban and Rural Network (UK air quality monitoring network)
CO	Carbon monoxide
DA	Detailed assessment
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
ECC	Electrochemical cell
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
mg/m ³	Milligrams of the pollutant per cubic metre of air
µg/m ³	Micrograms of the pollutant per cubic metre of air
MTCBC	Merthyr Tydfil County Borough Council
NO	Nitric oxide
NO ₂	Nitrogen Dioxide
NO _x	Nitrogen Oxides

O ₃	Ozone
PM ₁₀	Airborne particulate matter with an aerodynamic diameter of 10µm (micrometres or microns) or less
PM _{2.5}	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SPG	Special planning guidance
SO ₂	Sulphur Dioxide
TEOM	Tapered element oscillating microbalance
TRO	Traffic Regulation Order
USA	Updating and Screening Assessment
WAQF	Welsh Air Quality Forum